THE NEW VALUE FRONTIER

KYOCERA

2016-2017 KYOCERA

Cutting Tools

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ADVANCING PRODUCTIVITY

TZE01005

THE NEW VALUE FRONTIER

KYOCERA

Continuously creating new value at the cutting edge of technology

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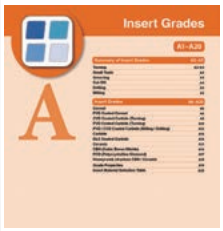

A1

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B4

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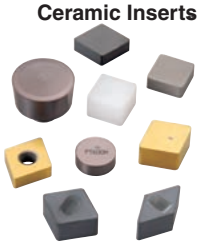
B97

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F2

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NEW

F4

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F63

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G6

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NEW

G12

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G21

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G23

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G45

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Advancing your productivity though efficient cutting tool products and advanced tooling solutions.

ADVANCING PRODUCTIVITY

KYOCERA Cutting Tools

Face Grooving (KGDF) (Separate type)

G78

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H6

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H12

Threading TF series

J4

Small Tools Threading KTKF

J5

NEW
MagicDrill DRA

K4

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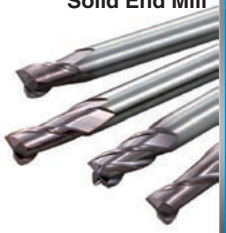
K34

Solid End Mill

L1

Milling Inserts

M10

High Efficiency Mill MFPN

M26

Double-Side 4-Edge Insert, Newly Developed End Mill MEW

M52

Helical End Mill MEWH

M76

Double-Side 6-Edge Insert, 90° Cutter MFWN

M88

NEW
MFH High Feed Cutter

M114

Multi-Function End Mill MEY

M134

Slot Mill MST

M140

NEW
High Efficiency Radius Cutter with Multiple-edge

M168

NEW
Low Cutting force Radius Cutter MRX

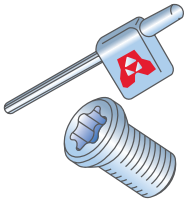
M174

End Mill
Ball-Nose
Chamfering
Bolt Countersink
T-Slot

M166,M186

Tools for Turning Mill HSK Shank

N1

Spare Parts

P1

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THE NEW VALUE FRONTIER

KYOCERA

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Kyocera Cutting Tools

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Safety Notes for Cutting Tools

1. Introduction

Kyocera has put a “caution” or a “warning” label on the package of the cutting tool products, but it is not on the tool itself.
Before using and handling any cutting tool products and cutting tool materials, be sure to read this guideline so they are used correctly.
Also, as part of your safety education, please make sure to familiarize all of your actual operators with the contents of this guideline.

2. Basic Information for Cutting Tool Materials

2-1. Technical Terms

Cutting Tool Material: Terminology for cutting tool materials, such as Cemented Carbide, Coated Carbide, Cermet, Coated Cermet, Ceramics, CBN and PCD
Carbide Material : Cemented Carbide with WC (Tungsten Carbide) as the main component

2-2 Physical Properties

Appearance: Depends on materials. (e.g. Gray, Black, Gold, etc.)
Smell : None
Hardness : Carbide / Cermet 5 ~ 30GPaHV, Ceramic 10 ~ 40GPaHV
CBN 20 ~ 50GPaHV, PCD 80 ~ 120GPaHV
Sp. Gr. : Carbide 9 ~ 16, Cermet 5 ~ 9, Ceramic 2 ~ 7, CBN / PCD 3 ~ 5

2-3 Composition

Carbide, Nitride, Carbon-nitride and Oxide with W, Ti, Al, Si, Ta, B, etc. and additionally, metals such as Co, Ni, Cr, Mo are included in some cutting materials.

3. Notes for Handling Cutting Tool Materials

- These cutting tool materials are very hard, but also brittle. Therefore, they may brake by shock or excessive clamp force.
- Carbide base material, in particular, can be very heavy. Handle with care when transferring and storing large size products or large quantities as heavy load.
- Carbide base material has a different rate of thermal expansion to that of normal metals. When brazing the cutting tool material, use the proper temperature to prevent the tool from breaking.

4. Notes for Cutting Tools

- The cutting edge is very sharp; wear gloves when handling or installing tools to prevent injury.
- When cutting, cutting tools may brake due to shock, excessive tool wear or improper conditions.
  It is essential to wear protective clothing such as safe guards, safety eyeglasses, and gloves to prevent injury.
- Depending on workpiece material and cutting conditions, sparks or fire may occur. Use protective material such as safe guards, safety eyeglasses and gloves.
- When cutting, flying chips or metal pieces may be dangerous. Use protective materials such as safe guards and safety eyeglasses to prevent injury.

Safety Notes for Cutting Tools

Precaution for using cutting tools

Target Products	Precariousness	Countermeasures
General Cutting Tools	○ Direct touch to a sharp cutting edge may cause injury.	* When you set up tools to the machine or take tools out of the case, please wear protective gloves.
	○ Misuse or inappropriate working conditions may cause tool breakage or dispersion of broken pieces.	* Please use safety items, such as safety glasses and protective gloves. * Please use in the range of our recommended cutting condition. See our catalog or instruction manuals.
	○ Excessive impact or heavy wear will increase cutting force and may cause tool breakage and dispersion of broken pieces.	* Please use safety items, such as safety glasses and protective gloves. * Early exchanging tools is prefereable.
	○ Dispersion of heated or prolonged chips may cause injury or burn.	* Please use safety items, such as safety glasses and protective gloves. * For chips removal, please stop the machine beforehand and use safety items, such as safety glasses and protective gloves.
	○ Tools and materials reach high temperatures during cutting operation. Direct touch to the tools and materials shortly after cutting may cause burn.	* Please prepare safety items, such as safety glasses and protective gloves.
	○ Sparks, generation of heat or chips in high temperature during operation may cause fire.	* Please do not operate around Hazardous zone, in which there is some possibility of fire or explosion. * In case of using oil-coolant, please make sure there is sufficient fire-protection equipment.
	○ Lack of dynamic balance during high-speed revolutions leads to vibrations which can make the tool break.	* Please use safety items, such as safety glasses and protective gloves. * Please conduct test-operation before cutting, and confirm that there is no vibration or unusual sound.
	○ Direct touch to burrs which were generated on the rough surface of the workpiece may cause injury.	* Do not touch workpiece with bare hand.
Indexable Cutting Tools	○ If the inserts or other tool parts are not installed properly, they can fall down or break which may cause injuries.	* Please clean up insert pockets or clamping parts before setting insert. * Please set up inserts with supplied wrench only, and confirm that the inserts or parts are clamped completely. Never use inserts or parts other than those prescribed.
	○ If inserts are clamped too tightly by supplementary tools like pipe etc, inserts or body may brake.	* Do not use aids such as pipes. Please set up using supplied wrench only.
	○ When tools are used in high-speed revolution, inserts or parts may burst out of the body due to centrifugal force. When handling, please pay special attention to safety.	* Please use in the range of our recommended cutting conditions. See our catalog or instruction manuals.
Milling Cutters and other Milling Tools	○ Since milling cutters have sharp edges, direct contact with bare hands may cause injury.	* Please use safety items, such as safety glasses and protective gloves.
	○ If a cutter lacks balance, the tool can start to vibrate. The dispersion of broken pieces can cause injuries.	* Please use in the range of our recommended cutting condition. * Accuracy and balance of machine spindle should be checked and adjusted regularly to prevent wear of the bearings due to eccentric rotation.
Drilling	○ When drilling a through-bore, it is possible that a disc is created during the drilling procedure that can fly out of the workpiece at a high speed. This is very dangerous since the disc has sharp edges.	* Please use safety items, such as safety glasses and protective gloves. Also attach a cover on a chuck part.
Brazed Tools	○ Dispersion or falling down of broken inserts may cause injury.	* Please check that the cutting inserts are brazed firmly before use. * Please do not use brazed tools in the condition that requires high cutting temperature.
Others	○ If brazing is carried out many times, the strength of carbide insert is deteriorated and can break easily during cutting.	* Please do not use tools that have been brazed several times. The quality of the tool deteriorates.
	○ The tools can only be used for the appropriate application. It may damage tools and machines.	* Please follow our recommended usage for the tools.

Preface

Thank you very much for using **"2016-2017 Kyocera Cutting Tools"**.

- This General Catalog contains major Kyocera cutting tools.
- This General Catalog is as of **July, 2016**.
- The stock status of products will be shown as follows:

● …Standard Item	□ …Deleted from the next catalogue
R …Right-hand Only	MTO…Made to order
L …Left-hand Only	None…No Stock
○ …Check Availability	

- The specifications of products in this catalog may be changed due to research / development / modification without prior notice. Also conventional products might be integrated or centralized due to new material or new product development.

- Kyocera Cutting Tools will continue to improve product quality and safety.
  1) For handling and usage of Kyocera Cutting Tool Products, please carefully read **"Safety Notes of Cutting Tools"** in the previous page.
  2) For **Material Safety Data Sheet (MSDS)** of each Insert Grade, please refer to our machine tool homepage, **http://global.kyocera.com/prdct/tool/index2.html**.

■ Quantities for inventory sales

1) Toolholder Body / Parts

Type	Sales piece per one box	Remarks
Toolholder	1 piece/box	
Milling	1 piece/box	
Parts	1 piece/box	Light weight parts (Clamp screws) are in a plastic bag

2) Insert / Solid End Mill / Fine Micro Drill

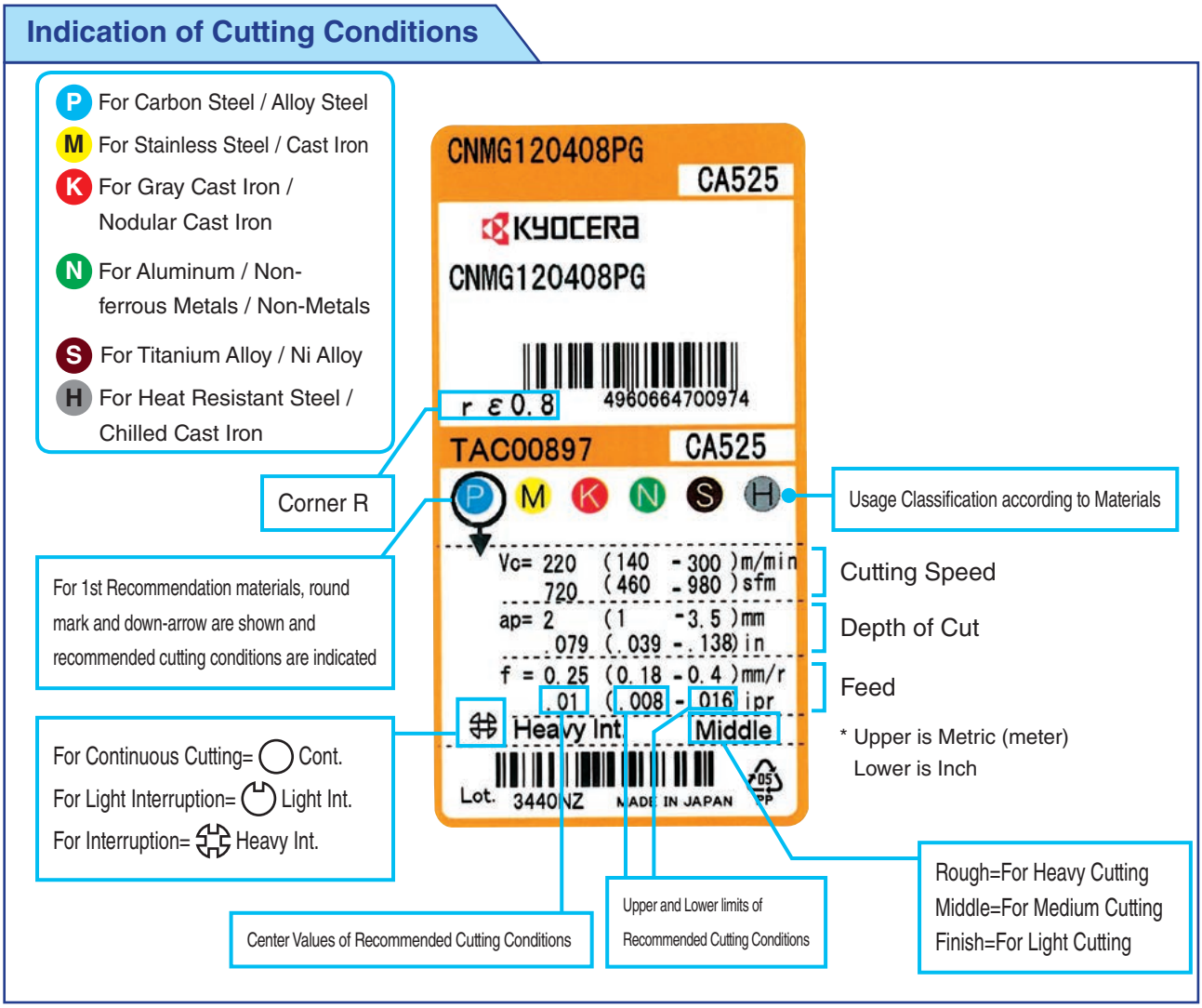
Type	Sales piece per one box	Remarks
Twin Bars	5 pieces/box	TWB / TWBT / TWFG / TWFGT Insert
System Tip-Bars	5 pieces/box	VNB / VNBT / VNFG / VNG / VNT Insert
EZ Bars	1 piece/box	EZB / EZVB / EZFG / EZG / EZT Insert
2-Edge Tip-Bars	1 piece/box	HPB / HPBT / HPFG / HPG / HPT Insert
Tip-Bars	1 piece/box	PSB / PSBT / PSFG / PSG / PST Insert
CBN Inserts	1 piece/box	Insert Grades: KBN···
PCD Inserts	1 piece/box	Insert Grades: KPD···
Threading Inserts	5 pieces/box	Insert Grades: PR930 / PR1115 / GW15 only
DA…M-GM type Insert	1 piece/box	Inserts for "MagicDrill DRA"
DC…M-SC type Insert	1 piece/box	Inserts for "MagicDrill DRC"
SEEN-W Inserts	5 pieces/box	Insert Grades: TN100M / KW10 only
PNEG-W Inserts	5 pieces/box	MFK Insert with wiper Edge
PNEU-W Inserts	5 pieces/box	MFPN Insert with wiper Edge
RDFG Type Insert	2 pieces/box	MRF / MRFW Ball End Mill Insert
RBG Type Insert	1 piece/box	
Fine Micro Drill	1 piece/box 10 pieces/box	Fine Micro Drill are sold in 1 or 10 pieces boxes
Solid End Mill	1 piece/box	
Other than above inserts	10 pieces/box	

■ Change to New Label

Indication of Cutting Conditions

To improve usability, cutting conditions are indicated in the label.

* This will apply to only new insert grades temporarily.



Insert Grades

A

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Summary of Insert Grades

Kyocera promotes research and development to help improve customers' productivity and profitability.
Kyocera provides high-quality inserts in various grades including Cermet, Coated Carbide, Coated Super Micro Grain Carbide, Carbide, Ceramic, PCD and CBN.

Turning

Workpiece Material		Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range		Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification		P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Cermet	TN Series	TN610, TN6010, TN620, TN6020, TN60, TN90					TN610, TN6010, TN620, TN6020, TN60, TN90					TN60			
	TC Series		TC60M					TC60M							
	PV Series	PV7020, PV90					PV7020, PV90								
	MEGACOAT (PV Series)	PV7010, PV7025					PV7010, PV7025					PV7005			
	MEGACOAT NANO (PV Series)	PV710, PV720					PV710, PV720								
Coated Carbide	CA Series	CA510, CA515, CA525, CA530, CA5505, CA5515, CA5525, CA5535					CA6515, CA6525					CA4010, CA4115, CA4120, CA4505, CA4515			
	PR Series	PR930, PR1005, PR1025, PR1115					PR930, PR1025, PR1125								
	MEGACOAT (PR Series)		PR1225					PR1225							
	MEGACOAT NANO (PR Series)		PR1425	PR1535				PR1425	PR1535						
Ceramic												KA30, KT66, A66N, PT600M, KS6050, CS7050			
Carbide													KW10, GW15		
CBN												KBN475, KBN60M, KBN900			

Turning

Workpiece Material		Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Heat-resistant alloys / Ni-base heat-resistant alloys)				Hard Materials (Hardened steel / Chilled cast Iron)				Sintered Steel			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Coated Carbide	CA Series						CA6515	CA6525									
	PR Series							PR1125									
	MEGACOAT (PR Series)					PR1305	PR1310	PR1325									
	MEGACOAT NANO (PR Series)							PR1535									
Cermet														TN6010			
														TN60			
Ceramic							CF1			KT66							
							KS6030			A66N							
							KS6040			PT600M							
CBN										KBN510							
										KBN525							
										KBN900							
MEGACOAT										KBN05M							
										KBN10M					KBN65M		
										KBN25M					KBN70M		
										KBN30M					KBN570		
										KBN35M							

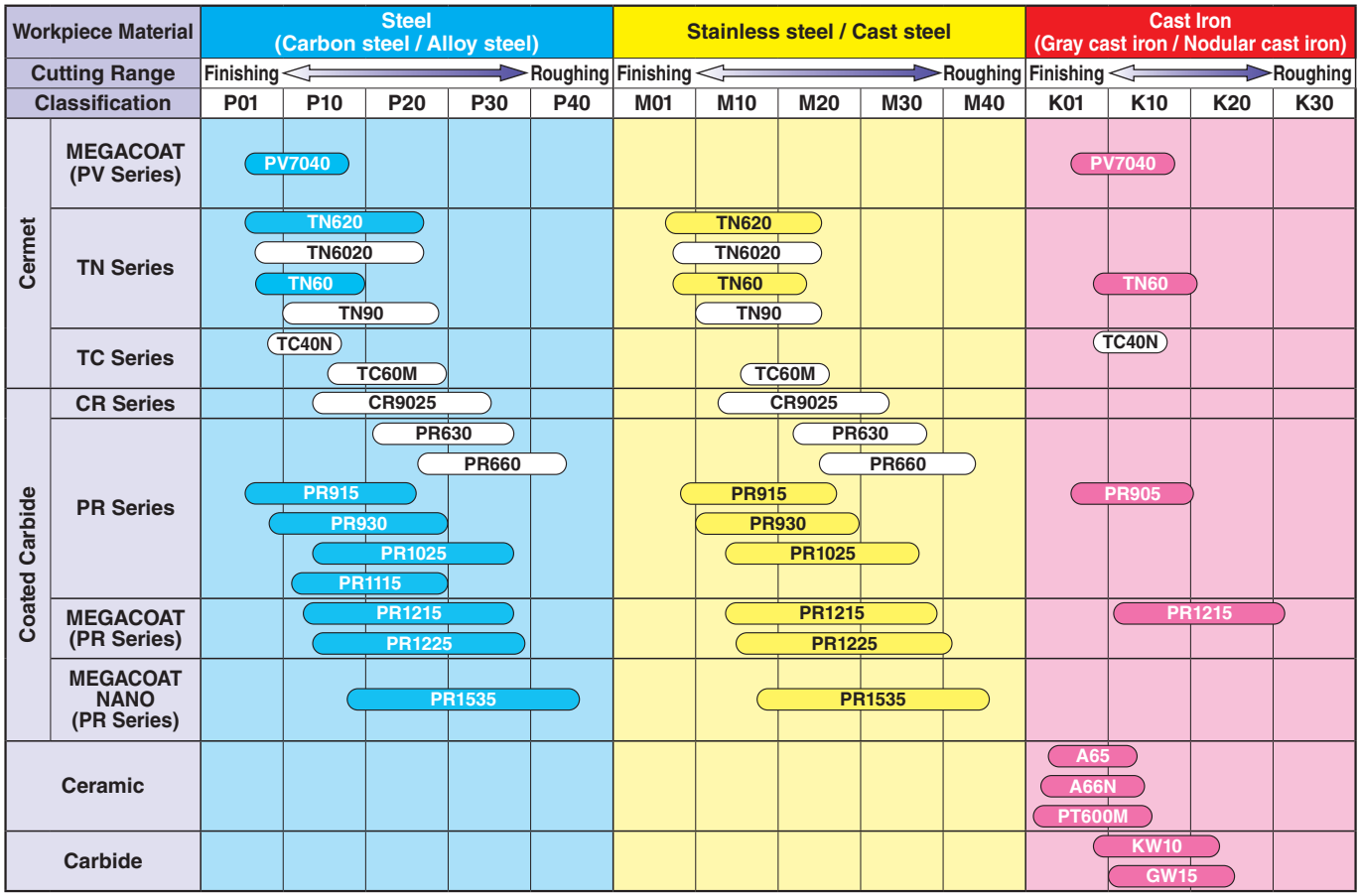
Workpiece Material		Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast Iron)				Sintered Steel			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Coated Carbide	MEGACOAT NANO (PR Series)							PR1535									
Carbide						SW05											
							SW10										
								SW25									
			KW10				KW10										
			GW15				GW15										
DLC Coated Carbide			PDL025														
PCD			KPD001					KPD001									
			KPD010				KPD010										
			KPD230														
			KPD250														

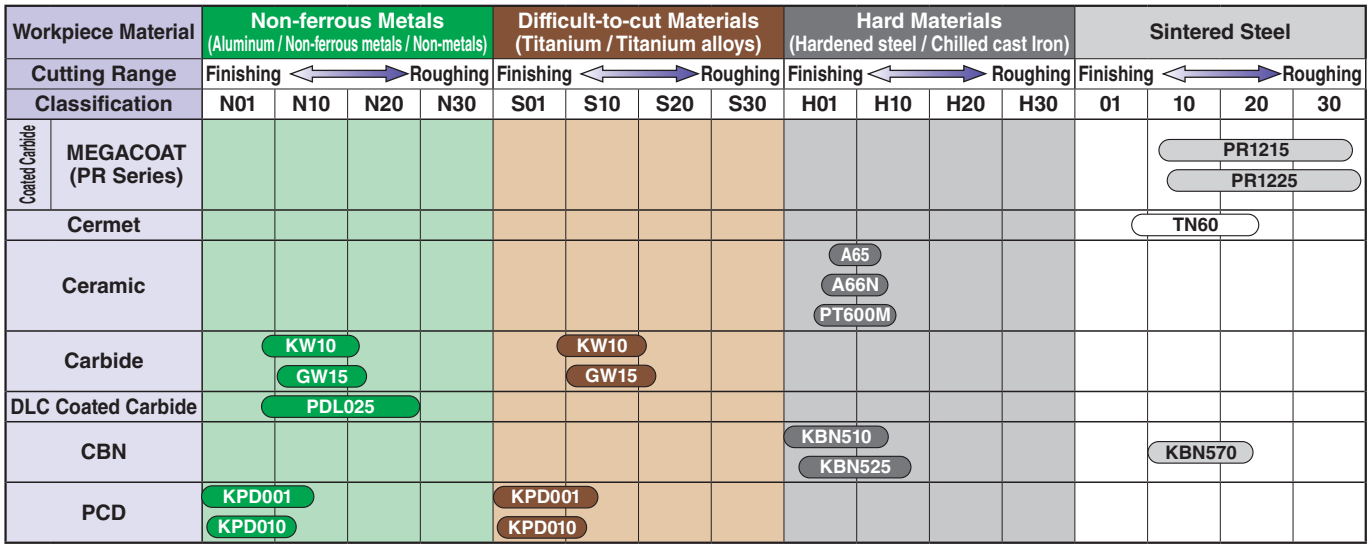
PVD Coated Carbide for Small Tools

Workpiece Material		Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range		Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification		P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Coated Carbide	PR Series		PR930					PR930							
		PR1005							PR1025						
			PR1025							PR1125					
			PR1115					PR1115							
	MEGACOAT (PR Series)			PR1225					PR1225						
	MEGACOAT NANO (PR Series)			PR1535					PR1535						
			PR1425					PR1425							

Summary of Insert Grades

Grooving / Cut-Off





Drilling

Workpiece Material		Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range		Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification		P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Coated Carbide	CA Series								CA6535						
	PR Series				PR660				PR660						
			PR830						PR830						
	MEGACOAT (PR Series)		PR1225						PR1225				PR1210		
			PR1230												
	MEGACOAT NANO (PR Series)		PR1535					PR1535							
Carbide												KW10			
												GW15			

Workpiece Material		Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast Iron)			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30
Coated Carbide	MEGACOAT (PR Series)									PR1230			
Carbide		KW10					KW10						
		GW15					GW15						

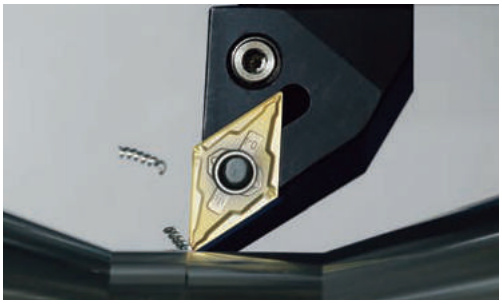
Milling

Workpiece Material		Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range		Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification		P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Cermet	TN Series		TN60					TN60							
			TN100M					TN100M							
	TC Series		TC60M					TC60M							
Coated Carbide	CA Series								CA6535				CA420M		
	PR Series			PR830					PR830						
	MEGACOAT (PR Series)		PR1225						PR1225				PR1210		
			PR1230												
	MEGACOAT NANO (PR Series)			PR1525					PR1525				PR1510		
									PR1535						
Carbide												KW10			
												GW25			

Workpiece Material		Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Heat-resistant alloys / Ni-base heat-resistant alloys)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast Iron)			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	S01	S10	S20	S30	H01	H10	H20	H30
Coated Carbide	CA Series						CA6535				CA6535						
	MEGACOAT (PR Series)										PR1210						
	MEGACOAT NANO (PR Series)						PR1535				PR1535						
Carbide			KW10								KW10						
			GW25								GW25						
DLC Coated Carbide			PDL025														
CBN																	
PCD			KPD001								KPD001						
			KPD010								KPD010						
			KPD230														
			KPD250														

Insert Grades

Cermet



Cermet

KYOCERA is known as one of the leading manufacturer of cermets.
Cermets combine toughness with superior wear resistance, and provide longer tool life and excellent surface finishes.
Typical materials used in cermets are TiC, TiN, TiCN and NbC.

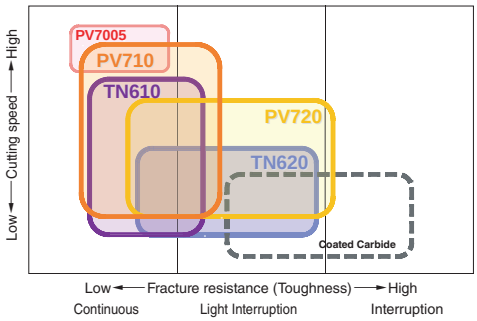
PVD Coated Cermet (MEGACOAT / MEGACOAT NANO Cermet)

PVD Coated Cermet is coated on cermet substrate with a thin layer of high wear resistance and high adhesion resistance by PVD (Physical Vapor Deposition) technology. Generally because of the low processing temperature of PVD compared with CVD, PVD coated cermet features less deterioration and more bending strength.

Features of Cermet and PVD Coated Cermet

Classification	Symbol		Color	Main Component (Coated Composition)	Advantages and Applications
P Steel	Cermet	TN610	Gray	TiCN	· High wear resistant cermet due to three types of special reinforcement technology · Application: Cermet for steel machining, long tool life in high speed and continuous
		TN620	Gray	TiCN	· Three types of special reinforcement technology realized the superior fracture resistance and wear resistance · Application: Stable machining of steel
		TN6010 (Super Micro-Grain)	Gray	TiCN	· Application: Uncoated cermet for steel
		TN60	Gray	TiCN+NbC	· Application: Machining of steel, continuous to interruption
		TN6020 (Super Micro-Grain)	Gray	TiCN	· Application: For steel machining
		TN100M	Gray	TiCN+NbC	· Tough cermet with improved oxidation resistance and thermal shock resistance · Application: Milling of steel at high speed
		TC40N	Gray	TiC+TiN	· Good balance of wear resistance and toughness · Application: Grooving and threading of steel
	MEGACOAT NANO Cermet	PV710	Gold	TiCN (MEGACOAT NANO)	· Superior wear and adhesion resistant MEGACOAT NANO on the high wear resistant cermet · Application: Long tool life and stability in high speed continuous machining of steel, excellent surface
		PV720	Gold	TiCN (MEGACOAT NANO)	· Superior wear and adhesion resistant MEGACOAT NANO on the special reinforcement cermet · Application: First choice PVD coated cermet for steel machining, high efficient machining and high quality surface finish
	MEGACOAT Cermet	PV7010 (Super Micro-Grain)	Blackish red	TiCN (MEGACOAT)	· Application: Long tool life in steel machining
		PV7025 (Super Micro-Grain)	Blackish red	TiCN (MEGACOAT)	· Application: PVD coated cermet for steel machining
		PV7040	Blackish red	TiC+TiN (MEGACOAT)	· MEGACOAT Cermet for Grooving · Application: Excellent surface finish and longer tool life in steel grooving
K Cast Iron		PV7005	Blackish red	TiC+TiN (MEGACOAT)	· Heat-resistant MEGACOAT on cermet with excellent wear resistance · Application: High speed finishing of gray and nodular cast iron

Application Map



TN Series (Uncoated Cermet)

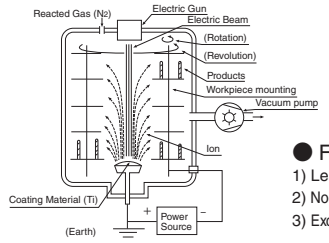
TN610 : Superior wear resistant cermet
TN620 : Superior fracture and wear resistance

PV Series (MEGACOAT NANO Cermet)

PV710 : Long tool life and stable machining of steel at high speed and continuous
PV720 : High efficiency and excellent surface finish (1st choice)

PVD Coating

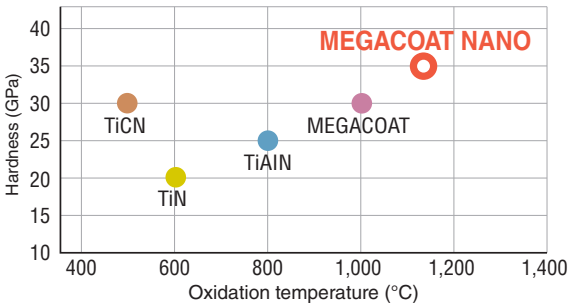
PVD (Physical Vapor Deposition)



● Features
1) Less deterioration
2) No loss of Bending Strength
3) Excellent Chipping resistance

Processing temperature : 400~600°C

Properties of PVD Coating



Hybrid Cermet

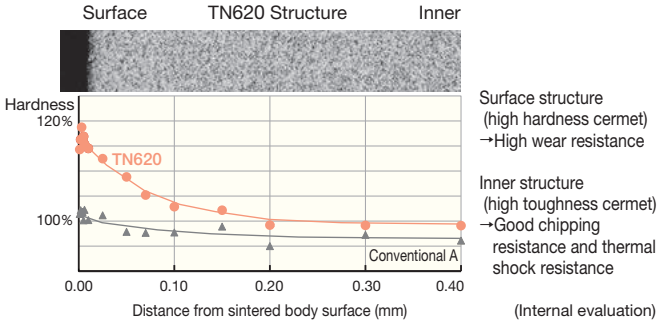
Three attributes of the Hybrid Technology contributes to superior surface finish and machining stability

General use : TN620 / PV720
High speed / Continuous : TN610 / PV710

Special Surface-Hardened "Hybrid Structure"

Excellent fracture resistance with the surface-hardened layer using the gradient composition technology. Good balance of stable wear resistance and fracture resistance by continuously-varied hardness.

TN620's inner structure has high toughness and chipping resistance as well as thermal shock resistance. And surface area has higher hardness and wear resistance compared to the conventional super micro-grain cermet A. (see attached chart)

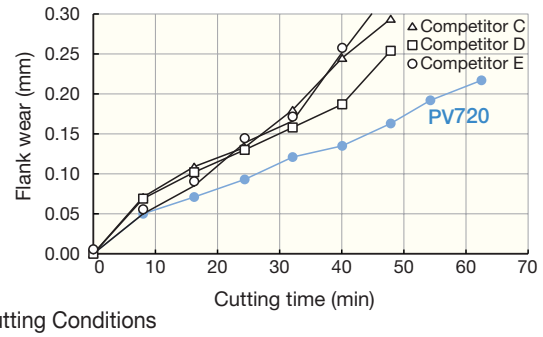


Surface structure
(high hardness cermet)
→High wear resistance

Inner structure
(high toughness cermet)
→Good chipping resistance and thermal shock resistance

(Internal evaluation)

Wear Resistance Comparison



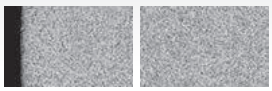
Cutting Conditions
SCM435 Vc=250m/min ap=1.0 mm
f=0.2mm/rev Wet CNMG120408PQ

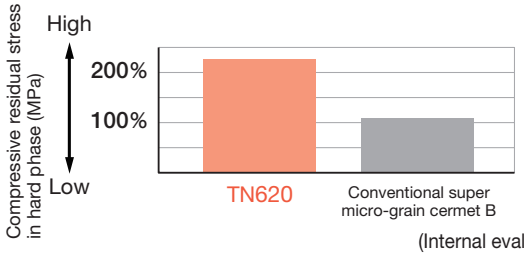
(Internal evaluation)

Super micro-grain "hybrid hard phase"

Improved strength by uniform super micro-grain hard phase and superior compressive stress by high melting point bonded phase. Fracture resistance improved.

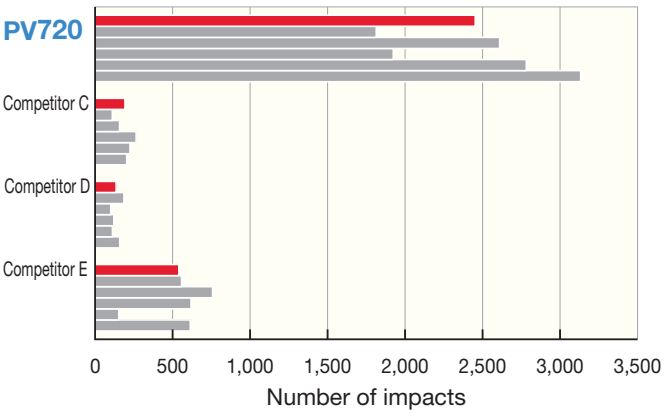
TN620 Structure





(Internal evaluation)

Fracture Resistance Comparison

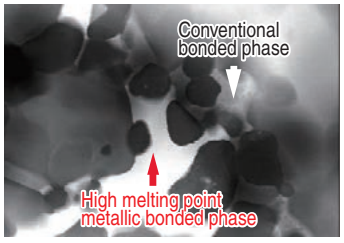


Cutting Conditions
S45C Vc=250m/min ap=1.0mm
f=0.2mm/rev Wet CNMG120408PQ

(Internal evaluation)

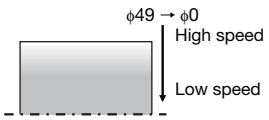
High melting point "hybrid bonded phase"

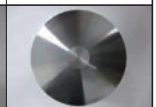
Combining the conventional cermet bonded phase (nickel, cobalt) and the special high melting point metallic bonded phase. Improved adhesion resistance and better surface finish are realized by higher thermal resistance of the bonded phase.



Surface finish comparison

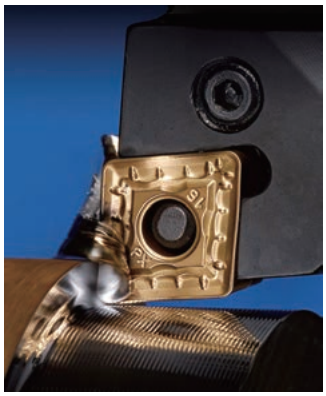
Cutting Conditions
Workpiece Material : S10C
Vc=180~0m/min (Constant late)
ap=0.5mm f=0.1mm/rev Wet CNMG120404 type



	PV720	Competitor C	Competitor D	Competitor E
Surface Finish				
Surface Roughness (ϕ4~ϕ15) ↓ (Vc=15~55m/min)	Good	Bad Good	Bad	Bad Good

(Internal evaluation)

CVD Coated Carbide (Turning)



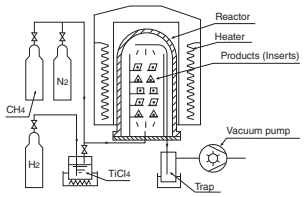
CVD Coated Carbide

Using Chemical Vapor Deposition coating technology, CVD coated carbide grades provide stable, efficient machining at high speeds or for heavy interrupted applications.

Features

- Applicable from low to high speed machining and from finishing to roughing
- Stable machining is achieved due to the superior toughness and crack resistance
- Cutting times are reduced due to good chip control from effective chipbreakers

CVD (Chemical Vapor Deposition)



● Features

1) Equally deposited on face
2) Easy application for multilayer deposition
3) Enabling thick coating

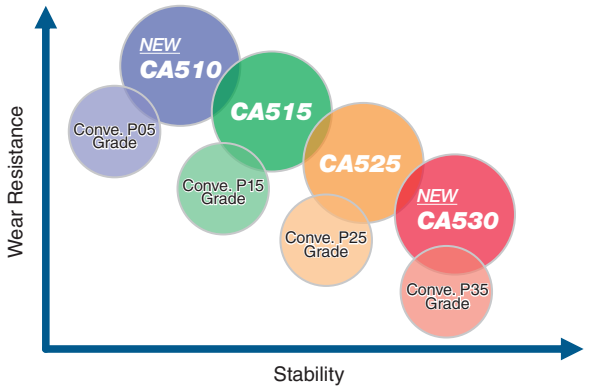
Processing temperature:900~1100°C

Features of CVD Coated Carbide

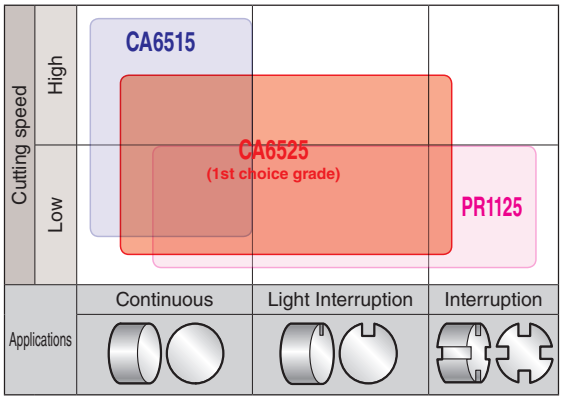
Classification	Symbol	Color	Coated Composition	Advantages and Applications
P Steel	CA510	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Special substrate with thermal deformation resistance along with a thick and tough coating layer providing high wear resistance · Application: High speed and high efficiency steel machining
	CA515	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Improved wear resistance and stability due to special substrate with heat deformation resistance and hard and tough coating layer with reinforced interface · Application: Light interrupted machining of steel
	CA525	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Stable and long tool life machining due to special substrate with heat deformation resistance and tougher coating layer and reinforced interface · Application: Interrupted to general machining of steel
	CA530	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Special tough substrate and tough coating layer providing high stability and wear resistance · Application: General to heavy interrupted machining (stability oriented)
	CA5505	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Application: High speed continuous machining of steel, continuous to light interrupted machining of cast iron
	CA5515	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Application: Machining of steel, continuous to light interruption
	CA5525	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Application: For general machining of steel, roughing to interruption
	CA5535	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Application: Roughing to heavy interrupted machining of steel
	CR9025	Gold	Columnar TiCN+TiN	· Improved toughness and stability due to specialized carbide substrate with plastic deformation resistance · Application: Cut-off, grooving and multi-function machining of steel
M Stainless steel	CA6515	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Specialized carbide substrate for machining stainless steel, excellent wear resistance · Application: Continuous machining of stainless steel
	CA6525	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Specialized carbide substrate for machining stainless steel, excellent notching resistance and toughness · Application: First choice for general machining of stainless steel, from finishing to roughing, continuous to interruption
K Cast Iron	CA4010	Gold	Columnar TiCN+Al_2O_3+TiN	· Application: Continuous to light interrupted high speed machining of cast iron
	CA4115	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Application: Continuous to light interrupted machining of nodular cast iron
	CA4120	Gold	Micro columnar TiCN+Al_2O_3+TiN	· Application: Roughing to heavy interrupted machining of nodular cast iron
	CA4505	Blackish gray	Micro columnar TiCN+Al_2O_3	· Stable, longer tool life due to improved bonding strength of coating layers and special treatment of the surface of the top coating layer · Application: For gray cast iron and nodular cast iron at high speed in continuous to light interrupted machining
	CA4515	Blackish gray	Micro columnar TiCN+Al_2O_3	· Stable, longer tool life due to improved bonding strength of coating layers and special treatment of the surface of the top coating layer · Application: First choice for gray cast iron and nodular cast iron in light to heavy interrupted machining

Application Map

● Steel



● Stainless steel



CVD coated carbide grades for steel

CA5 Series

CA5 series Productivity Innovation Coating

New coating technology to provide longer tool life and stable machining

1 High Adhesion Strength of Coating Layer Ultra fine interface

- Longer tool life and stable machining by improved adhesion strength
- 40% improved adhesion strength

2 High Hardness with Tougher α-Al_2O_3 coating layer

- Special crystal control technology
- Longer tool life due to high-aspect ratio of micro columnar α-Al_2O_3 coating layer

3 Smooth and Flat Surface

- Generates low cutting force and stable machining
- Prevents adhesion (edge build-up) and sudden fracturing

4 New Carbide Substrate

- Special carbide substrate with deformation resistance at high temperature
  10% improved hardness at high temperature
- Good for high efficient machining

CA510

- Special substrate with thermal deformation resistance along with a thick and tough coating layer providing high wear resistance

Application: High speed and high efficiency steel machining

CA515

- Special substrate and tough coating layer providing thermal deformation and high wear resistance

Application: For continuous to light interrupted machining of steel (general use)

CA525

- Special substrate and tough coating layer provides high wear and fracture resistance

Application: First choice for steel machining

CA530

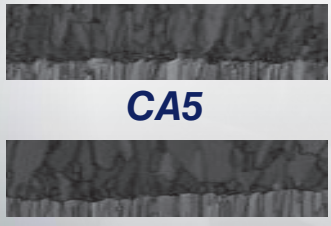
- Special tough substrate and tough coating layer providing high stability and wear resistance

Application: General to heavy interrupted machining (stability oriented)

Kyocera's unique crystal control technology and advanced layer adhesion lead CVD coating to the next stage

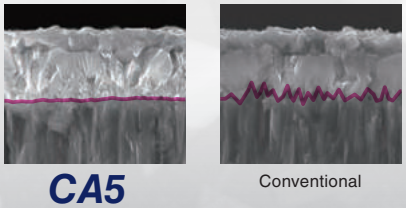
Longer tool life

Control α-Al_2O_3 crystal growth for improving wear resistance and fracture resistance



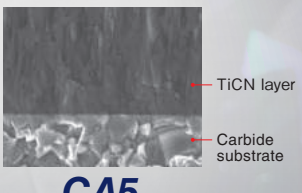
Prevents peeling of coating layer

40% improved layer adhesion by optimized interface

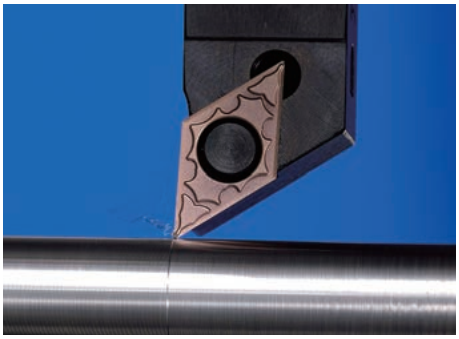


Control chipping

Higher layer strength and fracture resistance with high aspect ratio TiCN



PVD Coated Carbide (Turning)



PVD Coated Carbide（MEGACOAT / MEGACOAT NANO）

Using a Physical Vapor Deposition coating technology,
Generally because of the low processing temperature of PVD compared with CVD, PVD coated carbide features less deterioration and more bending strength.
PVD coated carbide grades are coated on a very tough carbide substrate and suitable for turning.

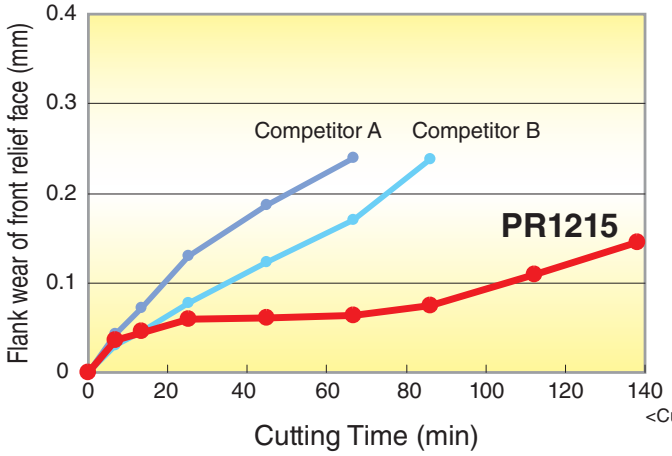
PVD Coated Super Micro-Grain Carbide

· Smooth fine surface of PVD coated carbide provides good surface finish and high precision machining
· Stable machining with excellent toughness

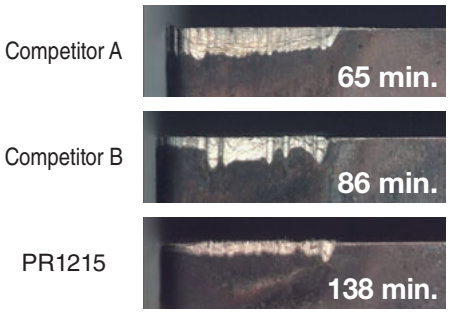
Features of PVD Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
P Steel	**PR915** (Super Micro-Grain)	Bluish violet	TiAlN	· Application: Stable and reliable high precision machining of steel
	PR930 (Super Micro-Grain)	Reddish gray	TiCN	· Application: Low machining speed, precise machining with sharp edge
	PR1005	Reddish gray	TiCN	· TiCN base PVD coated hard micro-grain carbide · Application: Turning of free-cutting steel, longer tool life achieved through anti-adhesion performance
	PR1025	Reddish gray	TiCN	· Application: General machining of steel and stainless steel, stable and longer tool life
	PR1115	Purple red	TiAlN	· Superior oxidation resistance with well balanced wear resistance and toughness · Application: Machining of steel and stainless steel, for grooving, cut-off and threading
	PR1215	Blackish red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application: Superior adhesion resistance and longer tool life for steel and stainless steel machining
	PR1425	Blackish red	MEGACOAT NANO	· New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance · Application: Various applications of machining steel, High speed machining of stainless steel, extended tool life
M Stainless steel	**PR1125**	Purple red	TiAlN	· Hard TiAlN base PVD coated super micro-grain carbide, superior toughness and heat resistance · Application: Finishing and light interrupted machining of stainless steel
	PR1225	Blackish red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application: Light interrupted to interrupted machining of stainless steel
	PR1535	Reddish green	MEGACOAT NANO	· Nano thin multi-layer coating [MEGACOAT NANO] improved wear resistance and stability · Application: Medium to roughing of stainless steel and heat-resistant alloys, cut-off of stainless steel
K Cast Iron	**PR905**	Bluish violet	TiAlN	· Smooth fine surface PVD coated hard carbide with plastic deformation resistance · Application: Suitable for machining gray and nodular cast iron
S Heat-resistant alloys	**PR1305**	Blackish red	MEGACOAT	· MEGACOAT on hard and superior heat-resistant carbide, superior wear resistance · Application: Finishing of heat-resistant alloys
	PR1310	Blackish red	MEGACOAT	· MEGACOAT on hard and superior heat-resistant carbide, superior wear and oxidation resistance · Application: First choice for continuous and light interrupted machining and finishing of heat-resistant alloys
	PR1325	Blackish red	MEGACOAT	· MEGACOAT on tough carbide · Application: Light interrupted machining and roughing of heat-resistant alloys

PR1215 Wear Resistance Comparison (Off-centered grooving)



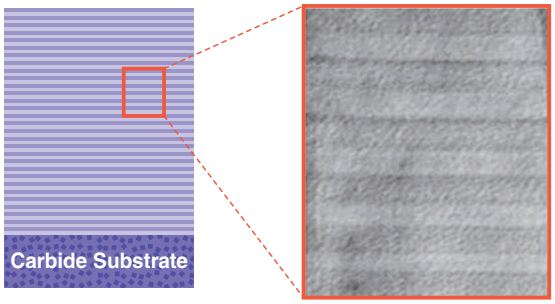
Flank wear of front relief face

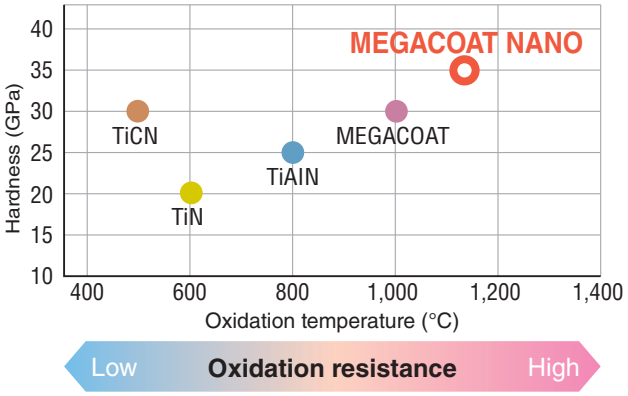


<Cutting Conditions> Vc=150m/min, ap=1.5mm, f=0.1mm/rev, Wet
SNCM439 ϕ198 → ϕ48 (Internal evaluation)

Properties of MEGACOAT NANO

Multi-layer composition of MEGACOAT

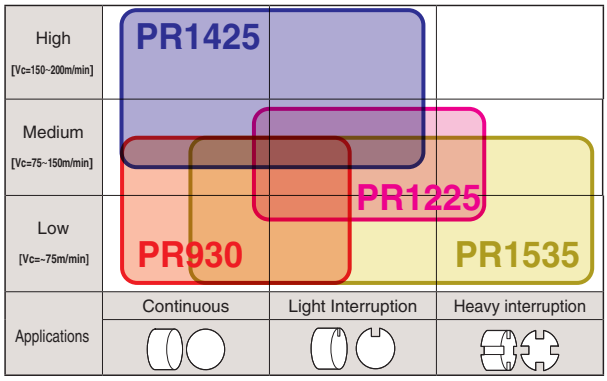




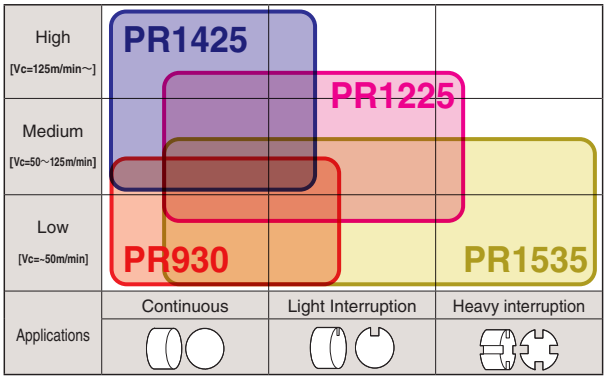
Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C)

Application Map

• Steel

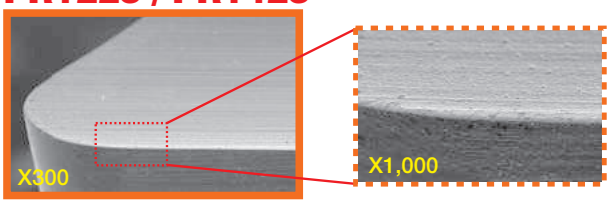


• Stainless steel



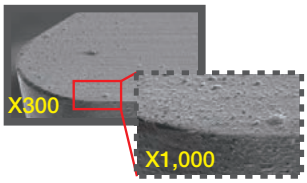
Cutting edge quality (Sharp edge insert)

PR1225 / PR1425

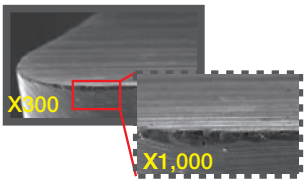


<Superior edge-sharpening performance and Smooth surface>

Competitor A



Competitor B



<Delamination (coating peeling) and rough surface>

MEGACOAT Series (PR1225 / PR1425) shows high edge sharpening performance and adhesion resistance.

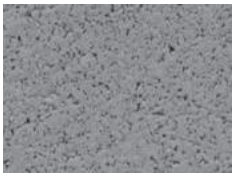
(Internal evaluation)

Advantages of PR13 Series

1) Superior wear and fracture resistance attained with uniform grain size and MEGACOAT on superior thermal shock resistant carbide

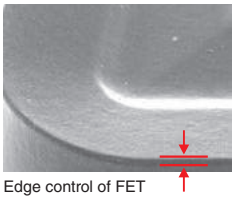
2) New edge preparation technology (FET: Fine Edge Treatment) controls and minimizes R horning and provides large tip rake angle, and thus prevents burrs and notching.

Special carbide substrate



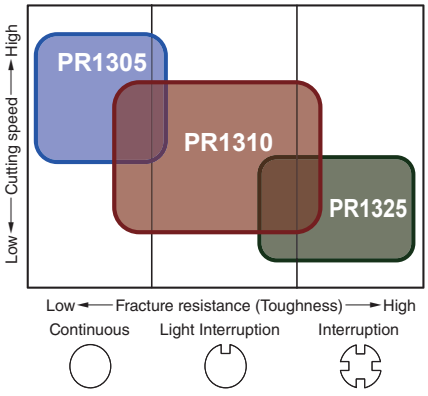
Uniform grain size enables superior thermal shock resistance and constant hardness

New edge preparation technology



Edge control of FET technology

Heat-resistant alloys



PVD / CVD Coated Carbide (Milling / Drilling)

PVD Coated Carbide (MEGACOAT / MEGACOAT NANO)

PVD coated carbide grades for milling and drilling are coated on a very tough carbide substrate.
Because of the low processing temperature of PVD compared with CVD, it features less deterioration and more bending strength.

CVD Coated Carbide

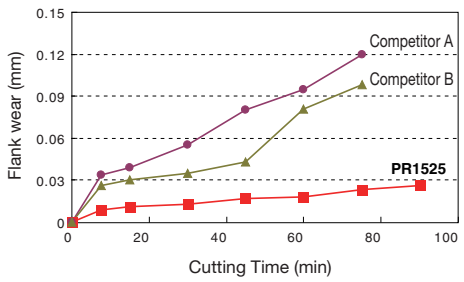
CVD coated carbide grades provide stable, efficient machining at high speeds or for heavy interrupted applications.
Ti-base (TiN, TiCN) coating with superior hardness and wear resistance or ceramic-base (Al_2O_3) coating with high-thermal stability is applied on a tough carbide substrate. Superior fracture resistance and wear resistance.

Features of CVD / PVD Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
P Steel	**PR830**	Gold	TiAlN+TiN	· Improved high temperature stability and wear resistance by TiAlN base PVD coating · Application: Milling of steel
	PR1230	Blackish red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on a special tough carbide substrate · Application: Stable and high feed milling and drilling of steel
	PR1525	Reddish green	MEGACOAT NANO	· New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance · Application: Stable and longer tool life for milling of steel and stainless steel
M Stainless steel	**PR1225**	Blackish red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application: General machining and high feed milling and drilling of steel and stainless steel
K Cast Iron	**PR1210**	Blackish red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT coated on special carbide substrate · Application: Highly efficient stable milling and drilling of gray and nodular cast iron
	PR1510	Reddish green	MEGACOAT NANO	· New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance · Application: Highly fracture resistance and wear resistance for gray and nodular cast iron
	CA420M	Gold	Micro columnar TiCN+Al_2O_3+TiN (CVD)	· Kyocera's unique crystal control technology and advanced layer adhesion CVD coating with superior wear resistance and toughness · Application: Milling of gray and nodular cast iron
S Heat-resistant Alloys Titanium Alloys	**PR1535**	Reddish green	MEGACOAT NANO	· Nano thin multi-layer coating [MEGACOAT NANO] improved wear resistance and stability · Application: For milling of Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
S Heat-resistant alloys	**CA6535**	Gold	Micro columnar TiCN+Al_2O_3+TiN (CVD)	· High heat-resistance and wear resistance with CVD coating · Application: For milling of Ni-base heat-resistant alloys and martensitic stainless steel

Properties of wear resistance (PR1525)

S45C

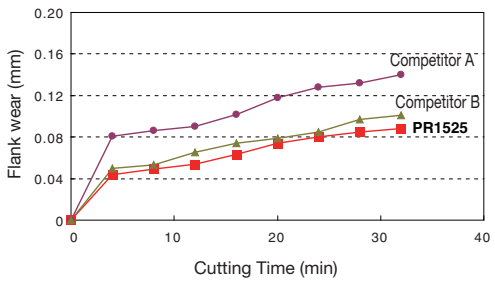


<Cutting Conditions>

S45C, Vc=200m/min, ap×ae=2x10mm
fz=0.12mm/t (Vf=183mm/min), Dry

(Internal evaluation)

SKD11



<Cutting Conditions>

SKD11, Vc=120m/min, ap×ae=2x10mm
fz=0.1mm/t (Vf=190mm/min), Dry

(Internal evaluation)

New grade for heat-resistant alloys and difficult-to-cut materials

NEW

CA6535 (CVD) For martensitic stainless steel and Ni-base heat-resistant alloys

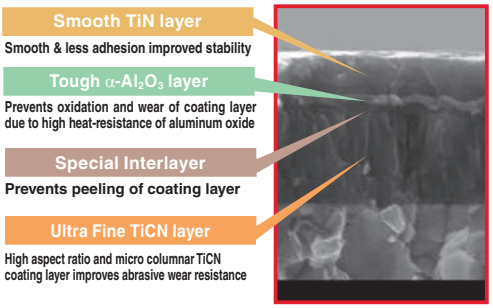
PR1535 (PVD) For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel

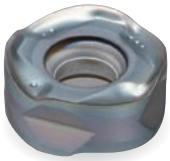
Suitable for variety of workpiece materials!

Stable machining by preventing sudden insert fracture
Suitable for high-efficiency machining

CA6535

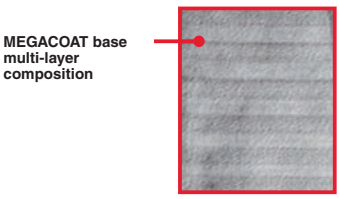
For martensitic stainless steel and Ni-base heat-resistant alloys
High heat resistance and wear resistance with CVD coating
Improved stability due to thin layer coating technology





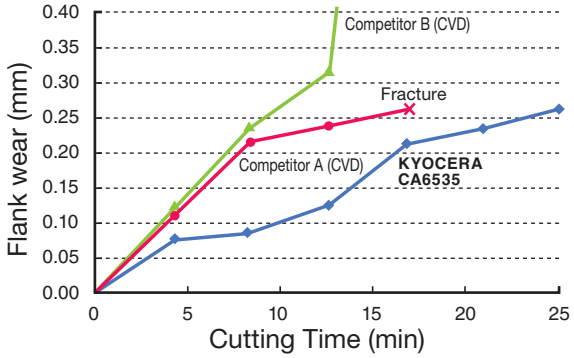
PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable and longer tool life by special nano thin multi-layer coating [MEGACOAT NANO]



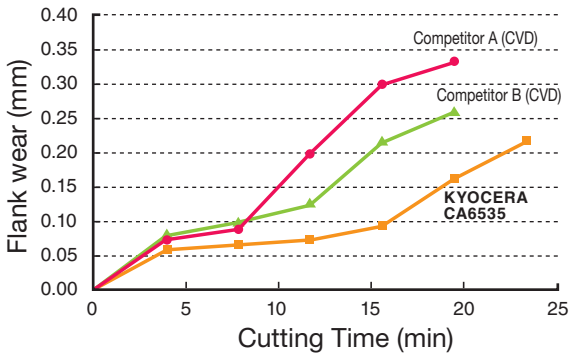
Tool Life Comparison

● Ni-base heat-resistant alloys



<Cutting Conditions> Vc=50m/min, ap=1.0mm, fz=0.15mm/t, Wet
(Internal evaluation)

● Martensitic stainless steel



<Cutting Conditions> Vc=300m/min, ap=2.0mm, fz=0.2mm/t, Wet
(Internal evaluation)

Longer tool life and more stable machining than competitors!

Insert Grades

Carbide

Carbide

Uncoated tungsten carbide grade is used in a variety of applications due to its superior mechanical properties.

Features

· KW10: Suitable for machining cast iron with high hardness and toughness
· GW15,GW25 : Suitable for machining non-ferrous metals and non-metals
· SW series : Suitable for machining of titanium and titanium alloy

Features of Carbide

Classification	Symbol	Color	Main Component	Advantages and Applications
N Non-ferrous Metals	**KW10**	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant) · Application: Machining cast iron, non-ferrous materials and non-metals
	GW15	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant), tough micro-grain carbide · Application: Machining cast iron, non-ferrous materials and non-metals
	GW25	Gray	WC+Co	· ISO identification symbol K carbide (K30 relevant) · Application: Milling operations of aluminum
S Heat-resistant alloys	**SW05**	Gray	WC+Co	· ISO identification symbol K carbide (K05 relevant) · Application: Titanium alloys for continuous machining and finishing
	SW10 (Made to order)	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant) · Application: Titanium alloys for continuous and light interrupted machining
	SW25 (Made to order)	Gray	WC+Co	· ISO identification symbol K carbide (K25 relevant) · Application: Titanium alloys for interrupted and light interrupted machining

DLC Coated Carbide

DLC Coated Carbide

DLC (Diamond-Like Carbon) Coated Carbide is coated on carbide substrate with a thin layer of amorphous carbon.

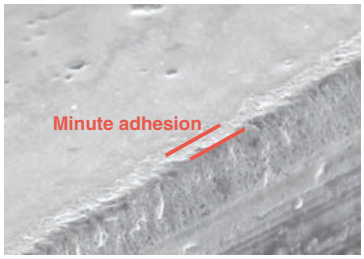
Features

· High Hardness with Kyocera's Proprietary Hydrogen-free DLC Coating
· Exellent surface finish achieved through anti-adhesion performance

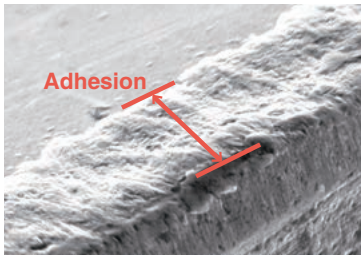
Features of DLC Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
N Non-ferrous Metals	**PDL025**	Rainbow color	C	· High Hardness with Kyocera's Proprietary Hydrogen-free DLC Coating · Application: Long tool life and stable machining of aluminum alloys

Adhesion Resistance Comparison



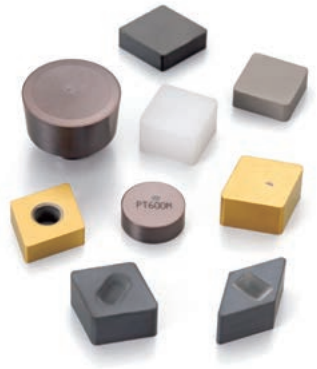
PDL025



Competitor A

Cutting Conditions : Vc=800m/min, fz=0.1mm/t, ap×ae=3×5mm, Dry Cutter Dia. ϕ25mm
Workpiece Material : A5052 Cutting length : 57m (Internal evaluation)

Ceramic



Ceramic

Ceramics inserts are capable of machining at high speeds. Recommended for hard turning of hardened steel or rough to finish turning of cast iron and heat-resistant alloys.

Features

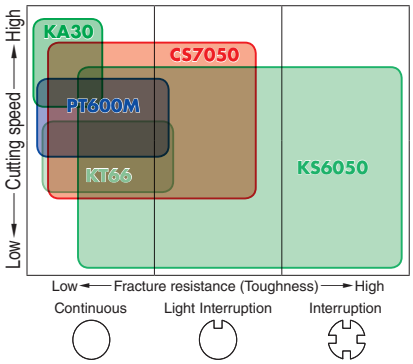
- Excellent wear resistance enables high speeds machining of cast iron
- Ceramic maintains good surface finishes due to the low affinity to workpiece materials
- Silicon nitride ceramic can machine cast iron with coolant due to its superior thermal shock resistance

Features of Ceramic

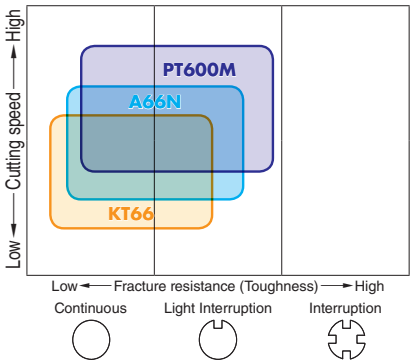
Classification	Symbol	Color	Main Component (Coated Composition)	Coating Layer	Hardness of Substrate (GPa)	Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)	Advantages and Applications
K Cast Iron	**KA30**	White	Al_2O_3	-	17.5	4.0	750	· Aluminum Oxide ceramic (Al_2O_3) · Application: Finishing of cast iron at high cutting speeds without coolant
K Cast Iron	**KS6050**	Gray	Si_3N_4	-	15.6	8.0	1,200	· Silicon nitride ceramic (Si_3N_4) · Application: Roughing and interrupted machining of cast iron. Focusing on stability. (with or without coolant)
K Cast Iron	**CS7050**	Grayish white	Si_3N_4 (Special Al_2O_3 COAT)	Thin coating	15.6	8.0	1,200	· Silicon nitride ceramic (Si_3N_4)+CVD Coated Carbide (Special Al_2O_3 COAT) · Application: Finishing and continuous machining, and high speed and high efficient machining. (with or without coolant)
K Cast Iron H Hard Materials	**KT66**	Black	Al_2O_3+TiC	-	20.1	4.1	980	· Aluminum Oxide and Titanium Carbide ceramic (Al_2O_3+TiC) · Application: Semi-roughing to finishing of cast iron, and hard materials
K Cast Iron H Hard Materials	**A66N**	Gold	Al_2O_3+TiC (TiN COAT)	Thin coating	20.1	4.1	980	· TiN PVD coated Aluminum Oxide and Titanium Carbide ceramic (TiN coated Al_2O_3+TiN) · Application: Semi-roughing to finishing of hard materials
K Cast Iron H Hard Materials	**PT600M**	Blackish red	Al_2O_3+TiC (MEGACOAT)	Thin coating	20.1	4.1	980	· Heat-resistant MEGACOAT on Aluminum Oxide and Titanium Carbide ceramic (MEGACOAT Al_2O_3+TiC) · Application: Semi-roughing to finishing of cast iron, hard materials and hardened roll materials
S Heat-resistant alloys	**KS6030**	Gray	SiAlON	-	15.2	6.0	600	· SiAlON Ceramic with superior wear resistance and high resistance against boundary wear · Application: Finishing to medium machining of heat-resistant alloys
S Heat-resistant alloys	**KS6040**	Brown	SiAlON	-	16.7	7.0	900	· High stability SiAlON ceramic with wear resistance and fracture resistance · Application: Roughing of heat-resistant alloys

Application Map

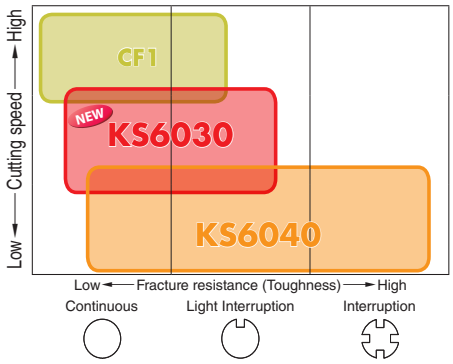
Cast Iron



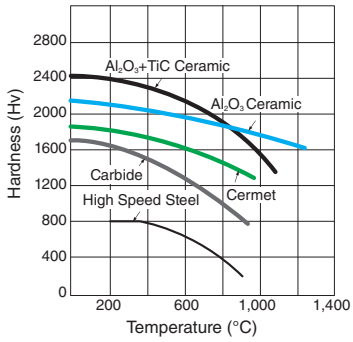
Hard Materials



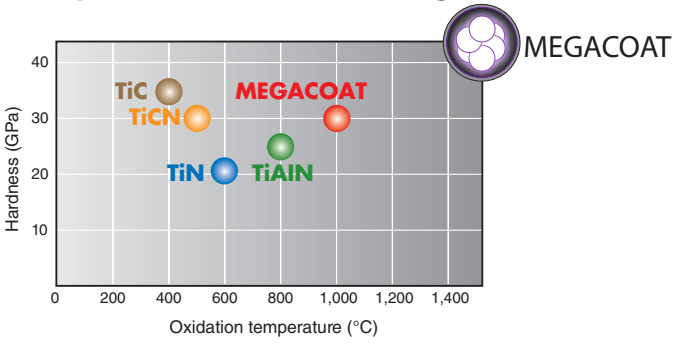
Heat-resistant alloys



High-Temperature Hardness



Properties of PVD Coating



Insert Grades

CBN (Cubic Boron Nitride)

CBN

CBN (Cubic Boron Nitride) is second only to diamond in hardness, and is a synthetically produced material with high thermal conductivity.

Features

- Superior wear resistance when machining hard materials
- Suitable for high speed machining of hard materials, sintered steel and cast iron
- High thermal conductivity provides stable machining

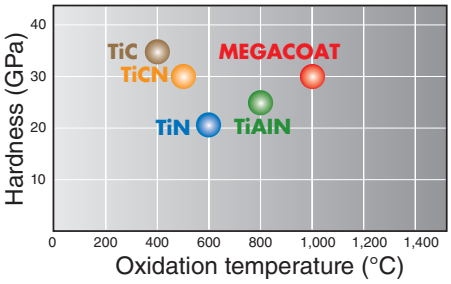
Features of CBN

Classification	Symbol	Color	Ave. grain size (μm)	Hardness of Substrate (GPa)	Transverse Strength (MPa)	Advantages and Applications
H Hard Materials	**KBN510**	Black	2	28	1,000	· Excellent wear resistance and crack resistance, non-coated CBN · Application: Finishing and continuous machining of hardened die steel
	KBN525	Black	1 and under	25	1,250	· Application: General purpose for hardened steel
	KBN05M (MEGACOAT)	Blackish red	0.5-1.5	27	1,000	· Heat-resistant MEGACOAT on highly heat-resistant CBN substrate · Application: High speed finishing of hardened steel
	KBN10M (MEGACOAT)	Blackish red	2	28	1,000	· Application: High speed finishing of hardened die steel
	KBN25M (MEGACOAT)	Blackish red	1 and under	25	1,250	· Heat-resistant MEGACOAT on micro-grain CBN with heat-resistant binder phase · Application: Stable machining of hardened steel at high cutting speeds
	KBN30M (MEGACOAT)	Blackish red	1-4	30	1,350	· Application: Stable machining of hardened steel for continuous to interrupted machining
Sintered Steel	**KBN65B**	Black	2	32	1,150	· Application: Stable machining of sintered steel (ferrous sintered alloy) at low speed
	KBN570	Black	2-4	34	1,350	· High CBN content ratio · Application: Machining of sintered steel (preventing burr formation)
	KBN65M (MEGACOAT)	Blackish red	2	32	1,150	· Heat-resistant MEGACOAT on CBN with heat-resistant binder phase · Application: Stable machining of sintered steel (ferrous sintered alloys)
	KBN70M (MEGACOAT)	Blackish red	2-4	34	1,350	· Heat-resistant MEGACOAT on CBN rich substrate · Application: Stable machining of sintered steel (ferrous sintered alloys)
K Cast Iron	**KBN475**	Black	2	39	1,400	· Excellent wear resistance due to high CBN content and special binder · Application: High speed machining of gray cast iron
	KBN60M (MEGACOAT)	Blackish red	0.5-6	33	1,250	· Heat-resistant MEGACOAT on CBN rich substrate with hard binder phase · Application: High speed finishing of gray cast iron
	KBN900 (TiN COAT)	Gold	9	31	630	· TiN coated solid CBN · Application: Heavy duty, interrupted machining and finishing of hardened steel, hardened roll steel and cast iron

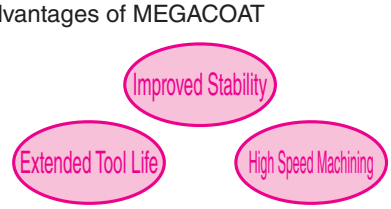
· For **KBN35M** , ref. to page **A18**

MEGACOAT CBN

Properties of PVD Coating



Advantages of MEGACOAT

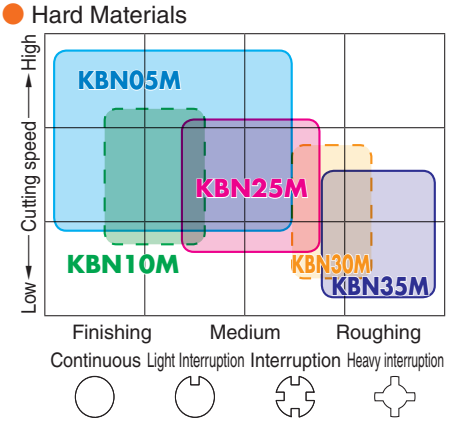


MEGACOAT

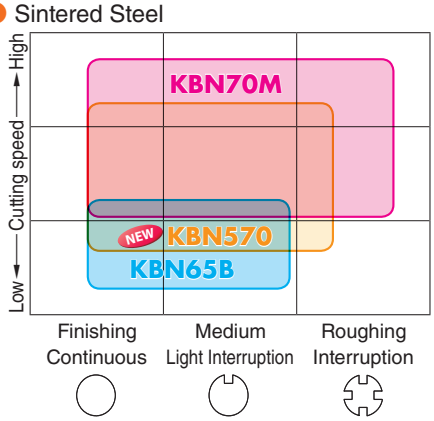
- Longer tool life and high speed machining due to superior heat resistance and hardness.
- Stability improvement through prevention of crater wear (oxidation, diffusional wear)
- High thermal stability and surface smoothness provide excellent surface finish

Application Map

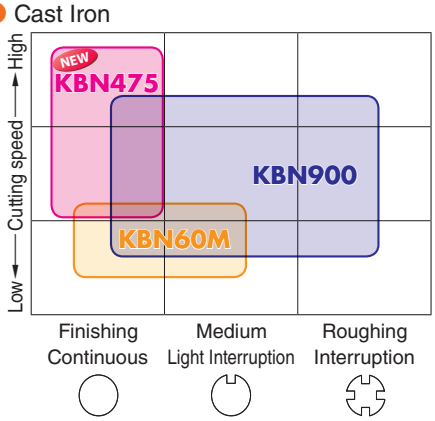
Hard Materials



Sintered Steel



Cast Iron



PCD (Polycrystalline Diamond)

PCD (Polycrystalline Diamond)

PCD (Polycrystalline Diamond) is a synthetic diamond sintered under high temperatures and pressures.

Features

- Applicable for milling of non-ferrous metals and non-metals
- No edge build-up provides high precision machining
- Diversified applications for machining of non-ferrous metals and non-metals
- Finished surface will be rainbow colored
  (Because of polycrystalline diamond, a mirror-like finished surface will not be obtained)

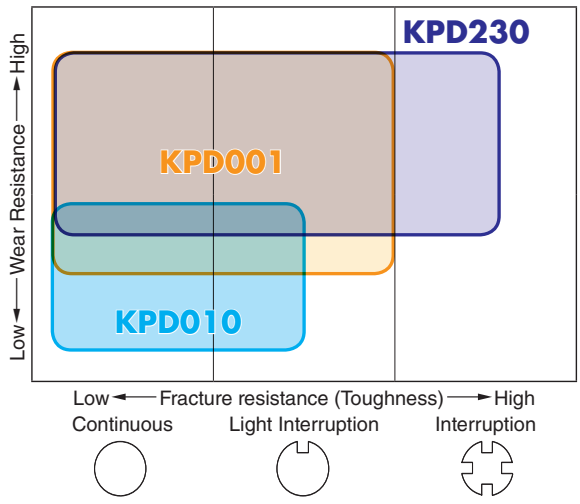
Features of PCD

Classification	Symbol	Ave. grain size (μm)	Advantages and Applications
N Non-ferrous Metals	KPD001	0.5	· Super Micro-Grain PCD features cutting edge strength, wear resistance, fracture resistance, good edge-sharpening performance and longer, stable tool life · Application: High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, and carbide.
	KPD010	10	· Good wear resistance and toughness, good grindability · Application: High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, and carbide.
	KPD230	2-30	· Superior abrasive wear resistance and toughness due to high density PCD with mixed rough and fine grains · Application: High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics.
	KPD250 (Made to order)	25	· Superior wear resistance due to rough grain PCD (25μm) · Application: High speed machining of high silicon aluminum alloy and machining of carbide

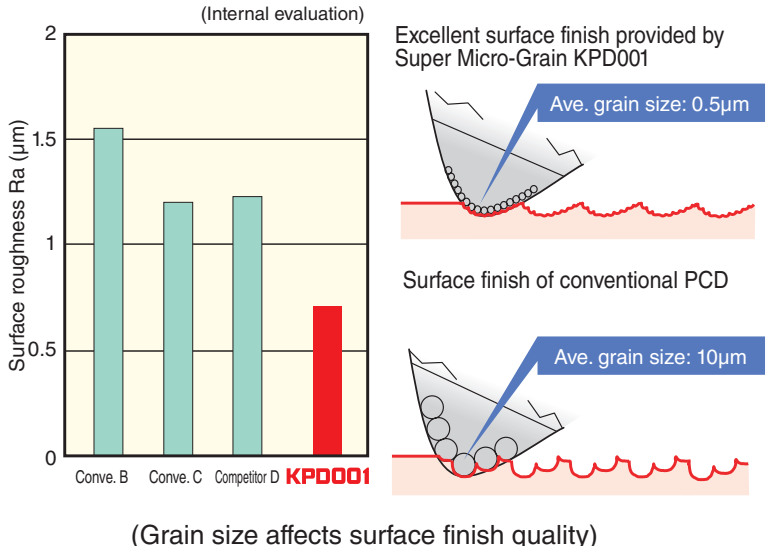
Applications

Workpiece Material		Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)			
Cutting Range		Finishing ← → Roughing				Finishing ← → Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30
Turning Milling	PCD	KPD001				KPD001			
		KPD010				KPD010			
		KPD230							
		KPD250							

Application Map



Surface Finish Roughness Comparison of Aluminum Machining



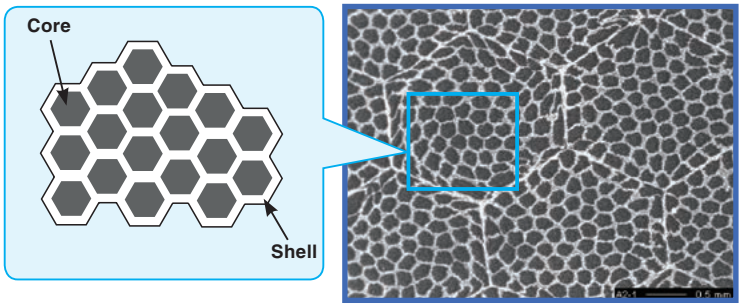
(Grain size affects surface finish quality)

Insert Grades

Honeycomb structure CBN / Ceramic

Honeycomb structure CBN / Ceramic

Honeycomb structure is the high structural controlled composite material consisting of a hard and superior wear-resistance core (gray portion) and a tough shell (white portion).



Features

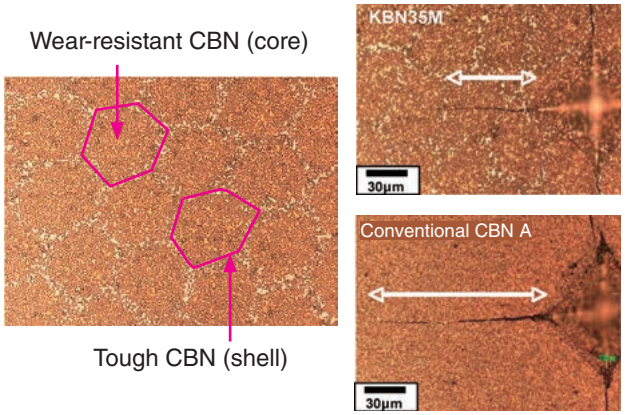
- Honeycomb structure CBN / Ceramic combine a hard, wear-resistant core and a tough shell into one insert.
- The tough shell stops cracks that form in the core.
- CBN is suitable for interrupted machining of exceptionally hard material and ceramic is suitable for heat-resistant alloys

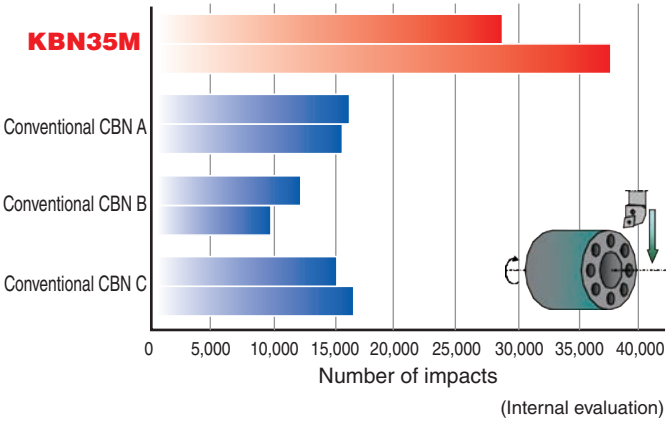
Features of Honeycomb structure CBN / Ceramic

Classification	Symbol	Color	Main Component	Advantages and Applications
H Hard Materials	**KBN35M (MEGACOAT)**	Blackish red	CBN	· Honeycomb structure CBN composite material consisting of wear resistant CBN (core) and tough CBN (shell) · Heat-resistant MEGACOAT on tough Honeycomb structure CBN · Application: Stable machining of hardened steel at interrupted machining
S Heat-resistant alloys	**CF1**	Gray	Ceramic	· Honeycomb structure ceramic composite material consisting of wear resistant ceramic (core) and tough ceramic (shell) · Application: Machining of heat-resistant alloys like Ni-base heat-resistant alloys

KBN35M (MEGACOAT Honeycomb structure CBN)

● Tough CBN (shell) prevents crack growth

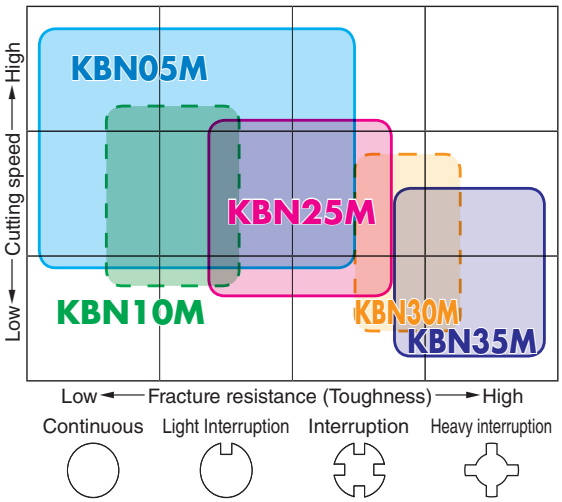




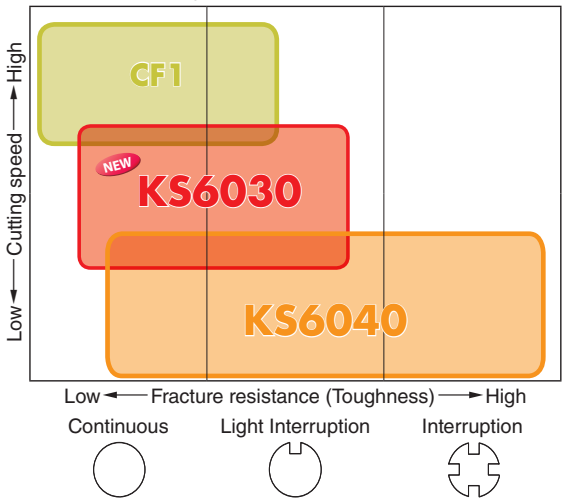
(Internal evaluation)

Application Map

● Hard Materials



● Heat-resistant alloys



Grade Properties

Cermet

Symbol	Color	Main Component	Coating Layer	Ratio	Hardness of Substrate (HV)	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m$^{1/2}$)	Transverse Strength (MPa)
TN610	Gray	TiCN	-	6.6	1,750	17.2	6.0	2,100
TN620	Gray	TiCN	-	6.9	1,550	15.2	9.0	2,500
TN6010	Gray	TiCN	-	6.5	1,700	16.7	7.0	2,000
TN6020	Gray	TiCN	-	6.4	1,500	14.7	10.0	2,500
TN60	Gray	TiCN+NbC	-	6.6	1,600	15.7	9.0	1,760
TN90	Gray	TiCN+NbC	-	6.4	1,450	14.2	10.0	1,960
TN100M	Gray	TiCN+NbC	-	6.7	1,520	14.9	10.5	1,860
TC40N	Gray	TiC+TiN	-	6.0	1,650	16.2	9.0	1,570
TC60M	Gray	NbC	-	8.1	1,500	14.7	10.5	1,670

PVD Coated Cermet

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate (HV)	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m$^{1/2}$)	Transverse Strength (MPa)
PV710	Gold	MEGACOAT NANO	Thin coating	6.6	1,750	17.2	6.0	2,100
PV720	Gold	MEGACOAT NANO	Thin coating	6.9	1,550	15.2	9.0	2,500
PV7005	Blackish red	MEGACOAT	Thin coating	6.0	1,650	16.2	8.5	1,470
PV7010	Blackish red	MEGACOAT	Thin coating	6.5	1,700	16.7	7.0	2,000
PV7025	Blackish red	MEGACOAT	Thin coating	6.4	1,500	14.7	10.0	2,500
PV7040	Blackish red	MEGACOAT	Thin coating	6.0	1,650	16.2	9.0	1,570
PV7020	Gold	TiAlN+TiN	Thin coating	6.4	1,500	14.7	10.0	2,500
PV90	Gold	TiN	Thin coating	6.4	1,450	14.2	10.0	1,960

CVD Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate (HV)	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m$^{1/2}$)	Transverse Strength (MPa)
CA420M	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.5	1,600	15.8	13.0	3,400
CA4010	Gold	Columnar TiCN+Al_2O_3+TiN	Thick coating	14.8	1,720	16.8	9.0	2,450
CA4115	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.7	1,550	15.2	12.0	2,750
CA4120	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.7	1,550	15.2	12.0	2,750
CA4505	Blackish gray	Micro columnar TiCN+Al_2O_3	Thick coating	15.0	1,790	17.5	9.5	2,350
CA4515	Blackish gray	Micro columnar TiCN+Al_2O_3	Thick coating	15.0	1,570	15.4	12.0	2,780
CA510	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.5	1,470	14.4	11.5	2,500
CA515	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.4	1,440	14.1	12.5	2,650
CA525	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.2	1,360	13.3	13.5	2,750
CA530	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	13.9	1,340	13.1	14.5	2,850
CA5505	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.7	1,730	17.0	10.0	2,540
CA5515	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.7	1,550	15.2	12.0	2,750
CA5525	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.5	1,400	13.7	12.0	2,780
CA5535	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick coating	14.1	1,340	13.1	16.5	2,970
CA6515	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thin coating	14.7	1,530	15.0	12.0	2,780
CA6525	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thin coating	14.7	1,370	13.4	16.0	3,100
CA6535	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thin coating	14.3	1,320	12.9	16.0	3,700
CR9025	Gold	Columnar TiCN+TiN	Thick coating	14.5	1,400	13.7	12.0	2,780

PVD Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate (HV)	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m$^{1/2}$)	Transverse Strength (MPa)
PR630	Gold	TiN	Thin coating	12.5	1,500	14.7	11.0	2,160
PR660	Gold	TiN	Thin coating	13.7	1,450	14.2	13.0	2,250
PR830	Gold	TiAlN+TiN	Thin coating	13.7	1,450	14.2	13.0	2,250
PR905	Bluish violet	TiAlN	Thin coating	14.8	1,720	16.8	9.0	2,450
PR915	Bluish violet	TiAlN	Thin coating	14.1	1,700	16.7	11.0	4,140
PR930	Reddish gray	TiCN	Thin coating	14.1	1,700	16.7	11.0	4,140
PR1005	Reddish gray	TiCN	Thin coating	14.9	1,800	17.6	10.0	3,300
PR1025	Reddish gray	TiCN	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1115	Purple red	TiAlN	Thin coating	14.7	1,700	16.7	11.0	3,000
PR1125	Purple red	TiAlN	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1210	Blackish red	MEGACOAT	Thin coating	14.8	1,720	16.8	9.0	2,450
PR1215	Blackish red	MEGACOAT	Thin coating	14.7	1,700	16.7	11.0	3,000
PR1225	Blackish red	MEGACOAT	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1230	Blackish red	MEGACOAT	Thin coating	13.7	1,450	14.2	13.0	2,250
PR1305	Blackish red	MEGACOAT	Thin coating	15.0	1,790	17.5	9.5	2,350
PR1310	Blackish red	MEGACOAT	Thin coating	14.8	1,720	16.8	9.0	2,450
PR1325	Blackish red	MEGACOAT	Thin coating	14.7	1,370	13.4	16.0	3,100
PR1425	Blackish red	MEGACOAT NANO	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1510	Reddish green	MEGACOAT NANO	Thin coating	14.8	1,720	16.8	9.0	2,450
PR1525	Reddish green	MEGACOAT NANO	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1535	Reddish green	MEGACOAT NANO	Thin coating	14.3	1,320	12.9	16.0	3,700

Carbide

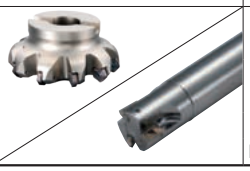
Symbol	Color	Main Component	Ratio	Hardness of Substrate (HV)	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m$^{1/2}$)	Transverse Strength (MPa)
KW10	Gray	WC+Co	15.0	1,650	16.2	10.0	1,470
GW15	Gray	WC+Co	14.7	1,700	16.7	11.0	3,000
GW25	Gray	WC+Co	14.5	1,600	15.8	13.0	3,400
SW05	Gray	WC+Co	15.0	1,790	17.5	9.5	2,350
SW10	Gray	WC+Co	14.8	1,720	16.8	9.0	2,450
SW25	Gray	WC+Co	14.7	1,370	13.4	16.0	3,100

DLC Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate (HV)	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m$^{1/2}$)	Transverse Strength (MPa)
PDL025	Rainbow color	C	Thin coating	14.5	1,600	15.8	13.0	3,400

Insert Grades

Insert Material Selection Table

Applications		Cutting Range	P	M	K		N	S		H	Sintered Steel
			Steel	Stainless steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant alloys	Titanium alloys	Hard Materials	
Turning		Finishing	TN610								
			TN6010		KBN475						
			TN620	TN620	KBN60M			CF1		KT66	
			TN60	TN60	KA30	TN60		KS6040		A66N	TN610
			PV710	PV720	PV7005	PV7005	KPD001	KW10		PT600M	TN60
			PV7010	CA6515	CA5505	CA5505	KPD010	CA6515	KPD001	KBN05M	
			PV720	CA6525	CA4505	CA4505	PDL025	CA6525	KPD010	KBN10M	KBN570
			CA510	PR1125	CA4515	CA4515	KW10	PR1305	SW05	KBN25M	KBN70M
			CA515	PR1535				PR1310	SW10	KBN30M	
			CA525					PR1325	SW25	KBN35M	
		Roughing	CA530					PR1535		KBN900	
Small Tools		Finishing	TN610								
			TN6010								
			TN620								
			PV710	TN620							TN610
			PV7010	PV720	CA4505	CA4505	KPD001	CA6515	KPD001	KBN05M	TN60
			PV720	PR930	CA4515	CA4515	KPD010	PR1125	KPD010	KBN10M	
			PR930	PR1025	KW10	KW10	PDL025	PR1225	KW10	KBN25M	KBN570
			PR1005	PR1225			KW10			KBN30M	KBN70M
			PR1025	PR1535							
			PR1425								
		Roughing	PR1535								
Boring		Large	TN610								
			TN6010								
			TN620								
			PV710	TN60	KBN475						
			PV7010	CA6515	KBN60M					PT600M	TN610
			PV720	CA6525	PV7005	PV7005	KPD001	CA6515	KPD001	KBN05M	TN60
			CA515	PR1025	CA4505	CA4505	KPD010	CA6525	KPD010	KBN10M	
			CA525	PR1125	CA4515	CA4515	PDL025	PR1125	KW10	KBN25M	KBN570
			CA530	PR1225	KW10	KW10	KW10	PR1225	SW05	KBN30M	KBN70M
			PR1025	PR930							
			PR1425	PR1535							
			PR930								
		Small	PR1535								
Cut-Off		Large	CR9025	CR9025							
			PR930	PR930							
			PR915	PR915	KW10	KW10	PDL025	KW10	KW10		
			PR1215	PR1215	PR1215	PR1215	KW10	PR1225		-	-
			PR1225	PR1225				PR660			
			PR1535	PR1535							
		Small	PR660	PR660							
Cut-Off		(Depends on the workpiece material)									
			PR1025	PR1025	KW10	KW10	PDL025	KW10	KW10		
			PR1225	PR1225			KW10	PR1025		-	-
			PR1535	PR1535				PR1225			
Grooving		Glossy finish	TC40N	TC40N							
			TN620	TN620							
			TN90	TN90	PR905	PR905	KPD001	PR915	KPD001	KBN510	TC40N
			PV7040	PV7040	PR1215	PR1215	PDL025	KW10	KW10	KBN525	
			PR930	PR930	KW10	KW10	KW10	PR1215		PT600M	KBN570
			PR1115	PR1115	GW15	GW15	GW15	PR1225			
			PR1215	PR1215							
		Stable	PR1225	PR1225							
Threading		Glossy finish									
			TC60M	TC60M	KW10	KW10	KW10	KW10	KW10		
			PR1115	PR1115	GW15	GW15	GW15	GW15	GW15	-	PR1115
		Stable	PR930	PR930							
Drilling		Wear Resistance						PR660			
			PR1225	PR1225	PR1210	PR1210	KW10	PR1225	KW10		
			PR1230	PR830	KW10	KW10	GW15	KW10		-	-
			PR830	PR660				GW15			
		Toughness	PR660								
Milling		Finishing					KPD230	CA6535	KPD230		
			TN100M	CA6535			KPD001	PR1225	KPD001		
			PR1225	PR1225	PR1210	PR1210	KPD010	PR1535	KW10	-	-
			PR1230	PR1525	PR1510	PR1510	PDL025		PR905		
			PR1230	PR830	KW10	KW10	KW10		PR1210		
		Roughing	PR830	PR1535			GW25		PR1535		

・Highlighted materials are recommended choice.

Turning Indexable Inserts

B

B1~B107

Turning Indexable Inserts Identification System		**B2**
Insert Color		**B3**
Chipbreaker Selection		**B4~B12**
Chipbreaker shape of Negative Inserts		**B4**
Chipbreaker shape of Positive Inserts		**B10**
How to read pages of "Turning Inserts"		**B13**
Cermet / Coated Carbide / Carbide Lineup		**B14~B82**
Turning Negative Inserts	CN□□...80° Rhombic	**B14**
	DN□□...55° Rhombic	**B21**
	KN□□...55° Parallelogram	**B28**
	RN□□...Round	**B28**
	SN□□...90° Square	**B29**
	TN□□...60° Triangle	**B33**
	VN□□...35° Rhombic	**B40**
	WN□□...80° Trigon	**B42**
	Small Double Sided Tools	**B46**
Turning Positive Inserts	CC□□, CP□□...80° Rhombic	**B49**
	DC□□, DP□□...55° Rhombic	**B57**
	JC□□...70° Rhombic	**B67**
	RC□□...Round	**B68**
	SC□□, SP□□...90° Square	**B69**
	TB□□, TC□□, TP□□...60° Triangle	**B70**
	VB□□, VC□□, VP□□...35° Rhombic	**B82**
	WB□□, WP□□...80° Trigon	**B89**
Inserts for Back Turning	TKFB	**B92**
	ABS15 / ABW15 / ABW23	**B94**
Bearing Machining	R□MT-BB / SNMF	**B95**
Solid Tip-Bars		**B96**
Ceramic Inserts Identification System		**B97**
Ceramic Lineup		**B98~B107**
Turning Negative Inserts	CN□□...80° Rhombic	**B98**
	DN□□...55° Rhombic	**B99**
	EN□□...75° Rhombic	**B99**
	RN□□...Round	**B100**
	SN□□...90° Square	**B101**
	TN□□...60° Triangle	**B103**
	VN□□...35° Rhombic	**B104**
Turning Positive Inserts	RP□□...Round	**B105**
	SP□□...90° Square	**B105**
	TB□□, TC□□, TP□□...60° Triangle	**B105**
Inserts for Hardened Rolls	RBG / RCGX / RPGX	**B106**
Grooving Inserts	GH	**B107**

Turning Indexable Inserts Identification System

Symbol	Shape
H	Hexagon
O	Octagon
P	Pentagon
S	Square
T	Triangle
C	80° Rhombic
D	55° Rhombic
E	75° Rhombic
F	50° Rhombic
M	86° Rhombic
V	35° Rhombic
W	80° Trigon
L	Rectangle
A	85° Parallelogram
B	82° Parallelogram
K	55° Parallelogram
R	Round

Shown angle stands for acute angle for rhombic and parallelogram inserts.

(1) Shape Symbol

Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

(2) Relief Angle Symbol

Symbol (Class)	Tolerance (mm)		
	Corner Height	Thickness	I.C. Size
A	±0.005	±0.025	±0.025
F			±0.013
C	±0.013		±0.025
H			±0.013
E	±0.025		±0.025
G		±0.13	
J	±0.005	±0.025	±0.05~±0.15
K*	±0.013		
L*	±0.025		
M*	±0.08~±0.18	±0.13	
N*		±0.025	
U*	±0.13~±0.38	±0.13	±0.08~±0.25

* Insert's periphery is as fired.
Tolerance difference is depending on insert size.

(3) Tolerance Symbol

Symbol	Hole	Hole Shape	Chipbreaker	Shape
N	No	–	No	
R			Single Sided	
F			Two Sides	
A	Yes	With Hole	No	
M			Single Sided	
G			Two Sides	
W		With Hole and One Countersink 40°~60°	No	
T			Single Sided	
Q		With Hole and Two Countersink 40°~60°	No	
U			Two Sides	
B		With Hole and One Countersink 70°~90°	No	
H			Single Sided	
C		With Hole and Two Countersink 70°~90°	No	
J			Two Sides	
X	-	-	-	-

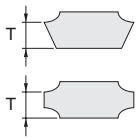
(4) Hole / Chipbreaker Symbol

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ISO (metric)	C	N	M	G	12	04	08	PG
ANSI (inch)	C	N	M	G	4	3	2	PG

(5) Edge Length Symbol (ISO)							I.C. Size (mm)	(5) I.C. Size (ANSI)	
C	D	R	S	T	V	W		IC Size (inch)	Symbol
03	04		03	06			3.97	5/32	12
04	05		04	08	08		4.76	3/16	15
		05					5		
05	06		05	09		03	5.56	7/32	18
		06					6		
06	07		06	11	11	04	6.35	1/4	2
08	09		07	13		05	7.94	5/16	25
		08					8		
09	11	09	09	16	16	06	9.525	3/8	3
	12	10					10		
		12					12		
12	15	12	12	22	22	08	12.7	1/2	4
16	19	15	15	27	27	10	15.875	5/8	5
		16					16		
19	23	19	19	33	33	13	19.05	3/4	6
		20					20		
22	27		22	38			22.225	7/8	7
		25					25		
25	31	25	25	44	44	17	25.4	1	8
32	38	31	31	54	54	21	31.75	1-1/4	10
		32					32		

· Expressed as edge length for ISO.
· ANSI expresses the inscribed circle diameter in inches.

(6) Thickness Symbol			
ISO		ANSI	
Thickness (mm)	Symbol	Thickness (inch)	Symbol
1.59	01	1/16	1
1.98	T1	5/64	12
2.38	02	3/32	15
2.78	T2	-	-
3.18	03	1/8	2
3.97	T3	5/32	25
4.76	04	3/16	3
5.56	05	7/32	35
6.35	06	1/4	4
7.94	07	5/16	5
9.525	09	3/8	6



Thickness displayed as the distance between bottom surface and highest point on cutting edge.

(7) Corner-R(rε) Symbol			
ISO		ANSI	
Corner-R(rε) (mm)	Symbol	Corner-R(rε) (inch)	Symbol
Sharp Corner	00	.000	00
0.03	003	.001	01
0.05	005	.002	013
0.1	01	.004	02
0.2	02	.008	05
0.4	04	1/64	1
0.8	08	1/32	2
1.2	12	3/64	3
1.6	16	1/16	4
2.0	20	5/64	5
2.4	24	3/32	6
2.8	28	7/64	7
3.2	32	1/8	8
Round insert	00 (inch) or M0 (metric)	Round insert	0

(8) Manufacturer's Option
Hand Symbol Chipbreaker Symbol, etc.

Positive Inserts Identification System

CCGT060201MER-U

- Minus tolerance for Corner-R(rε)
- With Honing
- Insert Hand
- Chipbreakers

CCGT060201MFP-GF

- Minus tolerance for Corner-R(rε)
- Sharp edge
- Polished
- Chipbreakers

When a minus tolerance is specified for the corner-R(rε)

If a minus tolerance is specified for the corner-R(rε) as shown in the Fig.1, using an insert with corner-R(rε)=0.2 mm may result in larger radius than specified.
Use an insert the corner of which R(rε) has a minus tolerance.

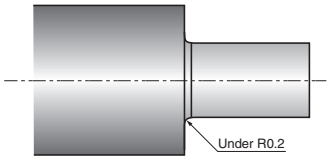
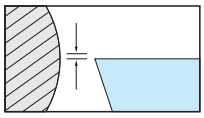


Fig.1 Example of a specified corner-R in the drawing

Features of insert with tolerance symbol of "E" Class

"E" Class Turning Insert

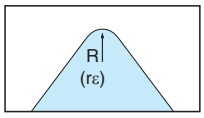
· Accuracy of index position after insert replacement



Thickness Tolerance

±0.13mm → ±0.025mm

(Conventional)



Corner-R (rε) Tolerance

±0.1mm → ±0.02mm

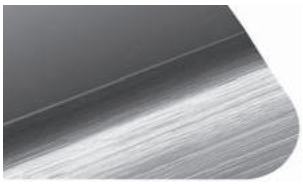
(Conventional)

High Quality Ground Insert "Super Fine"

· Applicable for mechatronics, electronics and high precision machined parts
· Sub-micron accuracy possible

High Quality Ground Insert

· Reduced micro chipping during edge grounding
· Less adhesion · Long tool life

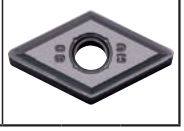


Insert Color

Cermet, MEGACOAT NANO Cermet, MEGACOAT Cermet and PVD Coated Cermet

Grades	Cermet							MEGACOAT NANO Cermet		MEGACOAT Cermet				PVD Coated Cermet	
	NEW TN610	NEW TN620	TN6010	TN6020	TN60	TN100M	TC40N	TC60M	NEW PV710	NEW PV720	PV7005	PV7010	PV7025	PV7040	PV7020	PV90
Insert Color																

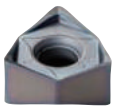
MEGACOAT (PVD Coated Carbide)

Grades	MEGACOAT						
	PR1210	PR1215	PR1225	PR1230	PR1305	PR1310	PR1325
Insert Color							

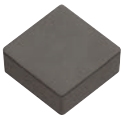
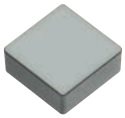
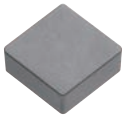
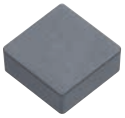
CVD Coated Carbide and PVD Coated Carbide

Grades	CVD Coated Carbide						PVD Coated Carbide								
	NEW CA420M	CA45 series	CA40/CA41 series	NEW CA510 CA515 CA525 CA530	CA55 series	CA65 series	PR660	PR830	PR905	PR915	PR930	PR1005	PR1025	PR1115	PR1125
Insert Color															

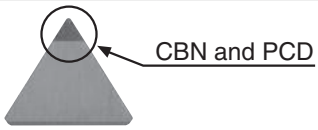
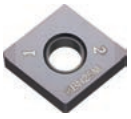
MEGACOAT (PVD Coated Carbide)

Grades	MEGACOAT NANO			
	PR1425	PR1510	PR1525	PR1535
Insert Color	NEW 			

Ceramic

Grades	Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	SiAlON Ceramic		Honeycomb structure Ceramic
	KA30	A65	KT66	A66N	PT600M	KS6050	CS7050	NEW KS6030	KS6040	CF1
Insert Color										

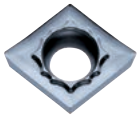
CBN and PCD

Grades	CBN					PCD			MEGACOAT CBN	PVD Coated CBN
	KBN65B	NEW KBN475	KBN510	KBN525	NEW KBN570	KPD001	KPD010	KPD230	KBN··M	KBN900
Insert Color	 CBN and PCD									

DLC Coated Carbide

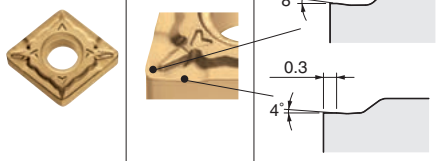
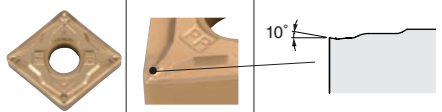
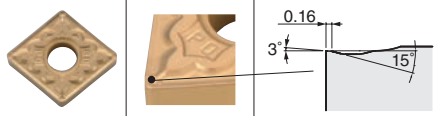
Grades	DLC Coated Carbide
	NEW PDL025
Insert Color	

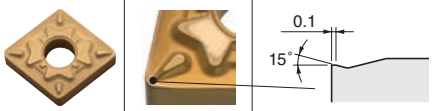
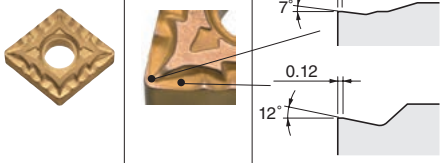
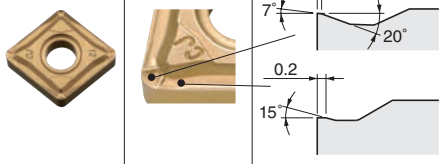
Carbide

Grades	Carbide			
	GW15	GW25	KW10	SW05
Insert Color				

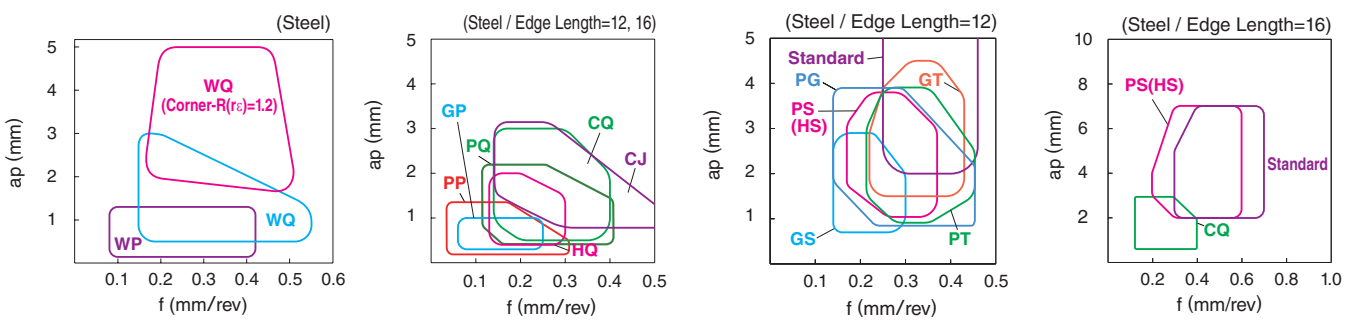
Steel

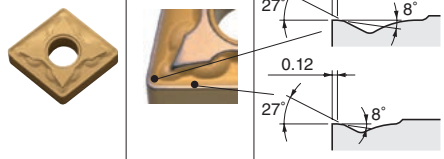
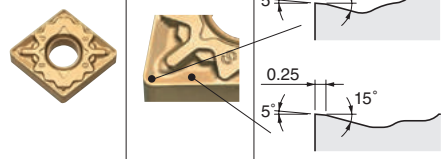
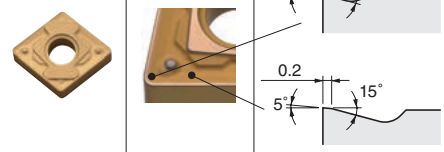
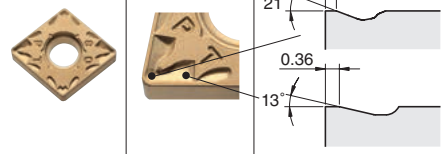
1 Molded Chipbreaker

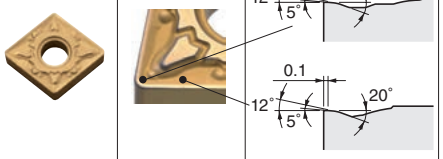
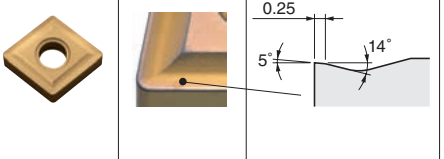
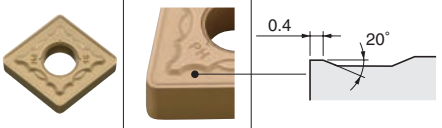
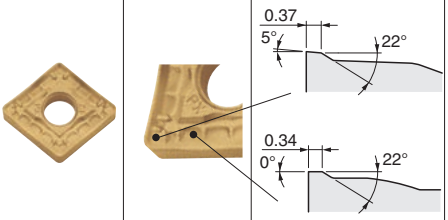
Cutting Range	Name	Design	Advantages
Finishing (With Wiper Edge)	WP		Wiper insert. Good chip control at small machining.
Finishing-Medium (With Wiper Edge)	WQ		Wiper insert. Double feed rate possible while maintaining a smooth finish. High efficiency and good chip control.
Finishing	PP		3-step dot structure realizes stable chip control at a wide range of feed rate. Less cutting force due to sharp cutting edge and smooth rake face.
Finishing-Medium	PQ		Stable chip control in a wide feed rate range by breaking chips effectively. The well-balanced edge sharpness and toughness.

Cutting Range	Name	Design	Advantages
Finishing	GP		Finishing to light machining. Good chip control.
Finishing-Medium	HQ		Sharp cutting performance with 3-D rake angle and double projection design.
Finishing-Medium	CQ		Good chip control for varied ap such as copying. Applicable to up facing.
Finishing-Medium (Up Facing)	CJ		Improved chip curing at small machining and high feed rate machining. Improved chip evacuation at copying and up facing.
Medium - Roughing	PG		Stable machining with good balance of edge sharpness and strength. Prevent chip clogging at high feed rate. Good chip control at low feed rate. Stable machining with wide chip control range.

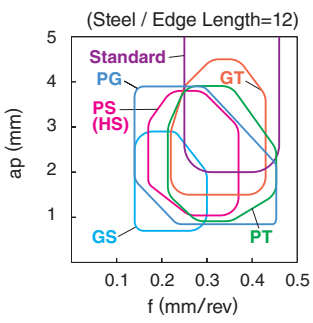
Applicable Chipbreaker Range (ap indicates radius)

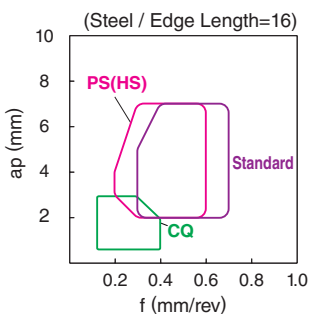


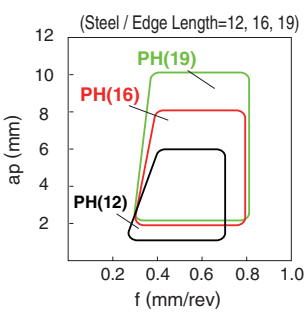
Cutting Range	Name	Design	Advantages
Medium - Roughing	GS		Strong edge chipbreaker. Stable for continuous machining and light interrupted machining.
Medium - Roughing	PS		General purpose chipbreaker. More stable due to large contact surface.
Medium - Roughing	HS		General purpose chipbreaker. Applicable to copying.
Medium-Roughing / High Feed Rate	PT		Low cutting force at high feed machining. Land support structure.

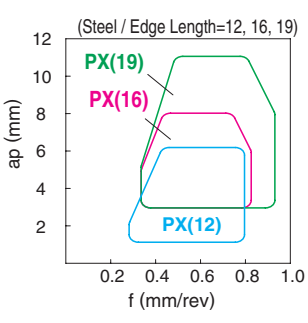
Cutting Range	Name	Design	Advantages
Medium-Roughing / High Feed Rate	GT		Strong edge chipbreaker. Wide land design and smooth chip control even at high feed rate machining.
Roughing	Standard (Without Indication)		Low cutting force and applicable to large ap roughing.
Roughing	PH		For roughing of steel. Suitable for heavy interrupted machining and for workpieces with scale due to strong cutting edge.
Single Sided Roughing (High Feed Rate)	PX		Roughing and high feed rate operation. Low cutting force chipbreaker.

Applicable Chipbreaker Range (ap indicates radius)



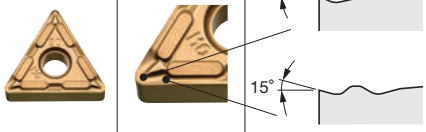
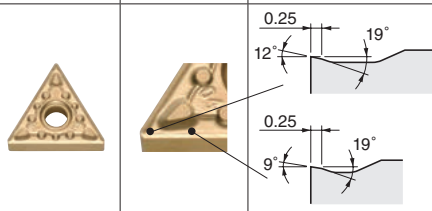
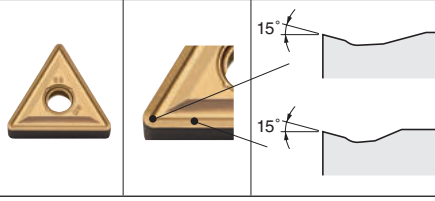


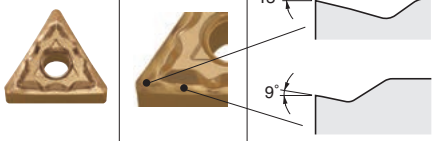
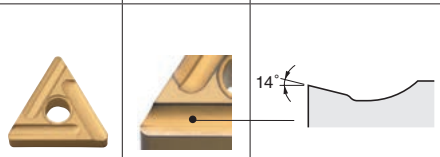




Chipbreaker Selection (Negative Inserts)

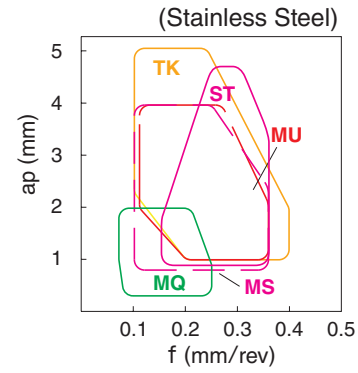
Stainless Steel / Heat-Resistant Alloys / Titanium Alloy

Cutting Range	Name	Design	Advantages
Finishing	MQ		Large rake angle. Low cutting force and good chip control.
Medium-Roughing	MS		Superior cutting edge sharpness and strength achieved by a positive land. Extra strength of cutting edge inhibits damage from wall shouldering.
Medium-Roughing	MU		Large rake angle reduces cutting force. Less burring achieved by diminishing damage from notching.

Cutting Range	Name	Design	Advantages
Medium-Roughing	TK		Smooth chipbreaker geometry improves chip flow with less adhesion. Large curled chips.
Medium-Roughing	ST		Less cutting force due to large rake angle. Less notching by special design.

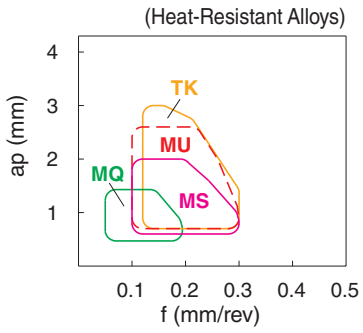
Stainless Steel

● Applicable Chipbreaker Range (ap indicates radius)



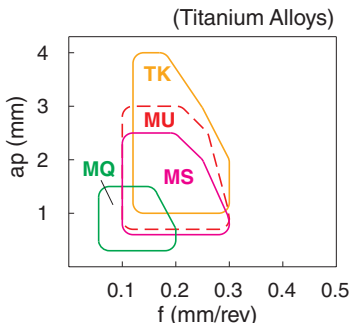
Heat-Resistant Alloys

● Applicable Chipbreaker Range (ap indicates radius)

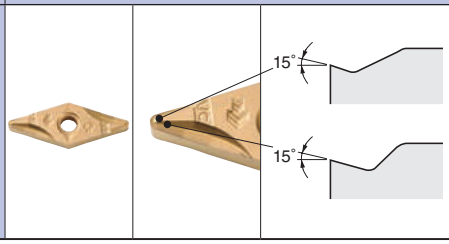


Titanium Alloys

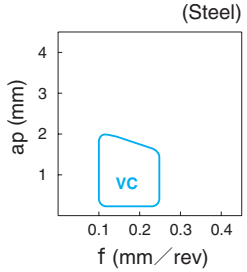
● Applicable Chipbreaker Range (ap indicates radius)



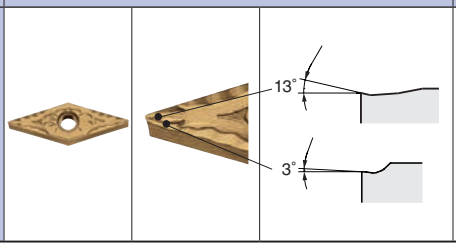
Steel (Copying / Undercutting , Varied ap)

Cutting Range	Name	Design	Advantages
Finishing-Medium	VC		Chipbreaker with hand for copying. Excellent chip control in a wide range of machinig applications.

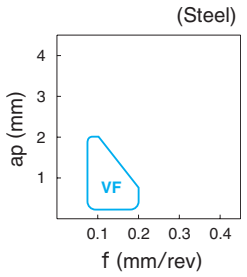
● Applicable Chipbreaker Range (ap indicates radius)



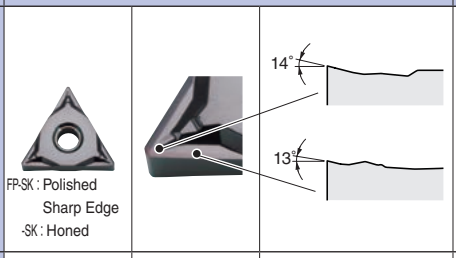
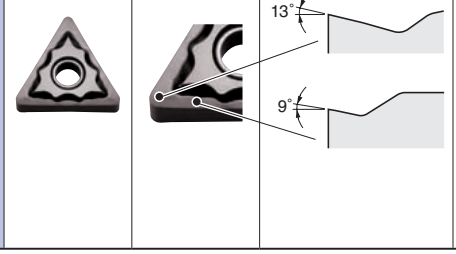
Steel (Copying / Undercutting , Varied ap)

Cutting Range	Name	Design	Advantages
Finishing-Medium	VF		Good chip control for varied ap such as copying and undercutting.

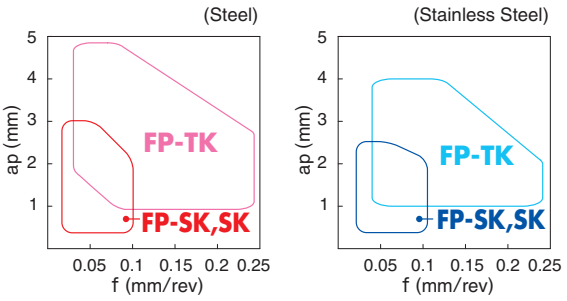
● Applicable Chipbreaker Range (ap indicates radius)



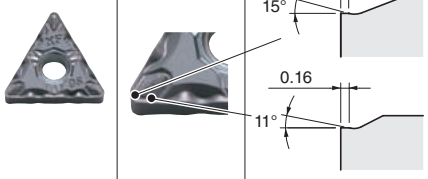
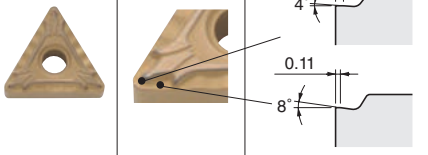
Steel / Stainless Steel (for automatic lathe)

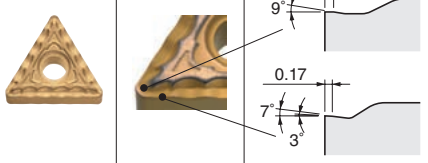
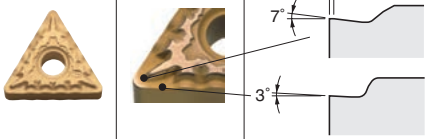
Cutting Range	Name	Design	Advantages
Finishing-Medium	SK	 FP-SK : Polished Sharp Edge -SK : Honed	For finishing to medium machining in automatic lathes. Sharp cutting performance equivalent to positive inserts. 2-step dot design provides reliable chip control at various ap.
Medium-Roughing	FP-TK		For medium to large ap in automatic lathes (When machining workpieces of medium to large dia.) Superior cutting performance achieved by sharp edge and polished surface. Smooth chipbreaker geometry improves chip flow with less adhesion. Large curled chips.

● Applicable Chipbreaker Range (ap indicates radius)



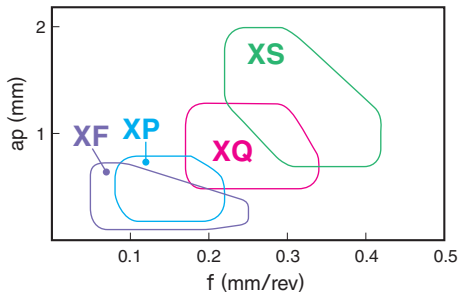
Low Carbon Steel (Pipe / Rolled Plate / Rolled Steel)

Cutting Range	Name	Design	Advantages
Finishing	XF		Excellent chip control at high speed and small ap machining of low carbon steel
Finishing	XP		Short chips when finishing due to sharp cutting and special design.

Cutting Range	Name	Design	Advantages
Medium	XQ		Consistent chip breaking at medium machining due to moderate rake face and special design.
Roughing	XS		Consistent chip breaking when roughing due to special rake face and rake angle design.

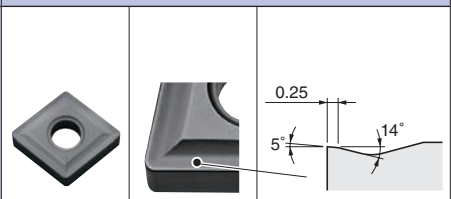
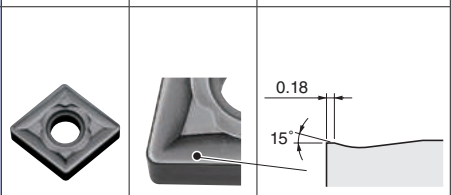
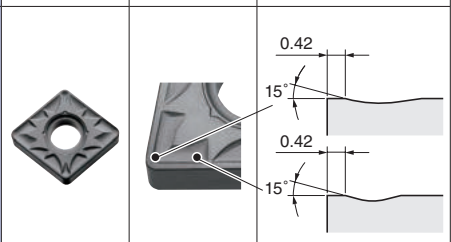
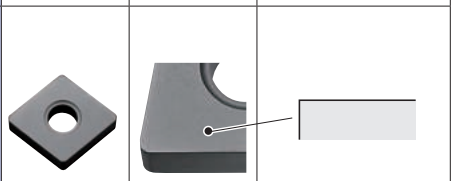
● Applicable Chipbreaker Range (ap indicates radius)

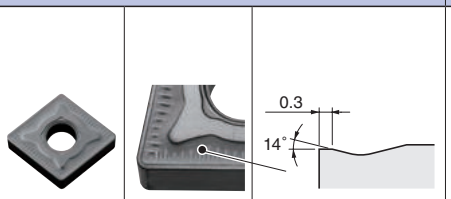
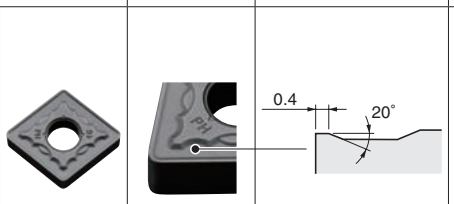
(Low Carbon Steel)



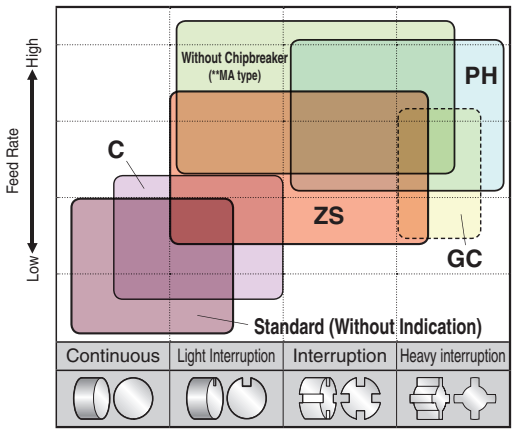
Chipbreaker Selection (Negative Inserts)

Cast Iron

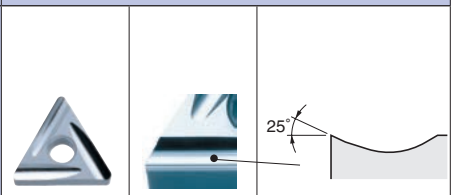
Cutting Range	Name	Design	Advantages
Sharp Cutting Oriented	Standard (Without Indication)		Standard chipbreaker for continuous to light interrupted machining of cast iron. (Low cutting force)
	C		High feed rate chipbreaker for continuous to light interrupted machining of cast iron.
	ZS		Standard chipbreaker for light interrupted to interrupted machining of cast iron. (Stability Oriented)
	Without Chipbreaker		High feed rate chipbreaker for light interrupted to interrupted machining of cast iron.

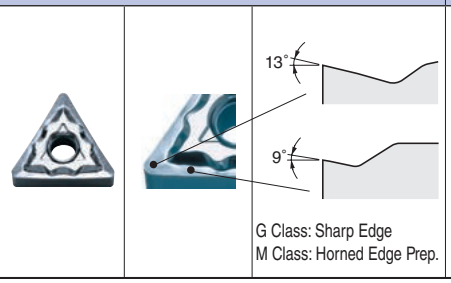
Cutting Range	Name	Design	Advantages
Stability Oriented	GC		Chipbreaker for heavy interrupted machining of cast iron. (Tough edge chipbreaker)
	PH		Chipbreaker for roughing of cast iron. Suitable for heavy interrupted machining and for workpieces with scale due to strong cutting edge.

Chipbreaker Selection (Negative Inserts)

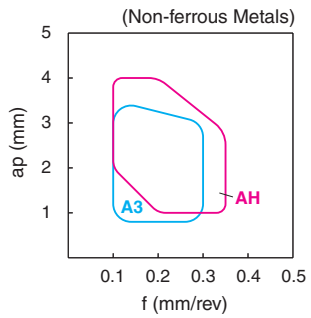


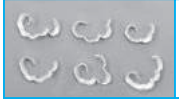
Non-ferrous Metals

Cutting Range	Name	Design	Advantages
Finishing-Medium	A3		Large rake angle and smooth surface. Good chip control and less adhesion.

Cutting Range	Name	Design	Advantages
Medium - Roughing	AH	 G Class: Sharp Edge M Class: Horned Edge Prep.	Polished chipbreaker. Smooth chip control and less adhesion.

Applicable Chipbreaker Range (ap indicates radius)

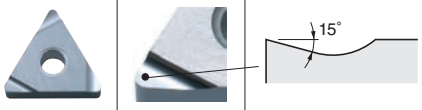
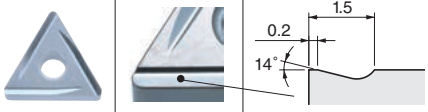
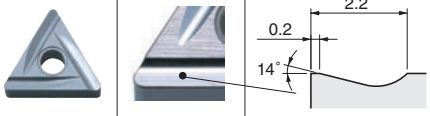


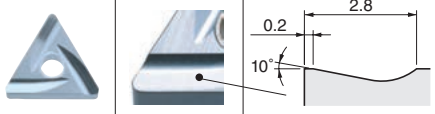
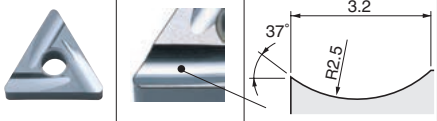
A3 Chipbreaker	
	ap=2mm f=0.2mm/rev
	ap=2mm f=0.3mm/rev

AH Chipbreaker	
	ap=2mm f=0.2mm/rev
	ap=2mm f=0.3mm/rev

Steel

2 Ground Chipbreaker

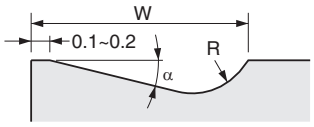
Cutting Range	Name	Design	Advantages
Finishing	S		Sharp edge and less cutting force. Good chip control and smooth chip evacuation.
Finishing-Medium	B		Suitable for general purpose machining at feed rate 0.15 to 0.25mm/rev.
Medium - Roughing	C		Suitable for general purpose machining at feed rate 0.20 to 0.35mm/rev.

Cutting Range	Name	Design	Advantages
Roughing	D		Suitable for general purpose machining at feed rate 0.30 to 0.45mm/rev.
Medium-Roughing / Low Cutting Force	25R		Applicable to sticky material such as low carbon steel. Large rake angle and suitable for stainless steel.

Effectiveness of ground chipbreaker

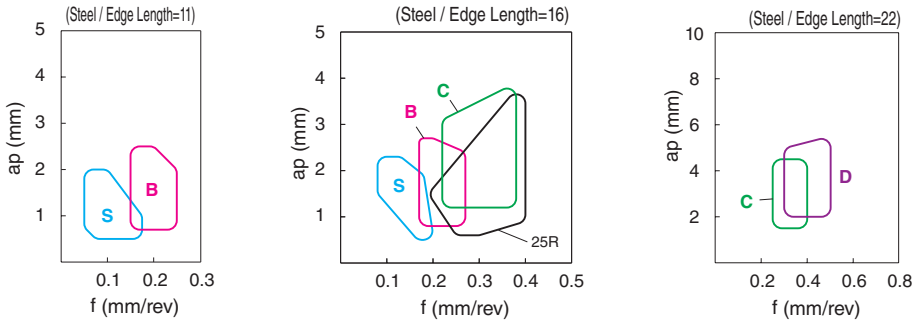
(1) Lower cutting force and improve edge
(2) Improved adhesion resistance
(3) Improved dimension accuracy and finishing surface accuracy
(4) Controlled chip evacuation direction

Specification of B, C, D and parallel ground chipbreaker



Insert Type	Size	Chipbreaker Name	W	α	R
CNGG	09,12	Without Indication (Similar to C)	2.2	14°	1.0
WNGG	06	Without Indication (Similar to C)	2.2	14°	1.0
TNGG	11, 16	B	1.5	14°	0.5
	16, 22	C	2.2	14°	1.0
	16, 22	D	2.8	10°	1.5
DNGG	11, 15	Without Indication (Similar to C)	2.5	14°	2.0
VNGG	16	Without Indication (Similar to B)	1.5	14°	0.5
SNGG	09, 12	B	1.5	14°	0.5
	12	C	2.2	14°	1.0

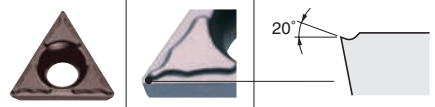
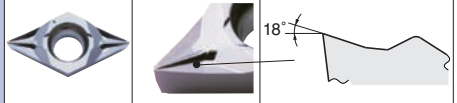
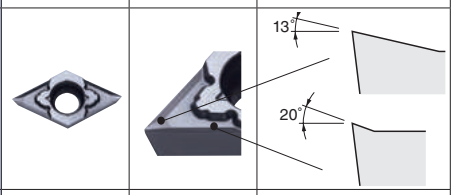
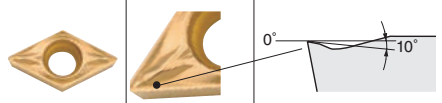
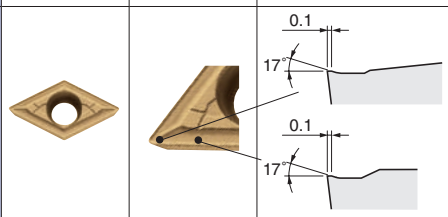
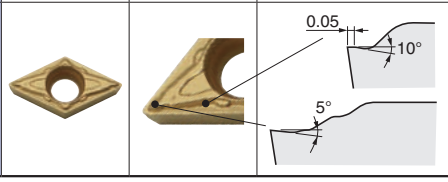
Applicable Chipbreaker Range (ap indicates radius)

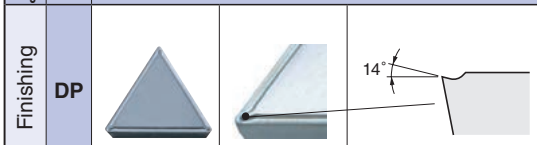
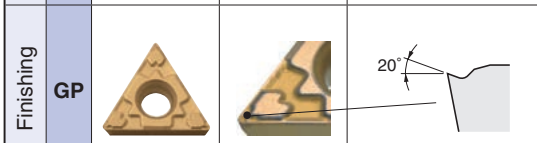
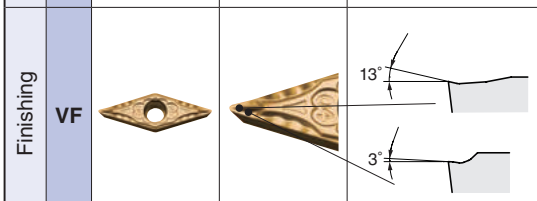
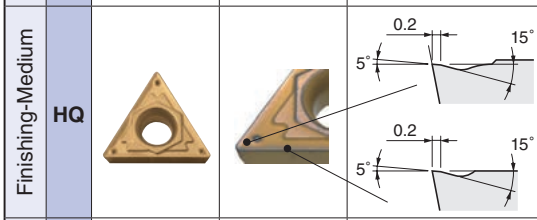
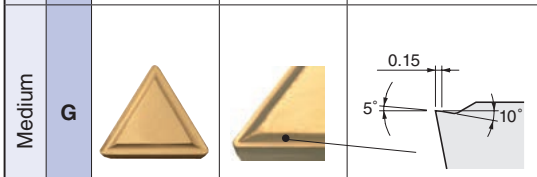
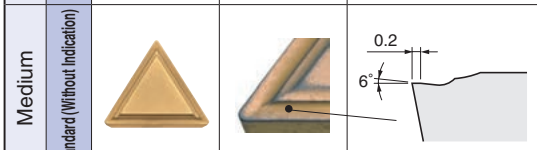


Chipbreaker Selection (Positive Insert)

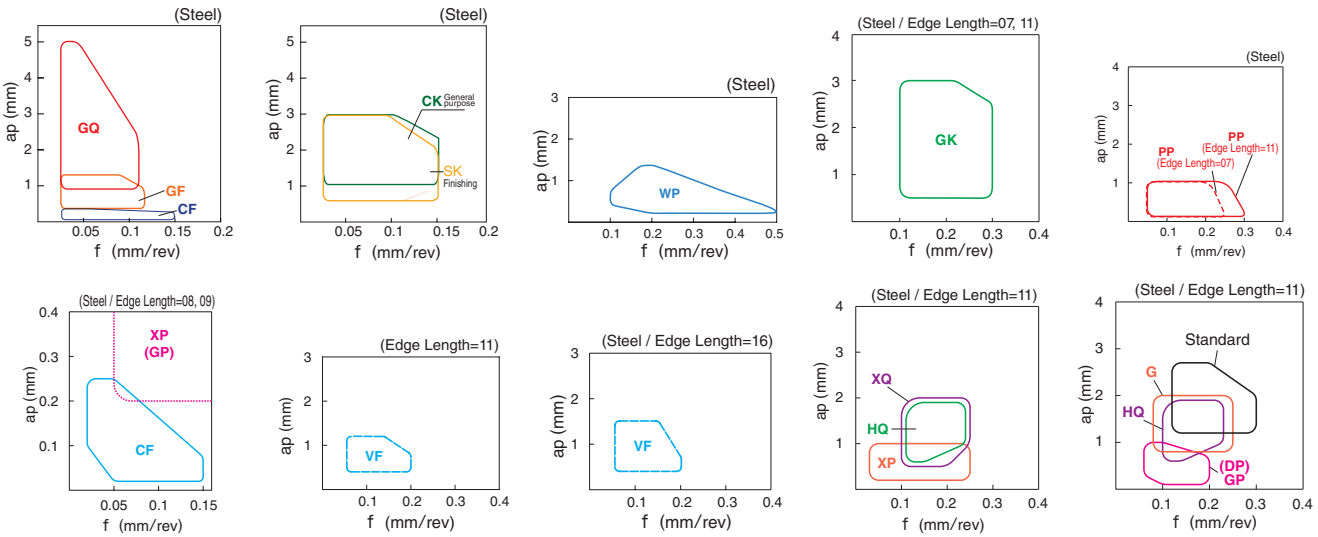
Steel

1 Molded Chipbreaker

Cutting Range	Name	Design	Advantages
Minute ap	CF		Available for minute ap (0.02 to 0.2mm) finishing.
Finishing	GF		Chips fragmented in small pieces in machining of small ap.
Finishing-Medium	GQ		Enables machining over a wide range of conditions by using the optimum chipbreaker width according to the cutting depth.
Finishing	SK		Sharp cutting performance due to Large rake angle. Large dot to the corner edge improved chip control in a wide feed rate range.
Finishing	CK		Good cutting performance. Applicable without hand for two direction machining on automatic lathe.
Finishing	WP		Wiper insert. Good surface finish at high feed machining Reduces surface finish galling
Finishing-Medium	GK		Good chip evacuation at wide range by breaker dot and wide chip pocket.
Finishing	PP		1st. Recommendation at steel finishing. Stable chip control in a wide feed rate range. Stable tool life due to special edge design with sharpness and improved strength.

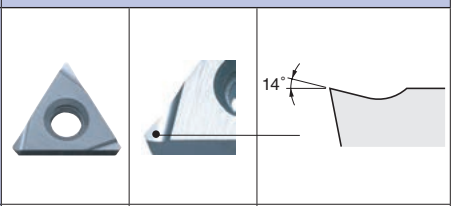
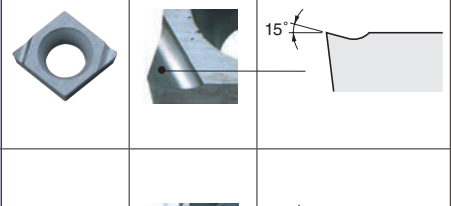
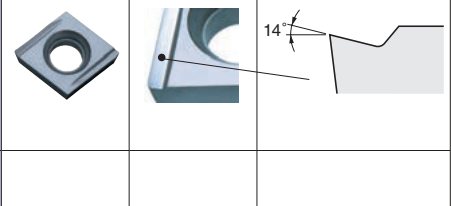
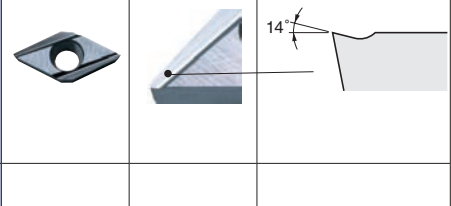
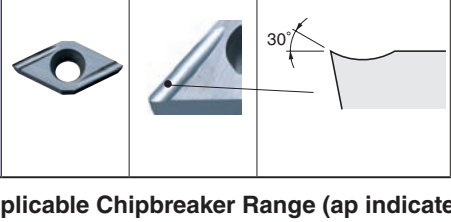
Cutting Range	Name	Design	Advantages
Finishing	DP		Consistent chip breaking performance for finishing.
Finishing	GP		Good chip control.
Finishing	VF		Good chip control for varied ap such as copying and undercutting.
Finishing-Medium	HQ		General purpose chipbreaker for medium machining.
Medium	G		Chipbreaker for short chips at medium machining.
Medium	Standard (Without Indication)		Strong edge chipbreaker for medium machining range.

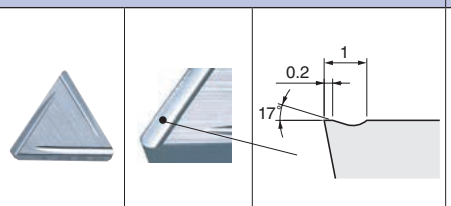
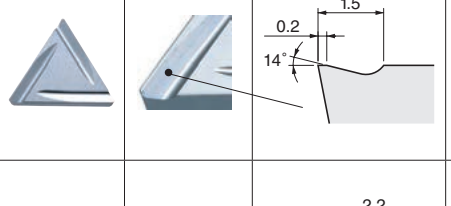
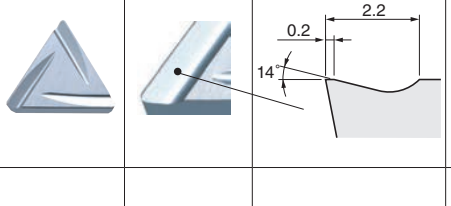
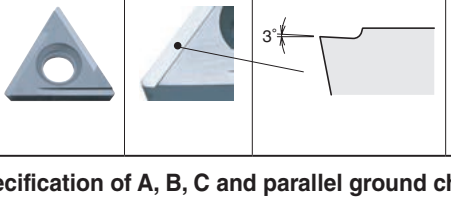
Applicable Chipbreaker Range (ap indicates radius)



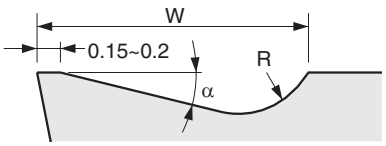
Steel

2 Ground Chipbreaker

Cutting Range	Name	Design	Advantages
Finishing	Lead (Without Indication)		Good chip control at finishing to light machining with low cutting force.
Finishing	F		Good chip control at finishing to light machining with low cutting force.
Medium	Y		Sharp cutting performance and good surface finish.
Low Feed	J		Slant chipbreaker width and chip control at various ap. Applicable to automatic lathes.
Low Feed	U		Good chip control at low feed rate and varied ap with low cutting force.

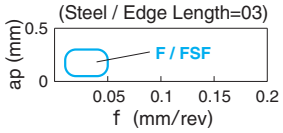
Cutting Range	Name	Design	Advantages
Finishing	A		Large rake angle and low cutting force. Narrow chipbreaker width and consistent chip control.
Finishing-Medium	B		General purpose chipbreaker for medium machining. Good balance between chip control and sharp cutting.
Medium	C		Applicable to high load machining. Good chip flow and less resistance.
Medium	H		Sharp cutting performance and small curled chips.

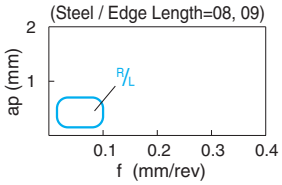
Specification of A, B, C and parallel ground chipbreaker

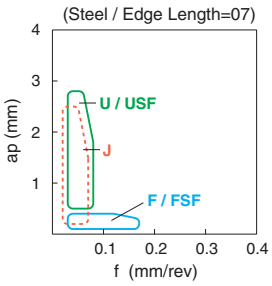


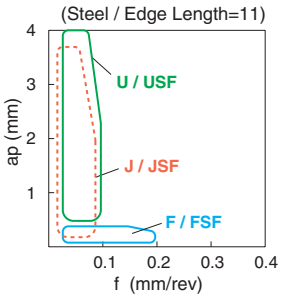
Insert Type	Size	Chipbreaker Name	W	α	R
TPGR	11	A	1.0	17°	0.5
	11,16	B	1.5	14°	0.5
	16	C	2.2	14°	1.0
SPGR	09	Without Indication (Similar to B)	1.5	14°	0.5
	12	Without Indication (Similar to C)	2.2	14°	1.0

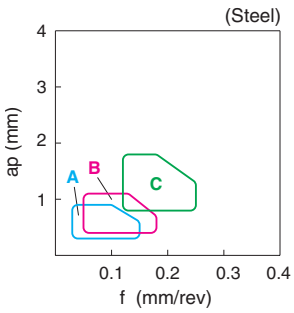
Applicable Chipbreaker Range (ap indicates radius)

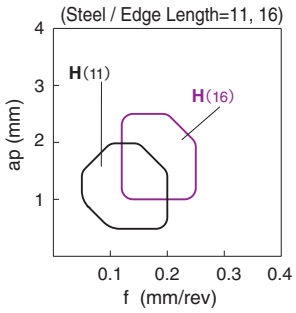






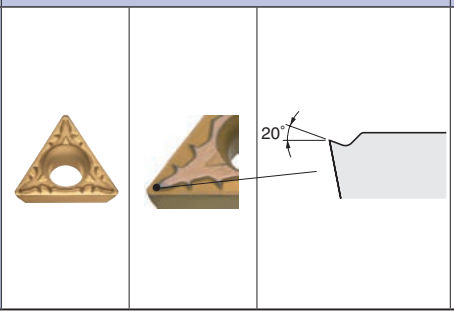


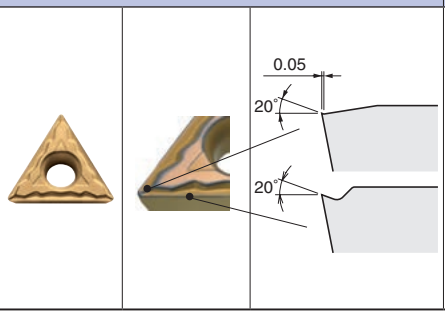




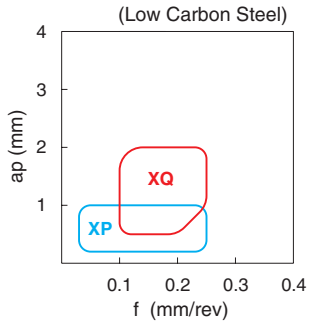
Chipbreaker Selection (Positive Insert)

Low Carbon Steel (Pipe / Rolled Plate / Rolled Steel)

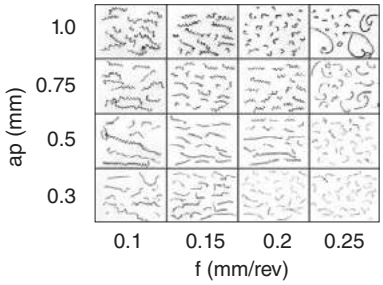
Cutting Range	Name	Design	Advantages
Finishing	XP		Consistent chip breaking performance even for low carbon steel and sticky material.

Cutting Range	Name	Design	Advantages
Finishing-Medium	XQ		Wide chip control range and sharp cutting performance. Suitable for low carbon steel and sticky material.

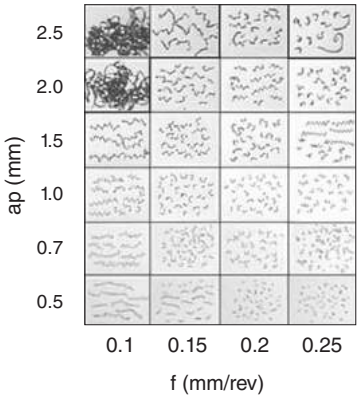
Applicable Chipbreaker Range (ap indicates radius)



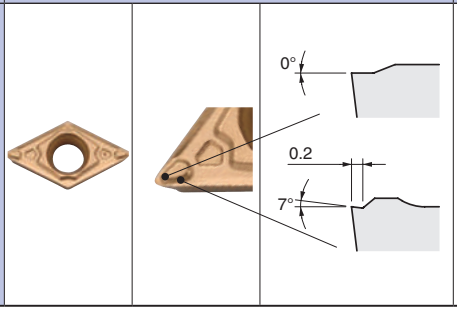
XP Chipbreaker



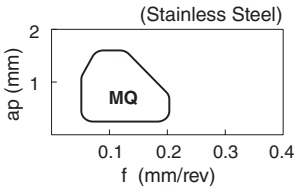
XQ Chipbreaker



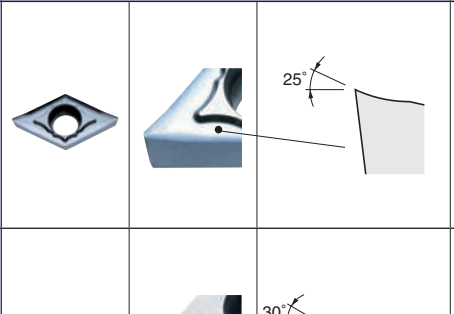
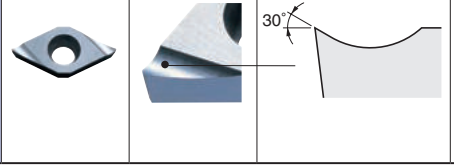
Stainless Steel

Cutting Range	Name	Design	Advantages
Finishing	MQ		Good chip evacuation at internal turning. Small curled chips. Prevents chip entanglement with toolholder and stabilizes surface roughness.

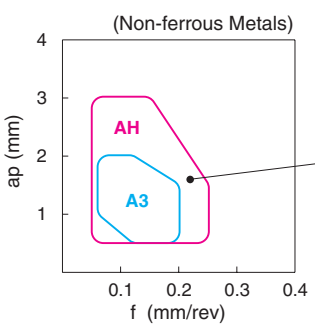
Applicable Chipbreaker Range (ap indicates radius)



Non-ferrous Metals

Cutting Range	Name	Design	Advantages
Finishing-Medium	AH		Positive chip groove and good chip control with low cutting force. Polished surface reduces adhesion.
Finishing-Medium	A3		Large rake angle, smooth chip flow and less adhesion. Superior cutting performance achieved by sharp edge.

Applicable Chipbreaker Range (ap indicates radius)



AH Chipbreaker

How to read pages of “Turning Inserts”

· Ref. to below for page contents of “Turning Inserts”
· Some contents are same in Chapter C

Classification of usage
✱: Interruption / 1st Choice
✲: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Recommended grades for each applications are shown here.

Insert's ISO Classification of usage (Workpiece materials are written on the right side.)

Insert Dimensions

Insert Grades (Red characters mean new)

Insert Corner-R(rε)

Insert Shape

Insert descriptions

Explanation for inserts

Example

Handed Insert shows Right-hand	Handed Insert shows Left-hand

Application / Recommended workpiece material

Insert Appearance Image Ref. to Page **B3** for insert color.

Applicable chipbreaker range map No.

Purchase unit

Stock

Applicable Toolholder

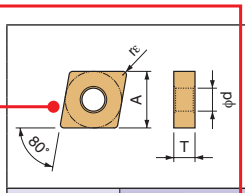
Applicable chipbreaker range map No.

Turning Indexable Inserts

How to read pages of “Turning Inserts” B13

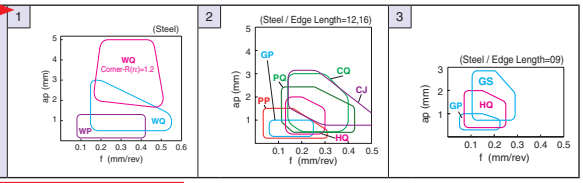
80° Rhombic / Negative with Hole

Description	A	T	φd	Description	A	T	φd
CN_0904_	9.525	4.76	3.81	CN_1606_	15.875	6.35	6.35
CN_1204	12.70	4.76	5.16	CN_1906	19.05	6.35	7.94



Insert	Description	rε	Cermet				MEGACOAT Cermet			PVD Coated Cermet	CVD Coated Carbide										MEGACOAT MEGACOAT NANO				PVD Coated Carbide			DLC	Carbide	Ref. to Page for Application (Toolholder) / Applicable Chipbreaker Range
			TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA4510	CA4515	CA530	CA4530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4605	CA4616	CA4620	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05	
With Wiper Edge	Finishing	CNMG 120404WP	0.4	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				1
		CNMG 120408WP	0.8	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				D8
With Wiper Edge	Finishing-Medium	CNMG 120404WQ	0.4	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				F63
		CNMG 120408WQ	0.8	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				F67
		CNMG 120412WQ	1.2	●	○	●	○	●	●	●	○	○	●	○	●	●	●	●	●	●	●	●																				F68
Finishing		CNMG 120402PP	0.2	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																					2
		CNMG 120404PP	0.4	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																					
		CNMG 120408PP	0.8	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																					
		CNMG 120412PP	1.2	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																					
Finishing		CNMG 090404GP	0.4	●		●		●	●	●			●		●	●	●	●	●	●	●	●																				D8	3
		CNMG 090408GP	0.8	●		●		●	●	●			●		●	●	●	●	●	●	●	●																				F68	
		CNMG 120402GP	0.2	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				D8	
		CNMG 120404GP	0.4	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				F63	
		CNMG 120408GP	0.8	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				F68	
Finishing-Medium		CNMG 120404PQ	0.4	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				D8	2
		CNMG 120408PQ	0.8	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				F63	
		CNMG 120412PQ	1.2	●	○	●	○	●	●	●	○	○	●	○	●	●	●	●	●	●	●	●																				F67	
Finishing-Medium		CNMG 090404HQ	0.4	●		●		●	●	●			●		●	●	●	●	●	●	●	●																				F68	
		CNMG 090408HQ	0.8	●		●		●	●	●			●		●	●	●	●	●	●	●	●																				D8	3
		CNMG 120404HQ	0.4	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				F68	
		CNMG 120408HQ	0.8	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																				D8	
		CNMG 120412HQ	1.2	●	○	●	○	●	●	●	○	○	●	○	●	●	●	●	●	●	●	●																				F63	
		CNGG 120408HQ	0.8																		●●																				F67	
		CNGG 120412HQ	1.2																		●●																				F68	
Finishing-Medium (Up Face)		CNMG 120404CQ	0.4	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																					2
		CNMG 120408CQ	0.8	●●	○	●●	○	●●	●●	●●	○○	○○	●●	○○	●●	●●	●●	●●	●●	●●	●●	●●																					
		CNMG 120412CQ	1.2	●	○	●	○	●	●	●	○	○	●	○	●	●	●	●	●	●	●	●																					
Finishing-Medium (Up Face)		CNMG 160608CQ	0.8												●●	●●	●●	●●	●●	●●	●●	●●																				D8	
		CNMG 160612CQ	1.2												●●	●●	●●	●●	●●	●●	●●	●●																					
Finishing-Medium (Up Face)		CNMG 120408CJ	0.8												●●	●●	●●	●●	●●	●●	●●	●●																				D8	
		CNMG 120412CJ	1.2												●●	●●	●●	●●	●●	●●	●●	●●																				F63	
																																									F67	
																																									F68	
		CNMG 160612CJ	1.2												●●	●●	●●	●●	●●	●●	●●	●●																				D8	
		CNMG 160616CJ	1.6												●●	●●	●●	●●	●●	●●	●●	●●																					

Applicable Chipbreaker Range
ap indicates radius



B14 Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

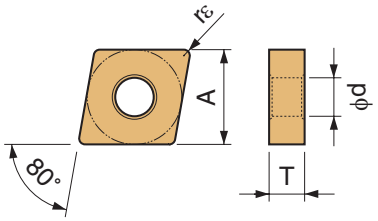
80° Rhombic / Negative with Hole

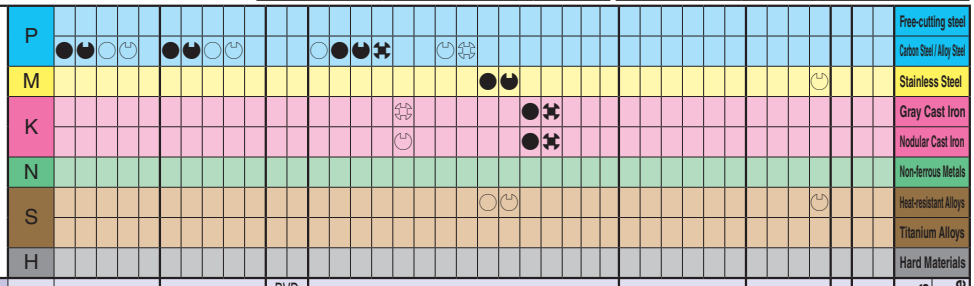
(mm)

Description	A	T	φd
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	φd
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94



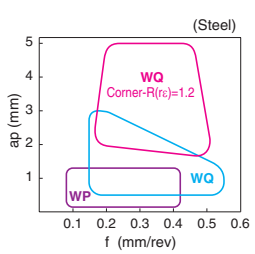


Insert	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	CNMG 120404WP	0.4	●	●			○	●	●	●	○			○	●	●	●	●	●	●	●																					
Finishing	CNMG 120408WP	0.8	●	●			○	●	●	●	○			○	●	●	●	●	●	●	●																					
With Wiper Edge	CNMG 120404WQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●				●	●														D8 F63 F67 F68	1
Finishing-Medium	CNMG 120408WQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●				●	●															
	CNMG 120412WQ	1.2		●		○		●					●	○	●	●	●	●	●	●	●				●	●															
Finishing	CNMG 120402PP	0.2	●	●	●	○		●	●	●	○				●	●	●	●		●	●																				
	CNMG 120404PP	0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																				
	CNMG 120408PP	0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																				
	CNMG 120412PP	1.2	●	●	●	○		●	●	●	○				●	●	●	●																							
Finishing	CNMG 090404GP	0.4		●			●		●				●																												
	CNMG 090408GP	0.8		●			●		●				●																												
	CNMG 120402GP	0.2	●	●		○	●	●	●	●	○		●	○	●	●	●	●		●	●																				
	CNMG 120404GP	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	□	●	●																				
	CNMG 120408GP	0.8	●	●		○	●	●	●	●	○		●	○	●	●	●	●	□	●	●																				
Finishing-Medium	CNMG 120404PQ	0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																				
	CNMG 120408PQ	0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																				
	CNMG 120412PQ	1.2	●	●	●	○		●	●	●	○				●	●	●	●		●	●																				
Finishing-Medium	CNMG 090404HQ	0.4		●			●		●				●		●	●	●	●		●	●																				
	CNMG 090408HQ	0.8		●			●		●				●		●	●	●	●		●	●																				
	CNMG 120404HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●																		
	CNMG 120408HQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●																		
	CNMG 120412HQ	1.2					●						●		●	●	●	●		●	●	●	●																		
	CNGG 120408HQ	0.8																		●	●																				
	CNGG 120412HQ	1.2																		●	●																				
Finishing-Medium / Up Facing	CNMG 120404CQ	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●	●	●	●	●																			
	CNMG 120408CQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●																			
	CNMG 120412CQ	1.2					●						●		●	●	●	●	●	●	●	●																			
	CNMG 160608CQ	0.8													●	●	●	●		●	●																				
	CNMG 160612CQ	1.2													●	●	●	●		●	●																				
Finishing-Medium / Up Facing	CNMG 120408CJ	0.8													●	●	●	●	●	●	●	●																			
	CNMG 120412CJ	1.2													●	●	●	●		●	●	●																			
	CNMG 160612CJ	1.2													●	●	●	●		●	●																				
	CNMG 160616CJ	1.6													●	●	●	●		●	●																				

Applicable Chipbreaker Range

ap indicates radius

1



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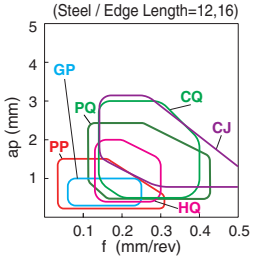

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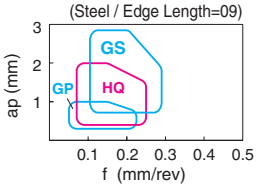

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How to read pages of "Turning Inserts" B13

80° Rhombic / Negative with Hole

(mm)

Description	A	T	φd
CN_0904_	9.525	4.76	3.81
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(mm)

Description	A	T	φd
CN_1606_	15.875	6.35	6.35
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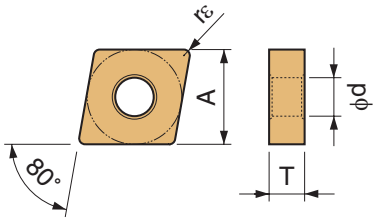
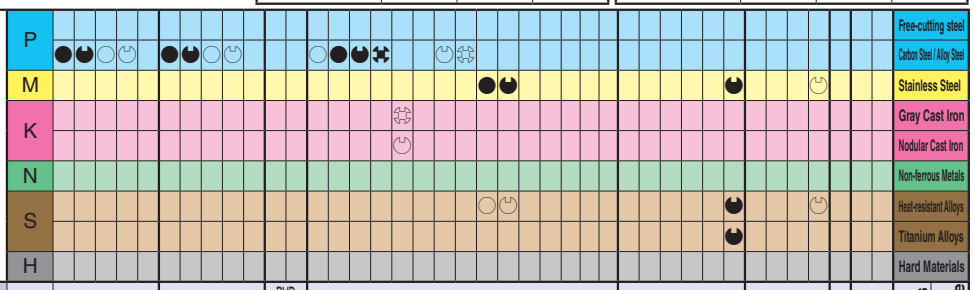
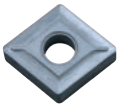


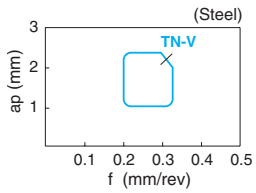


Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium		CNMG 120404TN-V 120408TN-V	0.4 0.8					●																																			D8 F63 F67 F68	1
Medium - Roughing		CNMG 090404GS 090408GS	0.4 0.8		●			●		●				●		●	●	●	●		●	●																					D8 F68	B14 3
		CNMG 120404GS 120408GS 120412GS	0.4 0.8 1.2								○			● ○ ● ○ □		●	●	●	●		●	●																							
Medium - Roughing	NEW	CNMG 120404PG 120408PG 120412PG 120416PG	0.4 0.8 1.2 1.6	●	●				●	●						●	●	●	●																	●							D8 F63 F67 F68	
Medium - Roughing		CNMG 120404PS 120408PS 120412PS 120416PS	0.4 0.8 1.2 1.6			●					● ○ ● ○ ○					●	●	●	●	●	●	●	●	●																●					
		CNMG 160612PS 160616PS	1.2 1.6													●	●	●	●	●	●	●	●	●																				D8	
Medium - Roughing		CNMG 120404HS 120408HS 120412HS 120416HS	0.4 0.8 1.2 1.6				○	○					○ ○ ○	○ ○ ○						○ ○ ○	○ ○ ○																						D8 F63 F67 F68	2
		CNMG 160612HS	1.2																									□															D8	
Medium-Roughing / High Feed Rate		CNMG 120408PT 120412PT	0.8 1.2													●	●	●	●	●	●	●	●	●	●																				D8 F63 F67 F68	
		CNMG 160608PT 160612PT 160616PT	0.8 1.2 1.6													●	●	●	●	●	●	●	●	●	●																				D8	
Medium-Roughing / High Feed Rate		CNMG 120408GT 120412GT	0.8 1.2								○			● ○ ● □		●	●	●	●		●	●																						D8 F63 F67 F68	

Applicable Chipbreaker Range

ap indicates radius

1



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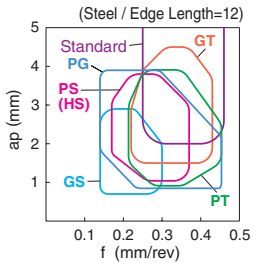

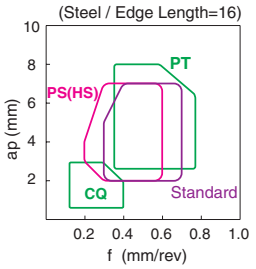

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80° Rhombic / Negative with Hole

(mm)

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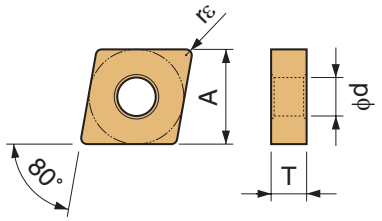
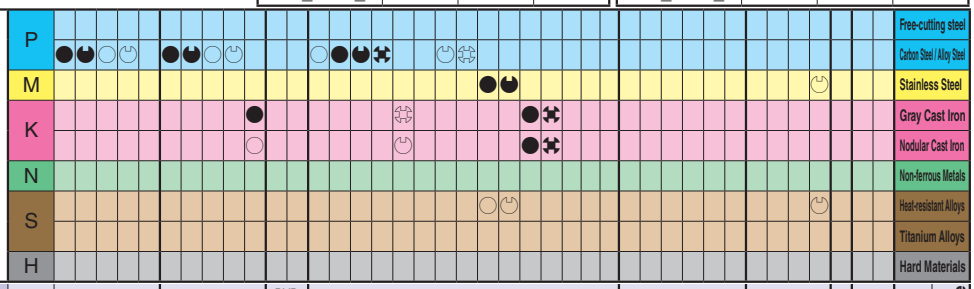
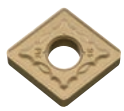


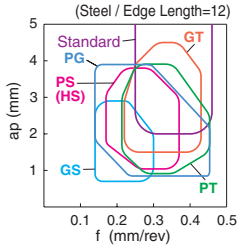


Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Roughing		CNMG 120404	0.4	●	●	●	○	●	●	●	●	○	●	●		●	●	●	●	●	●		●	●	●	●	○	○	●										●			D8 F63 F67 F68	1
		120408	0.8	●	●	●	○	●	●	●	●	○	●	●		●	●	●	●	●	●	●	●	●	●	●	○	○	●										●				
		120412	1.2					●					●			●	●	●	●	●	●	●	●	●	●	●	□	○	●										●				
		120416	1.6																	●					●	●	○	○	●														
		CNMG 160608	0.8															●	●	●	●	●																					D8	2
		160612	1.2															●	●	●	●	●					●																	
		160616	1.6																	□	●		●				●																	
		CNMG 190608	0.8																	●						●	●		○	●													-	
		190612	1.2													●	●	●	●		●	●	●			●	●		○	●														
		190616	1.6													●	●	●	●		□	●	●			●	●		□															
Roughing		CNMG 120408PH	0.8													●	●	●	●		●	●	●			●	●															D8 F63 F67 F68	3
		120412PH	1.2													●	●	●	●		●	●	●			●	●																
		120416PH	1.6													●	●	●	●		●	●	●			●	●																
		CNMG 160608PH	0.8													●	●	●	●		●	●				●	●															D8	
		160612PH	1.2													●	●	●	●		●	●	●			●	●																
		160616PH	1.6													●	●	●	●		●	●				●	●																
		CNMG 190608PH	0.8													●	●	●	●		●	●																					-	
		190612PH	1.2													●	●	●	●		●	●	●																				
		190616PH	1.6													●	●	●	●		□	●	●																				
		190624PH	2.4													●	●	●	●		□	□																				
Single Sided / Roughing / High Feed Rate		CNMM 120408PX	0.8													●	●	●	●		●	●	●																			D8 F63 F67 F68	4
		120412PX	1.2													●	●	●	●		●	●	●																				
		120416PX	1.6															●	●		□	□	□																				
		CNMM 160608PX	0.8													●	●	●	●		□	●	●																			D8	
		160612PX	1.2													●	●	●	●		●	●	●																				
		160616PX	1.6													●	●	●	●		●	●	●																				
		CNMM 190608PX	0.8															●	●		□	●																				-	
		190612PX	1.2													●	●	●	●		●	●																				
		190616PX	1.6													●	●	●	●		●	●	●																				
		190624PX	2.4															●	●		●	●	●																				

Applicable Chipbreaker Range

ap indicates radius

1



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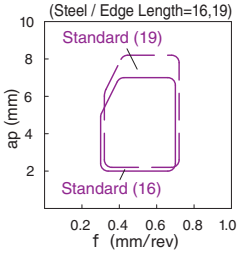

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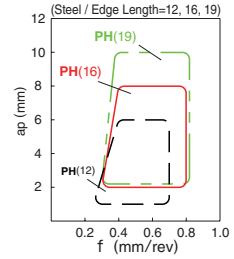

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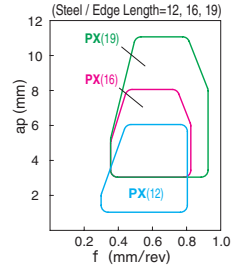

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(mm)

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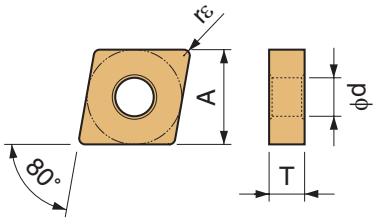


P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

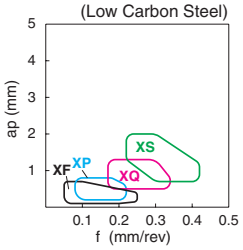
Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Carbon Steel	Finishing / Small ap	CNMG 120404XF 120408XF	0.4 0.8	● ●	● ●	● ●			● ●	● ●	● ●	○ ○																																	
Low Carbon Steel	Finishing	CNMG 120404XP 120408XP	0.4 0.8	● ●	● ●	● ●	○ ○	● ●	● ●	● ●	● ●	○ ○		● ●	○ ○	● ●	● ●	● ●	● ●		● ●	● ●																							D8 F63 F67 F68	1
Low Carbon Steel	Medium	CNMG 120404XQ 120408XQ	0.4 0.8	● ●	● ●	● ●	○ ○	● ●	● ●	● ●	● ●	○ ○		● ●	○ ○	● ●	● ●	● ●	● ●	● ●	● ●	● ●																							
Low Carbon Steel	Roughing	CNMG 120408XS	0.8	●	●	●	○	●	●	●		○		●	○	●	●	●	●		●	●																							
Finishing-Medium	NEW Sharp Edge / Polished	CNGG 120402MFP-SK 120404MFP-SK	<0.2 <0.4																											● ●	● ●			● ●									D8 E40 F63 F67 F68	2
Medium - Roughing	Sharp Edge / Polished	CNGG 120404FP-TK 120408FP-TK	0.4 0.8																											● ●	● ●			● ●											

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



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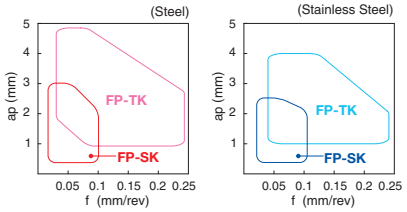

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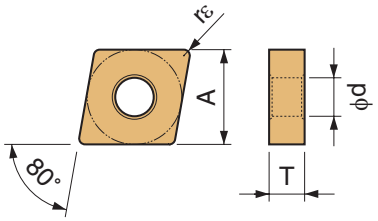

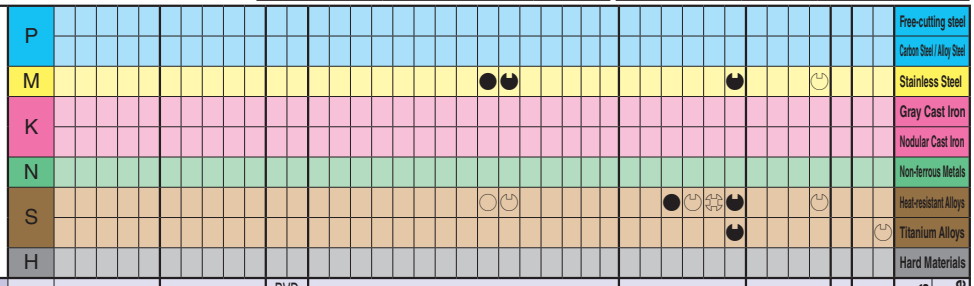

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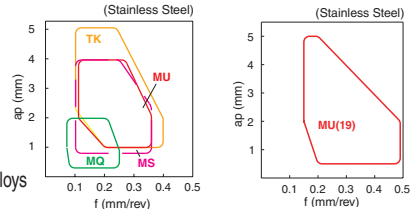
Stainless Steel / Heat-Resistant Alloys	Medium-Roughing / Sharp Edge	CNGG 120404TK 120408TK	0.4 0.8																												● ●	● ●									● ●		D8 F63 F67 F68	1
	Medium - Roughing	CNMG 120404TK 120408TK	0.4 0.8																				● ●	● ●							● ●	● ●	● ●					● ●				
Stainless Steel / Heat-Resistant Alloys	Finishing-Medium	CNMG 120404MQ 120408MQ	0.4 0.8																				● ●	● ●							● ●	● ●	● ●	● ●				● ●		● ●		
	Medium - Roughing	CNMG 120404MS 120408MS 120412MS 120416MS	0.4 0.8 1.2 1.6																				● ● ● ●	● ● ● ●							● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●				● ● ●		● ● ●		
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	CNMG 120404MU 120408MU 120412MU	0.4 0.8 1.2																				● ● ●	● ● ●							● ● ●	● ● ●	● ● ●	● ● ●				● ●		● ●		
		CNMG 160608MU 160612MU 160616MU	0.8 1.2 1.6																				● ● ●	● ● ●								● ● ●	● ● ●					● ● ●				D8	
		CNMG 190612MU 190616MU	1.2 1.6																													● ●	● ●										-	

Applicable Chipbreaker Range
ap indicates radius

1



Heat-Resistant Alloys
Titanium Alloys
B6

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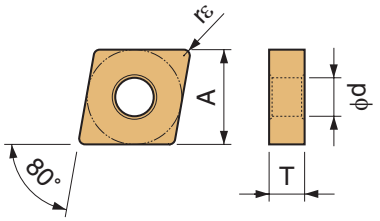
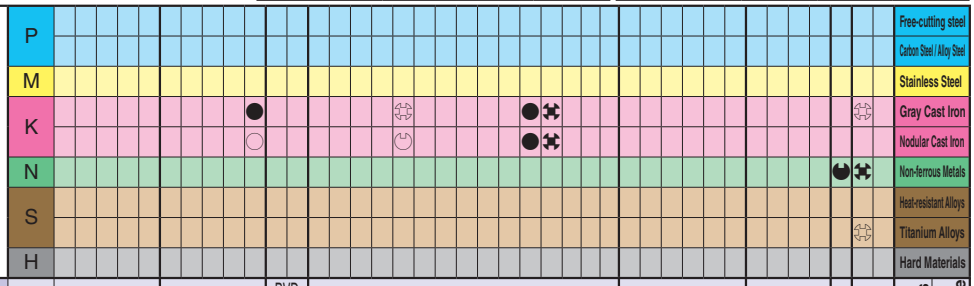
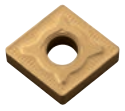
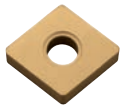
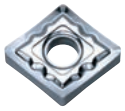


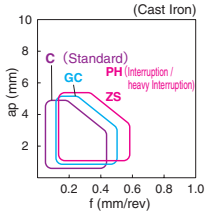


Insert Handed Insert shows Right-hand		Description	Dimension (mm) rε	Cermet					MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide													MEGACOAT MEGACOAT NANO					PVD Coated Carbide				DLC	Carbide			Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
				TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Cast Iron	Roughing	CNMG 120404C 120408C 120412C 120416C	0.4 0.8 1.2 1.6																□ ● ● ●						● ● ● ●	● ● ● ●	○ ○ ○ □	● ● ● ●													D8 F63 F67 F68	
		CNMG 160612C	1.2																						● ●	● ●	□ ○	● ●													D8	
Cast Iron	Roughing	CNMG 120408ZS 120412ZS	0.8 1.2																● ●						● ●	● ●	○ ○	○ ○	● ●														1
Cast Iron	 Roughing	CNMG 120408GC 120412GC	0.8 1.2																●						● ●	● ●	○ □	○ □	● ●														
Cast Iron	 Without Chipbreaker	CNGA 120404 120408	0.4 0.8									● ●																										● ●				-
		CNMA 120404 120408 120412 120416	0.4 0.8 1.2 1.6									● ●							● ● ● ●						● ● ● ●	● ● ● ●	□ ○ ○ □	□ ○ ○ □	● ● ● ●											● ●		D8 F63 F67 F68	
Non-ferrous Metals	Finishing-Medium / Sharp Edge	CNGG 120404R-A3 120404L-A3 120408R-A3 120408L-A3	0.4 0.4 0.8 0.8																																		● ● ● ●	● ● ● ●		
Non-ferrous Metals	Medium-Roughing / Sharp Edge	CNGG 120404AH 120408AH	0.4 0.8																																		● ●	● ●		2
Non-ferrous Metals	 Medium - Roughing	CNMG 120404AH 120408AH	0.4 0.8																																		● ●	● ●		

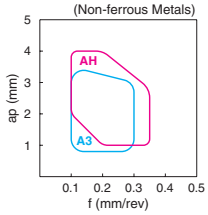
Applicable Chipbreaker Range

ap indicates radius

1 (Cast Iron)



2 (Non-ferrous Metals)



● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

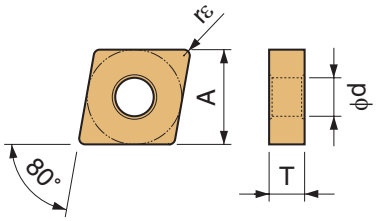
80° Rhombic / Negative with Hole

(mm)

Description	A	T	φd
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	φd
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94



P ● ● ○ ◔ ● ●
M
K ◇
N ✖
S ◇
H

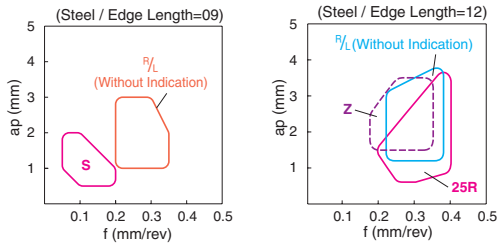
Free-cutting steel / Carbon Steel / Alloy Steel / Stainless Steel / Gray Cast Iron / Nodular Cast Iron / Non-ferrous Metals / Heat-resistant Alloys / Titanium Alloys / Hard Materials

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	CNGG 090402R-S	0.2	●		●		●	●					●																															
	CNGG 090402L-S	0.2	●		●		●	●					●																															
	CNGG 090404R-S	0.4	●		●		●	●					●																															
	CNGG 090404L-S	0.4	●		●		●	●																																	●		
	CNGG 090408R-S	0.8	●		●			●																																		D8 F68	
	CNGG 090408L-S	0.8	●		●			●																																			
Surface Roughness Oriented																																											
Medium	CNGG 090404L	0.4																																							●		
	CNGG 090408L	0.8																																							●		
	CNGG 120404R	0.4	●	●	●	○	●	●	●																																		1
	CNGG 120404L	0.4	●	●	●	○	●	●	●																																		
	CNGG 120408R	0.8	●		●	□	●	●																																		
	CNGG 120408L	0.8	●		●	□	●	●																																		
Medium - Roughing	CNGG 120404R-25R	0.4	●		●		●	●																																	●	D8 F63	
	CNGG 120404L-25R	0.4	●		●		●	●																																	●		
	CNGG 120408R-25R	0.8	●		●		●	●																																	●	F67	
	CNGG 120408L-25R	0.8	●		●		●	●																																	●	F68	
Low cutting force																																											
Medium - Roughing	CNGG 120404Z	0.4					●																																				
Low cutting force																																											

Applicable Chipbreaker Range

ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

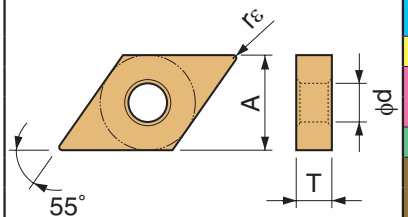
55° Rhombic / Negative with Hole

(mm)

Description	A	T	φd
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	φd
DN_1506_	12.70	6.35	5.16



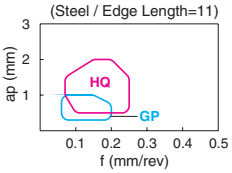
		Insert	Description	Dimension (mm)	Cermet				MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide												MEGACOAT MEGACOAT NANO					PVD Coated Carbide				DLC	Carbide			Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
				rε	TN610	TN620	TN6010	TN6020	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Finishing			DNMG 150402PP	0.2	●	●	●	○	●	●	●	○				●	●	●	●		●	●																				D10 D11 F64 F70 F71	
			DNMG 150404PP	0.4	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
			DNMG 150408PP	0.8	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
			DNMG 150412PP	1.2	●	●	●	○	●	●	●	○				●	●	●	●																								
			DNMG 150602PP	0.2	●	●	●	○	●	●	●	○				●	●	●	●		●	●																				D10 D11 F64	
			DNMG 150604PP	0.4	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
			DNMG 150608PP	0.8	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
			DNMG 150612PP	1.2	●	●	●	○	●	●	●	○				●	●	●	●																								
Finishing			DNMG 110404GP	0.4		●		●		●			●			●	●	●	●		●	●																				D11 F69	
			DNMG 110408GP	0.8		●		●		●			●			●	●	●	●		●	●																					
			DNMG 150402GP	0.2	●	●	●	○	●	●	●	○	●	○		●	●	●	●		●	●																				D10 D11 F64 F70 F71	
			DNMG 150404GP	0.4	●	●	●	○	●	●	●	○	●	○		●	●	●	●	●	●	●																					
			DNMG 150408GP	0.8	●	●		○	●	●	●	○	●	○		●	●	●	●	●	●	●																					
			DNMG 150602GP	0.2	●		●	○	●		●																																D10 D11 F64	1
			DNMG 150604GP	0.4	●		●	○	●		●																															
			DNMG 150608GP	0.8	●		●	○	●		●																															
Finishing-Medium			DNMG 150404PQ	0.4	●	●	●	○	●	●	●	○				●	●	●	●		●	●																				D10 D11 F64 F70 F71	
			DNMG 150408PQ	0.8	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
			DNMG 150412PQ	1.2	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
			DNMG 150604PQ	0.4	●	●	●	○	●	●	●	○				●	●	●	●		●	●																				D10 D11 F64	
			DNMG 150608PQ	0.8	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
			DNMG 150612PQ	1.2	●	●	●	○	●	●	●	○				●	●	●	●		●	●																					
Finishing-Medium			DNMG 110402HQ	0.2		●		●		●			●			●	●	●	●		●	●																				D11 F69	
			DNMG 110404HQ	0.4		●		●		●			●			●	●	●	●		●	●																					
			DNMG 150404HQ	0.4	●	●	●	○	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●	●																	D10 D11 F64 F70 F71	
			DNMG 150408HQ	0.8	●	●	●	○	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●	●																	
			DNMG 150412HQ	1.2	●		●	○	●			○		●	○	●	●	●	●	●	●	●	●																				
			DNMG 150604HQ	0.4	●		●	○	●		●	○				●	●	●	●	●	●	●		●	●																	D10 D11 F64	
			DNMG 150608HQ	0.8	●		●	○	●		●	○				●	●	●	●	●	●	●	□	●	●																	
			DNMG 150612HQ	1.2	●		●		●		●					●	●	●	●	□	●	●	□																				

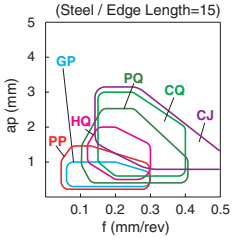
	Free-cutting steel
P	Carbon Steel / Alloy Steel
M	Stainless Steel
K	Gray Cast Iron
	Nodular Cast Iron
N	Non-ferrous Metals
S	Heat-resistant Alloys
	Titanium Alloys
H	Hard Materials

Applicable Chipbreaker Range

ap indicates radius

1





● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

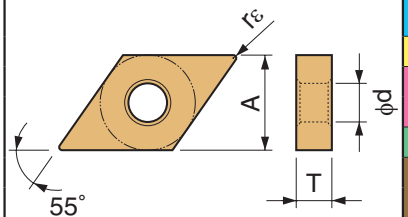
55° Rhombic / Negative with Hole

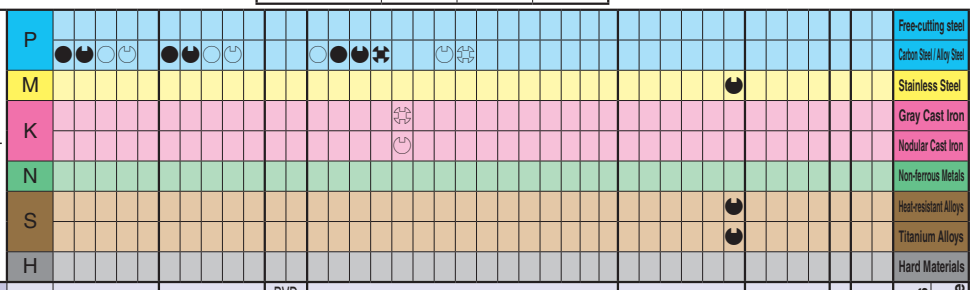
(mm)

Description	A	T	φd
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	φd
DN_1506_	12.70	6.35	5.16



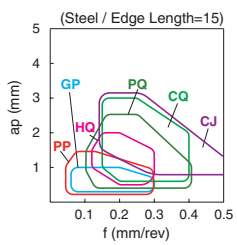


Insert	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium / Up Facing	DNMG 150404CQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●																					D10 D11 F64 F70 F71	
	DNMG 150408CQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●																						
	DNMG 150412CQ	1.2	●		●	□		●			○		●	○	●	●	●	●	□	●	●	●																						
	DNMG 150604CQ	0.4	●		●			●		●					●	●	●	●	□	●	●																					D10	
	DNMG 150608CQ	0.8													●	●	●	●	●	●	●	●																					D11	
	DNMG 150612CQ	1.2													●	●	●	●	□	●	●	□																					F64	1
Finishing-Medium / Up Facing	DNMG 150408CJ	0.8													●	●	●	●	□	●	●	□																					D10 D11 F64 F70 F71	
	DNMG 150412CJ	1.2													●	●	●	●	□	●	●																						
	DNMG 150608CJ	0.8													●	●	●	●	●	●	●	●																					D10 D11 F64	
	DNMG 150612CJ	1.2													●	●	●	●	□	●	●																						
Medium	DNMG 150404TN-V	0.4					●																																			D10 D11 F64 F70 F71	2
	DNMG 150408TN-V	0.8					●																																			
Medium - Roughing	DNMG 110404GS	0.4		●			●	●					●		●	●	●	●		●	●																					D11	
	DNMG 110408GS	0.8		●			●	●					●		●	●	●	●		●	●																					F69	
	DNMG 150404GS	0.4									○		●	○	●	●	●	●		●	●																					D10 D11 F64 F70 F71	
	DNMG 150408GS	0.8									○		●	○	●	●	●	●		●	●																						
	DNMG 150412GS	1.2											●		●	●	●	●		●	●																						
	DNMG 150604GS	0.4											●				●	●																									D10 D11 F64	
	DNMG 150608GS	0.8											●				●	●																										
Medium - Roughing	NEW DNMG 150404PG	0.4	●	●				●	●						●	●	●	●																									D10 D11 F64 F70 F71	3
	DNMG 150408PG	0.8	●	●				●	●						●	●	●	●																										
	DNMG 150412PG	1.2		●					●						●	●	●	●																										
	DNMG 150416PG	1.6													●	●	●	●																										
	DNMG 150604PG	0.4	●	●				●	●						●	●	●	●																									D10	
	DNMG 150608PG	0.8	●	●				●	●						●	●	●	●																									D11	
	DNMG 150612PG	1.2		●					●						●	●	●	●																										
	DNMG 150616PG	1.6													●	●	●	●																									F64	

Applicable Chipbreaker Range

ap indicates radius

1



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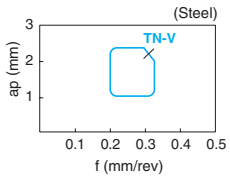

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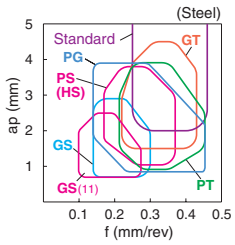


Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

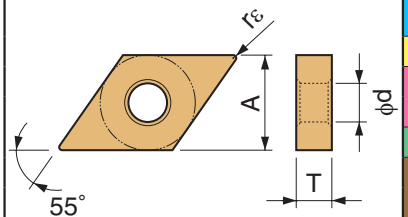
55° Rhombic / Negative with Hole

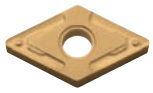
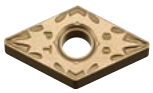
(mm)

Description	A	T	ϕd
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	ϕd
DN_1506_	12.70	6.35	5.16

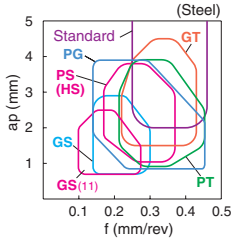


Insert		Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	PVD Coated Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing		DNMG 150404PS	0.4			●				●	○					●	●	●	●	●	●	●	●	●														●			D10	
		DNMG 150408PS	0.8			●				●	○					●	●	●	●	●	●	●	●	●														●			D11	
		DNMG 150412PS	1.2								○					●	●	●	●		●	●	●	●																	F64	
		DNMG 150416PS	1.6																		●	●																			F70 F71	
		DNMG 150604PS	0.4			●				●	○					●	●	●	●		●	●	●	●														●			D10	
		DNMG 150608PS	0.8			●				●	○					●	●	●	●	●	●	●	●	●														●			D11	
		DNMG 150612PS	1.2			●				●	○					●	●	●	●	●	●	●	●	●																	F64	
		DNMG 150616PS	1.6													●	●	●	●		●	●																			F70 F71	
Medium - Roughing		DNMG 150404HS	0.4				○	○					○	○							○	○																		D10	
		DNMG 150408HS	0.8				○	○					○	○							○	○																		D11	
		DNMG 150412HS	1.2				□	○					○	○							□	○																		F64	
		DNMG 150604HS	0.4					○					○	○							○	○																		D10	
		DNMG 150608HS	0.8					○					○	○							○	○																		D11	
		DNMG 150612HS	1.2					○						○								○																		F64	
Medium-Roughing / High Feed Rate		DNMG 150408PT	0.8													●	●	●	●	●	●	●	●		●																D10 D11 F64 F70 F71	1
		DNMG 150412PT	1.2													●	●	●	●	●	□	●	●		●																	
		DNMG 150608PT	0.8													●	●	●	●	●	●	●	●		●																D10 D11 F64	
		DNMG 150612PT	1.2													●	●	●	●	●	●	●	●	●																		
Medium-Roughing / High Feed Rate		DNMG 150408GT	0.8											●		●	●	●	●		●	●																			D10 D11 F64 F70 F71	
		DNMG 150412GT	1.2											●		●	●	●	●		●	●																				
		DNMG 150608GT	0.8											□		●	●	●	●		●	●																			D10 D11 F64	
		DNMG 150612GT	1.2													●	●	●	●		●	●																			
Roughing		DNMG 150404	0.4	●	●	●	○	●	●	●	●	○		●		●	●	●	●	●	●	●			●	●	○	○	●												D10 D11 F64 F70 F71	
		DNMG 150408	0.8	●	●	●	○	●	●	●	●	○	●	●		●	●	●	●	●	●	●	●			●	●	○	○	●											
		DNMG 150412	1.2													●	●	●	●	●	●	●	●			●	●	○	○	●											
		DNMG 150604	0.4																							●	●														D10	
		DNMG 150608	0.8										●			●	●	●	●	□	●	●	●			●	●			○	●										D11	
		DNMG 150612	1.2													●	●	●	●		●	□				□	●			□	●										F64	

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

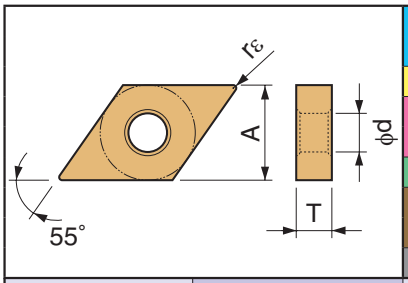
55° Rhombic / Negative with Hole

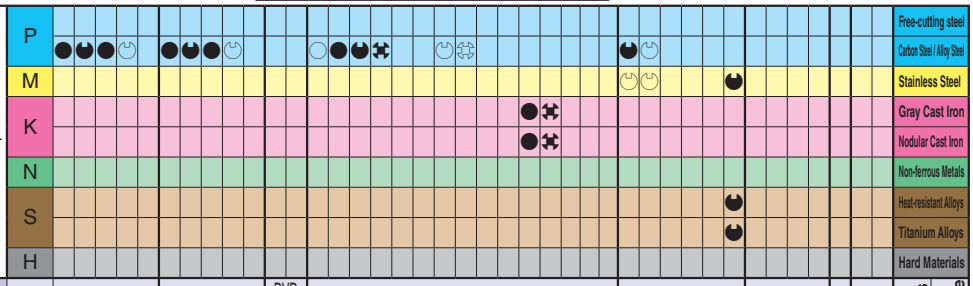
(mm)

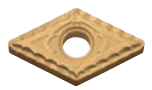
Description	A	T	ϕd
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	ϕd
DN_1506_	12.70	6.35	5.16





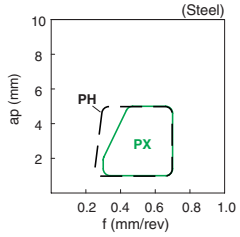
Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Roughing		DNMG 150408PH 150412PH 150416PH	0.8 1.2 1.6													● ●	● ●	● ●	● ●		● □	● ●	●			● ●	● ●																	D10 D11 F64 F70 F71	1
		DNMG 150608PH 150612PH 150616PH	0.8 1.2 1.6													● ●	● ●	● ●	● ●		● ●	● ●	● ●			● ●	● ●																	D10 D11 F64	
Single Sided / Roughing / High Feed Rate		DNMM 150408PX 150412PX 150416PX	0.8 1.2 1.6															● ●	● ●			● ●	●																					D10 D11 F64 F70 F71	
		DNMM 150608PX 150612PX 150616PX	0.8 1.2 1.6													● ●	● ●	● ●	● ●		● □	● ●	● □																					D10 D11 F64	
Low Carbon Steel	Finishing / Small ap	DNMG 150404XF 150408XF	0.4 0.8	● ●	● ●	● ●			● ●	● ●	● ●	○ ○																															D10 D11 F64 F70 F71	
Low Carbon Steel	Finishing	DNMG 150404XP 150408XP	0.4 0.8	● ●	● ●	● ●	○ ○	● ●	● ●	● ●	● ●	○ ○		● ●	○ ○	● ●	● ●	● ●	● ●	● ●	● ●	● ●																							D10 D11 F64 F70 F71	
		DNMG 150604XP 150608XP	0.4 0.8	● ●					● ●		● ●																																	D10 D11 F64	2
Low Carbon Steel	 Medium	DNMG 150404XQ 150408XQ	0.4 0.8	● ●	● ●	● ●	○ ○	● ●	● ●	● ●	● ●	○ ○		● ●	○ ○	● ●	● ●	● ●	● ●		● ●	● ●																							D10 D11 F64 F70 F71	
		DNMG 150604XQ 150608XQ	0.4 0.8								● ●										○ ○																							D10 D11 F64	
Low Carbon Steel	Roughing	DNMG 150408XS 150608XS	0.8	● ●	● ●	● ●	□ □		● ●	● ●		○ ○		● ●	○ ○	● ●	● ●	● ●	● ●		● ○	● ○																							D10 D11 F64 F70 F71	
Finishing-Medium	NEW Sharp Edge / Polished	DNGG 150402MFP-SK 150404MFP-SK	<0.2 <0.4																												● ●	● ●			● ●									D10 D11 F64 F70 F71	3

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



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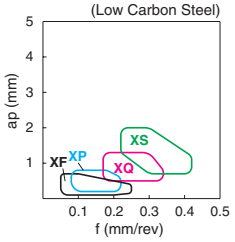

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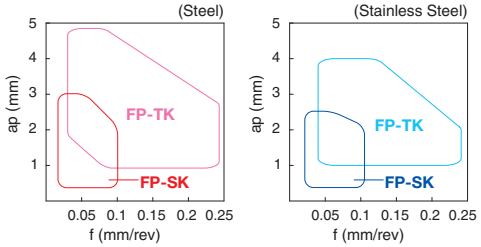

Inserts are sold in 10 piece boxes

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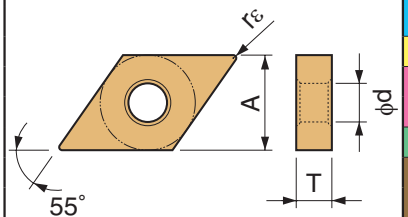
55° Rhombic / Negative with Hole

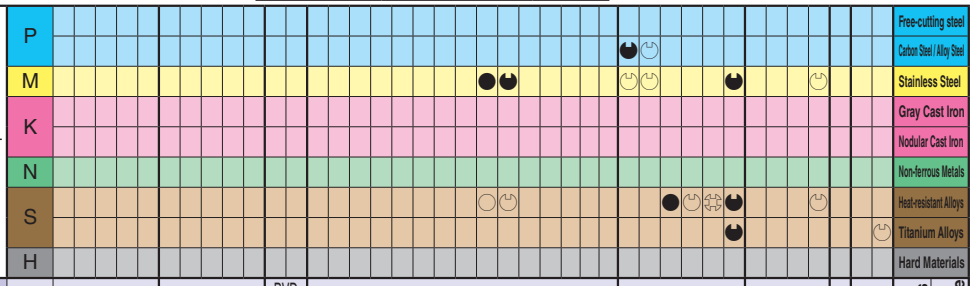
(mm)

Description	A	T	φd
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	φd
DN_1506_	12.70	6.35	5.16



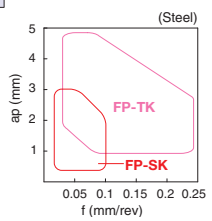


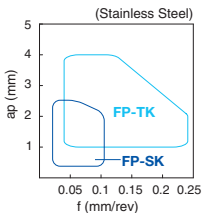
Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing	Sharp Edge / Polished	DNGG 150404FP-TK 150408FP-TK	0.4 0.8																											●● ●●				● ●									D10 D11 F64 F70 F71	1
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing / Sharp Edge	DNGG 150404TK 150408TK	0.4 0.8																													●● ●●								●		
		DNGG 150604TK 150608TK	0.4 0.8																													●● ●●								●		D10 D11 F64	
	Medium - Roughing	DNMG 150404TK 150408TK	0.4 0.8																				●● ●●	●● ●●								●●● ●●●							●			D10 D11 F64 F70 F71	
		DNMG 150604TK 150608TK	0.4 0.8																				●● ●●	●● ●●								●●● ●●●							●			D10 D11 F64	
Stainless Steel / Heat-Resistant Alloys	Finishing-Medium	DNMG 150404MQ 150408MQ	0.4 0.8																				●● ●●	●● ●●								●●●● ●●●●	●						●	●		D10 D11 F64 F70 F71	
		DNMG 150604MQ 150608MQ	0.4 0.8																				●● ●●	●● ●●								●●●● ●●●●	●						●	●		D10 D11 F64	2
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	DNMG 150404MS 150408MS 150412MS	0.4 0.8 1.2																				●● ●● ●●	●● ●● ●●								●●●● ●●●● ●●●●	●						●	●		D10 D11 F64 F70 F71	
		DNMG 150604MS 150608MS 150612MS	0.4 0.8 1.2																				●● ●● ●●	●● ●● ●●								●●●● ●●●● ●●●●	●						●	●		D10 D11 F64	
Stainless Steel / Heat-Resistant Alloys	Medium-Roughing	DNMG 150404MU 150408MU	0.4 0.8																				●● ●●	●● ●●								●●●● ●●●●	●						●	●		D10 D11 F64 F70 F71	
		DNMG 150604MU 150608MU	0.4 0.8																				●● ●●	●● ●●								●●●● ●●●●	●						●	●		D10 D11 F64	

Applicable Chipbreaker Range

ap indicates radius

1





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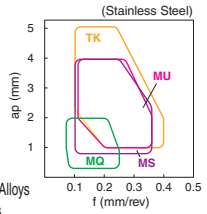


Heat-resistant Alloys
Titanium Alloys

B6

● : Std. Item

Inserts are sold in 10 piece boxes

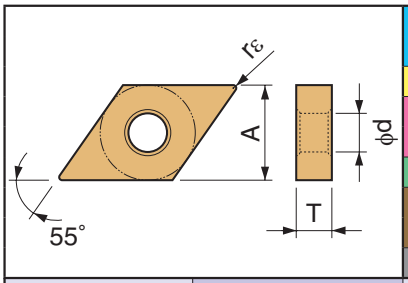
55° Rhombic / Negative with Hole

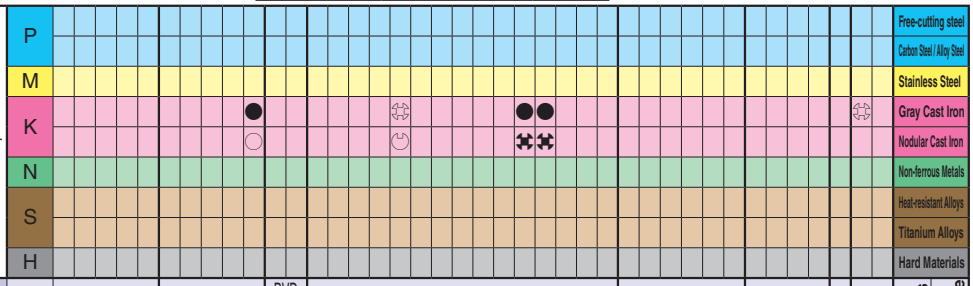
(mm)

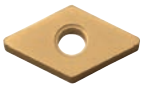
Description	A	T	φd
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	φd
DN_1506_	12.70	6.35	5.16



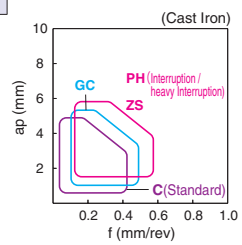


Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Cast Iron	Roughing	DNMG 150404C 150408C 150412C	0.4 0.8 1.2																					● ● ●	● ● ●		○ ○ □	● ● ●															D10 D11 F64 F70 F71	
		DNMG 150604C 150608C 150612C	0.4 0.8 1.2																					□ ● ●	● ● ●			● ●															D10 D11 F64	
Cast Iron	Roughing	DNMG 150408ZS 150412ZS	0.8 1.2																	□ □						● ●	● ●	□ □	○ □	● ●															D10 D11 F64 F70 F71	
		DNMG 150608ZS 150612ZS	0.8 1.2																							● ●	● ●		○	● ●															D10 D11 F64	1
Cast Iron	Roughing	DNMG 150408GC 150412GC	0.8 1.2																	●						● ●	● ●	□		● ●															D10 D11 F64 F70 F71	
		DNMG 150608GC 150612GC	0.8 1.2																	□						□ □	● □			● ●															D10 D11 F64	
Cast Iron	 Without Chipbreaker	DNMA 150404 150408	0.4 0.8										● ●							● ●						● ●	● ●		○ ○	● ●													● ●		D10 D11 F64 F70 F71	
		DNMA 150604 150608	0.4 0.8																							● ●	● ●																		D10 D11 F64	

Applicable Chipbreaker Range

ap indicates radius

1



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How to read pages of "Turning Inserts" B13

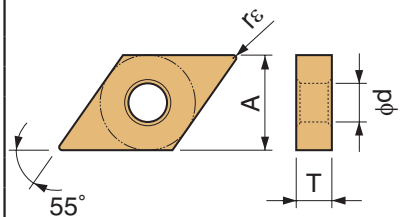
55° Rhombic / Negative with Hole

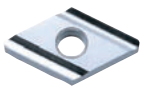
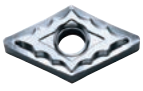
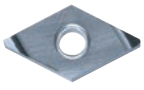
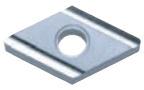
(mm)

Description	A	T	φd
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	φd
DN_1506_	12.70	6.35	5.16

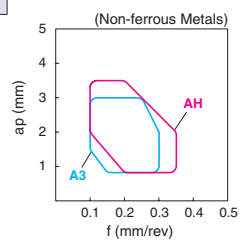


	Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	PVD Coated Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	DNGG 150404R-A3	0.4																																		●	●		
		150404L-A3	0.4																																		●	●	D10	
		DNGG 150408R-A3	0.8																																		●	●	D11	
		150408L-A3	0.8																																		●	●	F64	
																																							F70	
Non-ferrous Metals	Medium-Roughing / Sharp Edge	DNGG 150404AH	0.4																																		●	●	F71	1
		150408AH	0.8																																		●	●		
		DNGG 150604AH	0.4																																			●	D10	
		150608AH	0.8																																			●	D11	
																																							F64	
Non-ferrous Metals	 Medium-Roughing	DNMG 150404AH	0.4																																		●	●	D10	
		150408AH	0.8																																		●	●	D11	
																																							F64	
																																							F70	
																																							F71	
Finishing	 Surface Roughness Oriented	DNGG 110402R-S	0.2					●					●																									●			
		110402L-S	0.2					●					□																									●			
		DNGG 110404R-S	0.4					●					●																									●			
		110404L-S	0.4					●					●																									●			
		DNGG 110408R-S	0.8					●					●																									●		D11	
		110408L-S	0.8					●					●																											F69	
Medium		DNGG 110404R	0.4					●																														●			2
		110404L	0.4					●																														●			
		110408R	0.8					●																																	
		DNGG 150404R	0.4	●	●	●	○	●	●	●	○	●	●	○																						●			●	D10	
		150404L	0.4	●	●	●	○	●	●	●	○	●	□	○																						●			●	D11	
		DNGG 150408R	0.8	●	●	●	○	●	●	●	○	●	●	○																						●			●	D64	
		150408L	0.8	●	●	●	○	●	●	●	○	●	●	□																						●			●	D70	
																																							D71	

Applicable Chipbreaker Range

ap indicates radius

1



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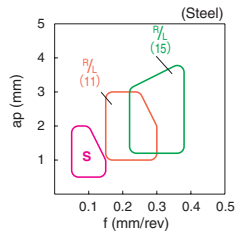


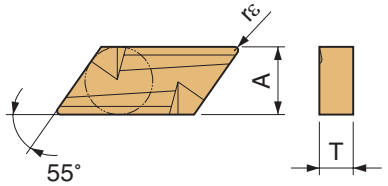
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

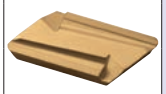
Inserts are sold in 10 piece boxes

55° Parallelogram / Negative without Hole

(mm)

Description	A	T	φd
KNMX1604_	9.525	4.76	-



Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium-Roughing 	KNMX 160405R-1	0.5																		●●																								-	1
	160405L-1	0.5																		●●																									
	160410R-1	1.0																		●●																									
	160410L-1	1.0																		●●																									

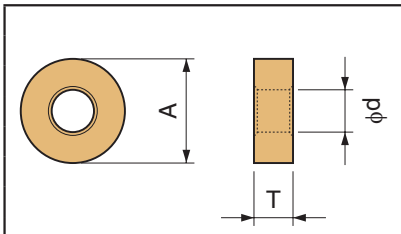
Round / Negative with Hole

(mm)

Description	A	T	φd
RN_0903_	9.525	3.18	3.81
RN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	φd
RN_1506_	15.875	6.35	6.35

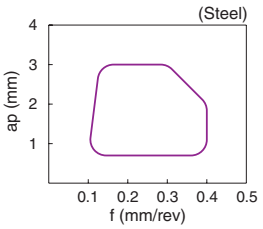


Insert	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium-Roughing	RNMG 090300	-					●					●			●●	●●	●●	●●			●																							D19	
	RNMG 120400	-					●					●			●●	●●	●●	●●			●●					●																			2
	RNMG 150600	-															●●	●●			●●					●		○																	-	

Applicable Chipbreaker Range

ap indicates radius

1



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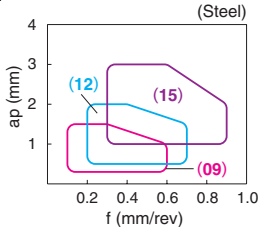


Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability

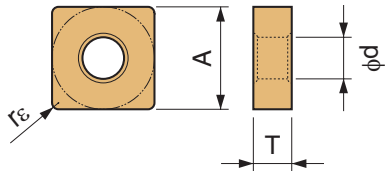
90° Square / Negative with Hole

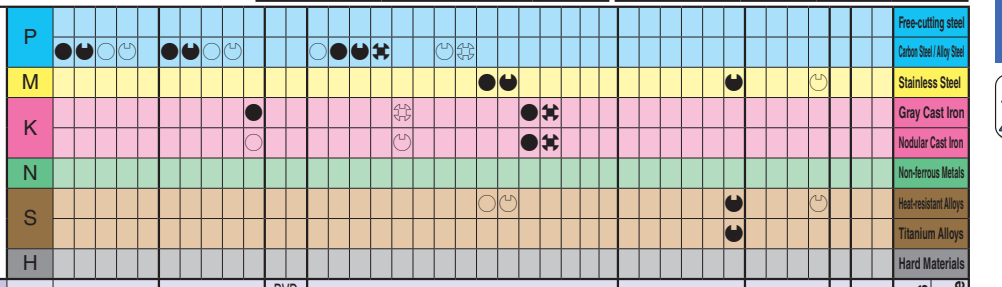
(mm)

Description	A	T	φd
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	φd
SN_1506_	15.875	6.35	6.35
SN_1906_	19.05	6.35	7.94



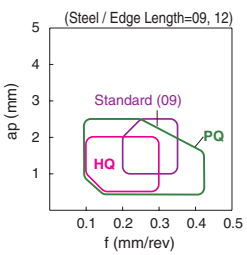


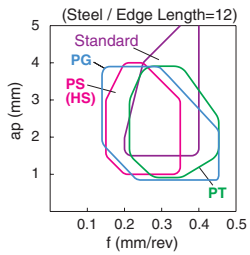
Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium		SNMG 120404PQ	0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		SNMG 120408PQ	0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		SNMG 120412PQ	1.2													●	●	●	●		●	●																							
Finishing-Medium		SNMG 120404HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●																							
		SNMG 120408HQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●																					
		SNMG 120412HQ	1.2	●		●	○	●	●			○		●	○	●	●	●	●		●	●	□																	●					
Medium - Roughing	NEW	SNMG 120408PG	0.8	●	●				●	●						●	●	●	●																	●								D12	
		SNMG 120412PG	1.2		●					●						●	●	●	●																	●								D13	
		SNMG 120416PG	1.6		●					●						●	●	●	●																									F73	
Medium - Roughing		SNMG 120408PS	0.8			●					●	○				●	●	●	●	●	●	●	●	●																●					1
		SNMG 120412PS	1.2									□				●	●	●	●		●	●		●																●					
		SNMG 120416PS	1.6													●	●	●	●		●	●	□																					
Medium - Roughing		SNMG 120408HS	0.8				○	○						○	○					○	○																							
		SNMG 120412HS	1.2				○	○						○	○					○	○																							
		SNMG 120416HS	1.6				○	○							○							○																							
Medium-Roughing / High Feed Rate		SNMG 120408PT	0.8													●	●	●	●	●	□	●	●		●																				
		SNMG 120412PT	1.2													●	●	●	●	●	□	●	●		●																				
Roughing		SNMG 090304	0.4	●		●		●	●									●	●			●																					D12	
		090308	0.8	●		●		●	●									●	●			●					●																D13	
		SNMG 120404	0.4	●	●	●	○	●	●	●		○	●	●						●						●	●		○	●														
		120408	0.8	●	●	●	○	●	●	●		○	●	●		●	●	●	●	●	●	●	●	●	●	●	●	○	□	●									●				D12	
		120412	1.2				○	●								●	●	●	●	●	●	●	●			●	●	○	□	●									●				D13	
		120416	1.6				○	●									●	●	●	●	●	●	●				●	□	□	●													F73	
		120420	2.0					●											●								●	□	□	●														
		SNMG 190612	1.2																●				●																					-	2
		190616	1.6																				●																					

Applicable Chipbreaker Range

ap indicates radius

1





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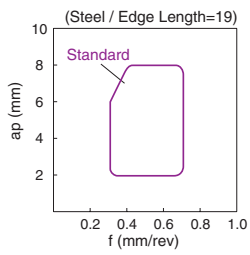


● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

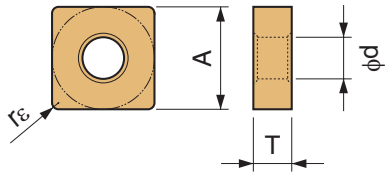
90° Square / Negative with Hole

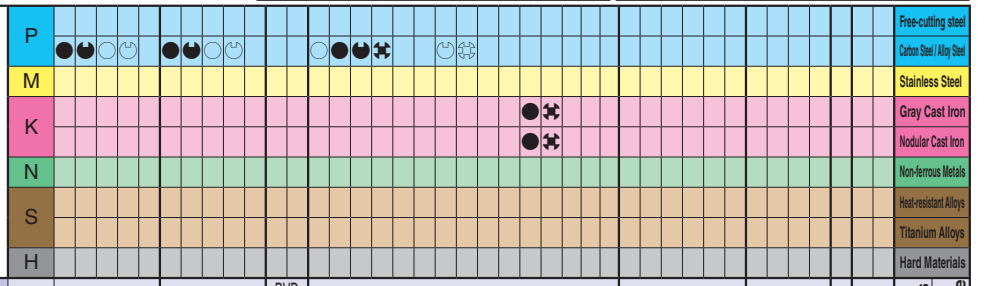
(mm)

Description	A	T	φd
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	φd
SN_1506_	15.875	6.35	6.35
SN_1906_	19.05	6.35	7.94



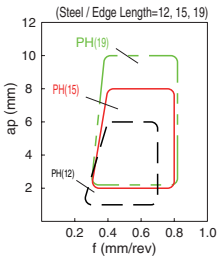


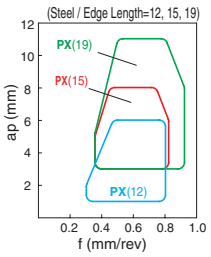
Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Roughing		SNMG 120408PH 120412PH 120416PH	0.8 1.2 1.6													● ● ●	● ● ●	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●			● ● ●	● ● ●																		D12 D13 F73	
		SNMG 150612PH 150616PH	1.2 1.6													● ●	● ●	● ●	● ●		□ ●	● ●				● ●	● ●																		-	
		SNMG 190612PH 190616PH 190624PH	1.2 1.6 2.4														● ●	● ●	● ●		● ● □	● ● □	● ● ●																						1
Single Sided / Roughing / High Feed Rate		SNMM 120408PX 120412PX 120416PX	0.8 1.2 1.6													● ●	● ●	● ●	● ●		● ● □	● ● □																							D12 D13 F73	
		SNMM 150612PX 150616PX	1.2 1.6															● ●	● ●		● ●	● □																							-	
		SNMM 190612PX 190616PX 190624PX	1.2 1.6 2.4													● ●	● ●	● ●	● ●		□ ●	● ●																							-	
Low Carbon Steel	Finishing	SNMG 120408XP	0.8	●	●	●	○	□	●	●	●	○		●	○	●	●	●	●		●	●																								
Low Carbon Steel	Medium	SNMG 120408XQ	0.8	●	●	●	□	●	●	●	●	○		●	○	●	●	●	●		●	●																							D12 D13 F73	2
Low Carbon Steel	Roughing	SNMG 120408XS	0.8	●	●	●	○		●	●		○				●	●	●	●		□	●																								

Applicable Chipbreaker Range

ap indicates radius

1





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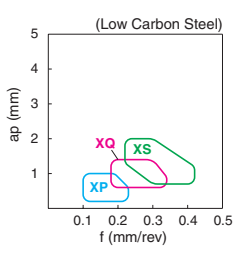


Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

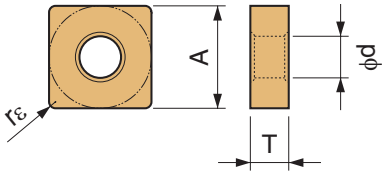
90° Square / Negative with Hole
90° Square / Negative without Hole

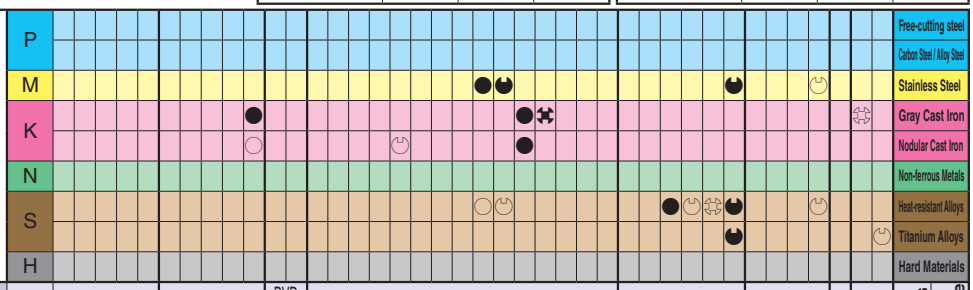
(mm)

Description	A	T	ϕd
SN_1204_	12.70	4.76	5.16
SN_1506_	15.875	6.35	6.35

(mm)

Description	A	T	ϕd
SN_1906_	19.05	6.35	7.94
SNMN1204_	12.70	4.76	-

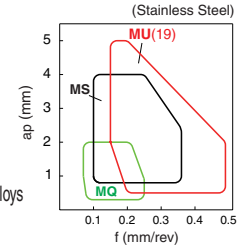




Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Stainless Steel / Heat-Resistant Alloys	Finishing-Medium	SNMG 120404MQ 120408MQ	0.4 0.8																				●● ●●	●● ●●							●● ●●	●● ●●	●● ●●				● ●			● ●			D12 D13	
	Medium-Roughing	SNMG 120404MS 120408MS 120412MS 120416MS	0.4 0.8 1.2 1.6																				●● ●● ●● ●●	●● ●● ●● ●●							●● ●● ●● ●●	●● ●● ●● ●●	●● ●● ●● ●●	● ●				● ●			F73	1
	Medium-Roughing	SNMG 120412MU 150612MU 190612MU 190616MU	1.2 1.6																				●● ●● ●● ●●									●● ●● ●● ●●	●● ●● ●● ●●								-	
Cast Iron	Roughing	SNMG 120408C 120412C	0.8 1.2																	□						● ●		□ ●	● ●																
Cast Iron	Roughing	SNMG 120408ZS 120412ZS	0.8 1.2																	● □						●● ●●	○ ○	□ □	● ●																
Cast Iron	Roughing	SNMG 120408GC 120412GC	0.8 1.2																	● ●						●● ●○		□ ○	● ●														D12 D13 F73	2
Cast Iron	Without Chipbreaker	SNGA 120404 120408	0.4 0.8									●																														●	●		
		SNMA 120404 120408 120412 120416 120420	0.4 0.8 1.2 1.6 2.0																	□ ●						● ● ● ● ●		□ □ □ □	● ●																
Cast Iron	Without Chipbreaker	SNMN 120408 120412	0.8 1.2																	□						● ●																	D25 D34 D35 F79	

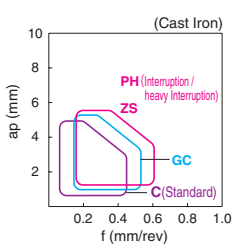
Applicable Chipbreaker Range
ap indicates radius

1



Heat-Resistant Alloys
Titanium Alloys
B6

2



● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

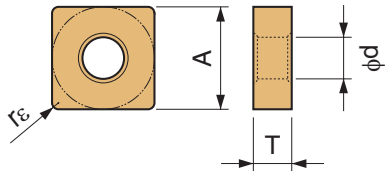
90° Square / Negative with Hole

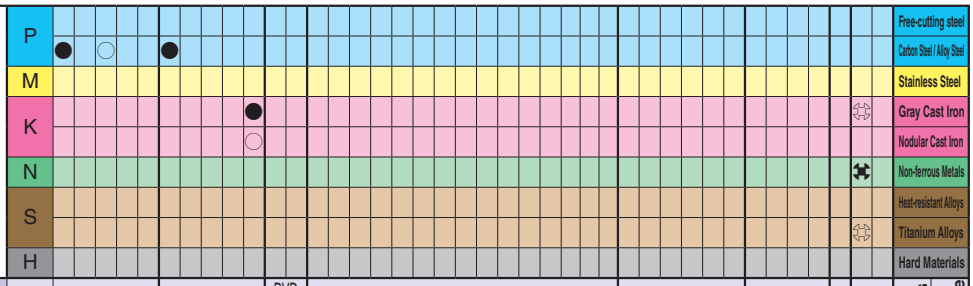
(mm)

Description	A	T	φd
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	φd
SN_1906_	19.05	6.35	7.94
SNMN1204_	12.70	4.76	-





Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium / Medium-Roughing	SNGG 090304R-B	0.4	●		●		●	●				●																															D12	
	SNGG 090304L-B	0.4	●		●		●	●				●																															D12	
	SNGG 090308R-B	0.8	●		●		●	●																																			D13	
	SNGG 090308L-B	0.8	●		●		●	●																																			D13	
	SNGG 120404R-C	0.4	●		●		●	●				●	●																												●			
	SNGG 120404L-C	0.4	●		●		●	●				●	●																												●			
	SNGG 120408R-C	0.8	●		●		●	●				●	●																												●			
	SNGG 120408L-C	0.8	●		●		●	●				●	●																												●			
	SNMG 120404R-C	0.4	●		●		●	●																																			D12	
	SNMG 120404L-C	0.4	●		●		●	●																																			D12	
	SNMG 120408R-C	0.8	●		●		●	●																																			D13	
	SNMG 120408L-C	0.8	●		●		●	●																																			D13	
																																										F73	
Medium - Roughing	SNGG 120404R-25R	0.4	●		●		●	●																																				
	SNGG 120404L-25R	0.4	●		●		●	●																																				
	SNGG 120408R-25R	0.8	●		●		●	●																																				
	SNGG 120408L-25R	0.8	●		●		●	●																																				

-B : Finishing-Medium
-C : Medium-Roughing

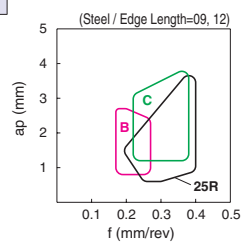
Low cutting force

1

Applicable Chipbreaker Range

ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item

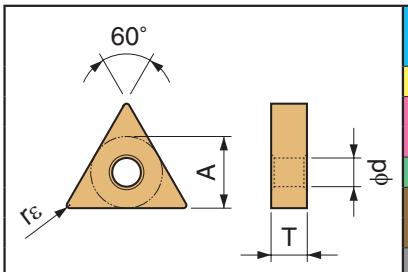
How to read pages of "Turning Inserts" B13

60° Triangle / Negative with Hole

(mm)

Description	A	T	φd
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

Description	A	T	φd
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



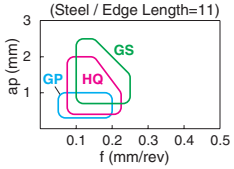
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

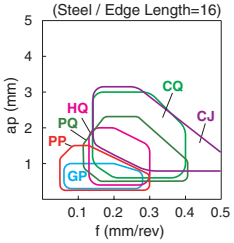
Insert		Description		Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing		TNMG 160402PP		0.2	●	●	●	○		●	●	●	○				●	●	●	●		●	●																					D14	
		TNMG 160404PP		0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																					D15	
		TNMG 160408PP		0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																					F64	
		TNMG 160412PP		1.2	●	●	●	○		●	●	●	○				●	●	●	●																									F74	
																																												F75	
Finishing		TNMG 110404GP		0.4		●			●		●				●																													D14	
		TNMG 110408GP		0.8		●			●		●				●																													F75	
		TNMG 160402GP		0.2	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●																							
		TNMG 160404GP		0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●																					D14	
		TNMG 160408GP		0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	□	●	●																					D15	
Finishing-Medium		TNMG 160404PQ		0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																					F64	
		TNMG 160408PQ		0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																					F74	
		TNMG 160412PQ		1.2	●	●	●	○		●	●	●	○				●	●	●	●		●	●																					F75	1
Finishing-Medium		TNMG 110404HQ		0.4		●			●		●				●																													D14	
		TNMG 110408HQ		0.8		●			●		●				●																													F75	
		TNMG 160404HQ		0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●	●																	D14	
		TNMG 160408HQ		0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●	●																	D15	
		TNMG 160412HQ		1.2				○	●			●	○		●	○	●	●	●	●		●	●																					F64	
Finishing-Medium / Up Facing		TNMG 160404CQ		0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●																					F74	
		TNMG 160408CQ		0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●																					F75	
		TNMG 160412CQ		1.2		●		○	●		●		○		●	○	●	●	●	●	●	●	●	●																							
		TNMG 220408CQ		0.8													●	●	●	●		●	●																					D14	
		TNMG 220412CQ		1.2													●	●	●	●		●	●																					F74	
Medium - Roughing		TNMG 110404GS		0.4		●			●		●								●	●			●																					D14	
		TNMG 110408GS		0.8															●	●			●																					F75	
		TNMG 160404GS		0.4									○		●	○	●	●	●	●		●	●																							
		TNMG 160408GS		0.8									○		●	○	●	●	●	●		●	●																					D14	
		TNMG 160412GS		1.2											●																															
Medium - Roughing		TNMG 160404PG		0.4	●	●				●	●						●	●	●	●																	●						D15	
		TNMG 160408PG		0.8	●	●				●	●						●	●	●	●																	●						F64	
		TNMG 160412PG		1.2		●					●						●	●	●	●																	●						F74	2
																																												F75	
Medium - Roughing		TNMG 160404PS		0.4			●					●	○				●	●	●	●	●	●	●	●	●	●																●			
		TNMG 160408PS		0.8			●					●	○				●	●	●	●	●	●	●	●	●	●																●			
		TNMG 160412PS		1.2													●	●	●	●		●	●	●	●	●																			
		TNMG 220404PS		0.4													●	●	●	●		●	●	●																					
		TNMG 220408PS		0.8													●	●	●	●	●	●	●	●	●	●																			D14	
		TNMG 220412PS		1.2													●	●	●	●		●	●	●		●																			F74	
		TNMG 220416PS		1.6													●	●	●	●		●	●																							

Applicable Chipbreaker Range

ap indicates radius

1





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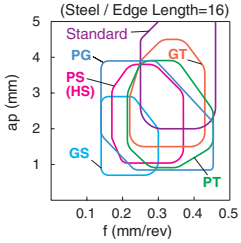
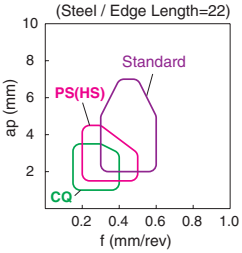




● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

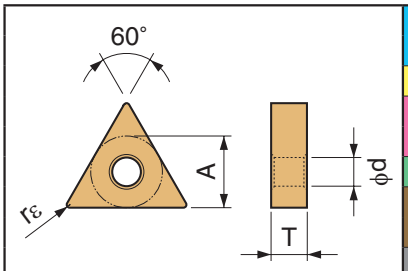
60° Triangle / Negative with Hole

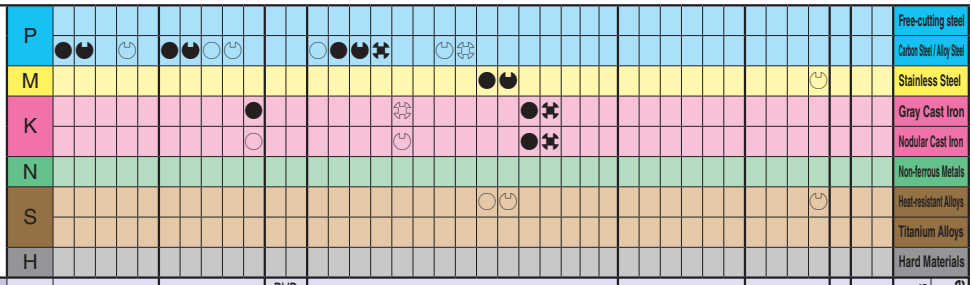
(mm)

Description	A	T	φd
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	A	T	φd
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



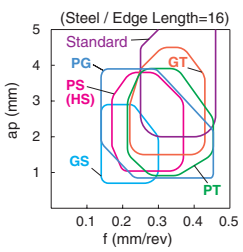


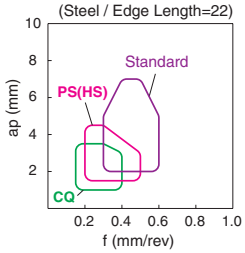
Insert	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing	TNMG 160404HS TNMG 160408HS TNMG 160412HS	0.4 0.8 1.2				○ ○ ○	○ ○ ○						○ ○ ○	○ ○ ○					○ ○ □	○ ○ ○	○ ○ ○																					D14 D15 F64 F74 F75	
Medium - Roughing	TNMG 220404HS TNMG 220408HS TNMG 220412HS	0.4 0.8 1.2					○ ○						○						○																							D14 F74	
Medium-Roughing / High Feed Rate	TNMG 160408PT TNMG 160412PT	0.8 1.2													● ●	● ●	● ●	● ●	● □	● ●	● ●	● ●		●																					
Medium-Roughing / High Feed Rate	TNMG 160408GT TNMG 160412GT	0.8 1.2									○		● ●	○ □	● ●	● ●	● ●	● ●		● ●	● ●																						D14 D15 F64 F74 F75	1
Roughing	TNMG 160404 TNMG 160408 TNMG 160412 TNMG 160416 TNMG 160420	0.4 0.8 1.2 1.6 2.0	● ●	● ●	○ ○	● ● ●	● ● ●	● ●	● ●	○ ○ ○	● ● ●	● ●	● ●		● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ●	● ● ●	● ● ● ● ●	● ● ● ● ●	○ ○ ○ □ ●	○ ○ ○ □ ●	● ● ● ● ●											● ●				
Roughing	TNMG 220404 TNMG 220408 TNMG 220412	0.4 0.8 1.2					● ●								● ● ●	● ● ●	● ● ●	● ● ●	● □ ●	● ● ●	● ● ●				● ● ●	● ● ●	○ ○ ○	○ ○ ○	● ● ●														D14 F74	
Roughing	TNMG 160408PH TNMG 160412PH	0.8 1.2													● ●	● ●	● ●	● ●		● □	● ●				● ●	● ●																	D14 D15 F64 F74 F75	2
Roughing	TNMG 220408PH TNMG 220412PH TNMG 220416PH	0.8 1.2 1.6													● ● ●	● ● ●	● ● ●	● ● ●	□ □ □	● ● ●	● ● ●																					D14 F74	
Single Sided / Roughing / High Feed Rate	TNMM 160408PX TNMM 160412PX	0.8 1.2															● ●	● ●		● ●	● ●	● □																					D14 D15 F64 F74 F75	3
Single Sided / Roughing / High Feed Rate	TNMM 220408PX TNMM 220412PX TNMM 220416PX	0.8 1.2 1.6															● ● ●	● ● ●	□ □ □	● ● ●	● ● ●																					D14 F74	

Applicable Chipbreaker Range

ap indicates radius

1





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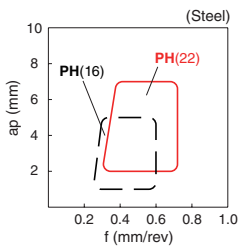
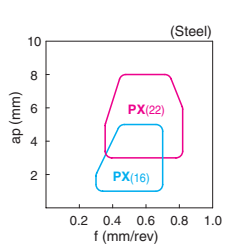


3



Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

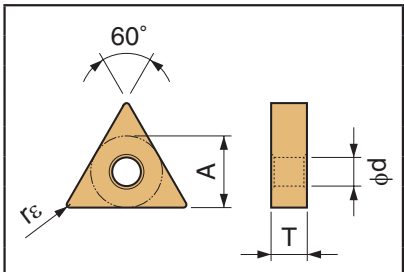
60° Triangle / Negative with Hole

(mm)

Description	A	T	φd
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	A	T	φd
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



P: Free-cutting steel / Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron / Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys / Titanium Alloys
H: Hard Materials

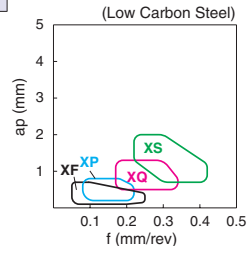
Insert	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PVD Coated Cermet: PV7005	PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Carbon Steel	Finishing / Small ap	TNMG 160404XF	0.4	●	●	●			●	●	●	○																																
		TNMG 160408XF	0.8	●	●	●			●	●	●	○																																
Low Carbon Steel	Finishing	TNMG 160404XP	0.4	●	●		○	●	●	●	●	○	●	○	●	●	●	●	□	●	●																					D14 D15 F64	1
		TNMG 160408XP	0.8	●	●		○	●	●	●	●	○	●	○	●	●	●	●	●	●	●																						
Low Carbon Steel	Medium	TNMG 160404XQ	0.4	●	●		○	●	●	●	●	○	●	○	●	●	●	●	□	●	●																					D14 D15 F64 F74 F75	1
		TNMG 160408XQ	0.8	●	●		○	●	●	●	●	○	●	○	●	●	●	●	□	●	●																						
Low Carbon Steel	Roughing	TNMG 160408XS	0.8		●		○	●		●		○	●	○	●	●	●	●		●	●																						
Finishing-Medium	NEW Sharp Edge / Polished	TNGG 160401MFP-SK	<0.1																											●	●			●									
		TNGG 160402MFP-SK	<0.2																											●	●			●								D14 D15 E41	2
		TNGG 160404MFP-SK	<0.4																											●	●			●									
Medium - Roughing	Sharp Edge / Polished	TNGG 160404FP-TK	0.4																											●	●			●								F64 F74 F75	2
		TNGG 160408FP-TK	0.8																											●	●			●									

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



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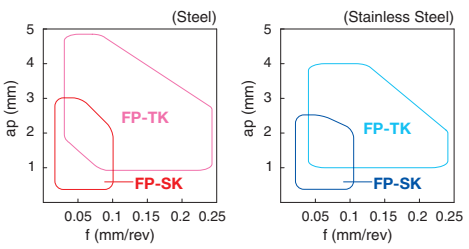

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Inserts are sold in 10 piece boxes

60° Triangle / Negative with Hole

(mm)

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TN_1104_	6.35	4.76	2.26

(mm)

Description	A	T	φd
TN_1603_	9.525	3.18	3.81
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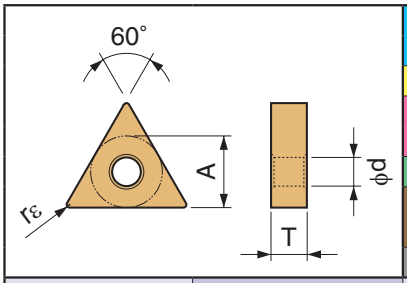
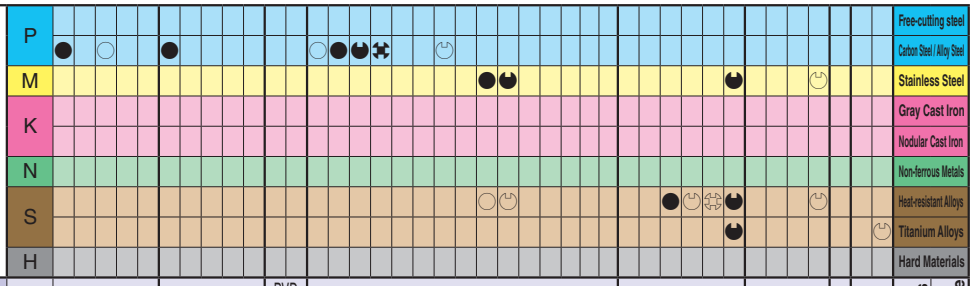
TN_2204_	12.70	4.76	5.16



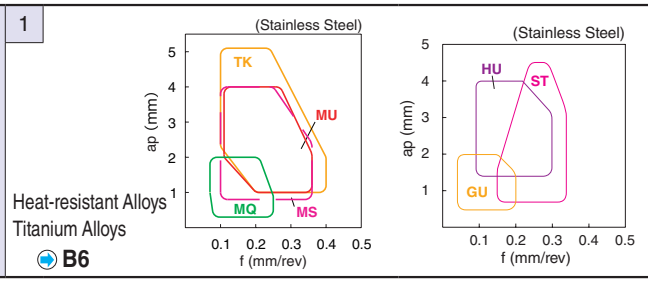


Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Stainless Steel / Heat-Resistant Alloys — Medium-Roughing / Sharp Edge	TNGG 160404TK	0.4																													●	●										●			
	TNGG 160408TK	0.8																													●	●										●			
Medium-Roughing	TNMG 160404TK	0.4																					●	●														●							
	TNMG 160408TK	0.8																					●	●														●							
Finishing-Medium	TNMG 160404MQ	0.4																					●	●							●	●	●	●				●				●		D14	
	TNMG 160408MQ	0.8																					●	●							●	●	●	●				●				●		D15	
Medium-Roughing	TNMG 160404MS	0.4																					●	●							●	●	●	●				●				●		F64	1
	TNMG 160408MS	0.8																					●	●							●	●	●	●				●				●		F74	
	TNMG 160412MS	1.2																					●	●							●	●	●	●				●				●		F75	
Medium-Roughing	TNMG 160404MU	0.4																					●	●							●	●	●	●								●			
	TNMG 160408MU	0.8																					●	●							●	●	●	●								●			
Stainless Steel — Medium-Roughing	TNMG 160404R-ST	0.4	●		●		●	●							●	●	●	●		●	●		●	●														●							
	160404L-ST	0.4	●		●		●	●							●	●	●	●		●	●		●	●														●							
	160408R-ST	0.8					●								●	●	●	●		●	●		●	●														●							
	160408L-ST	0.8					●								●	●	●	●		●	●		●	●														●							

Applicable Chipbreaker Range

ap indicates radius

1



Heat-resistant Alloys
Titanium Alloys

B6

Inserts are sold in 10 piece boxes

● : Std. Item

60° Triangle / Negative with Hole

(mm)

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TN_1104_	6.35	4.76	2.26

(mm)

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TN_1604_	9.525	4.76	3.81
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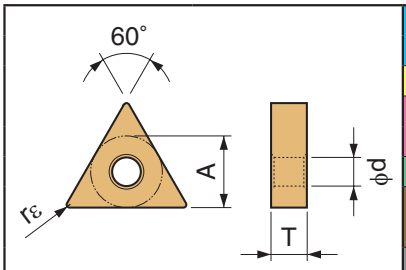
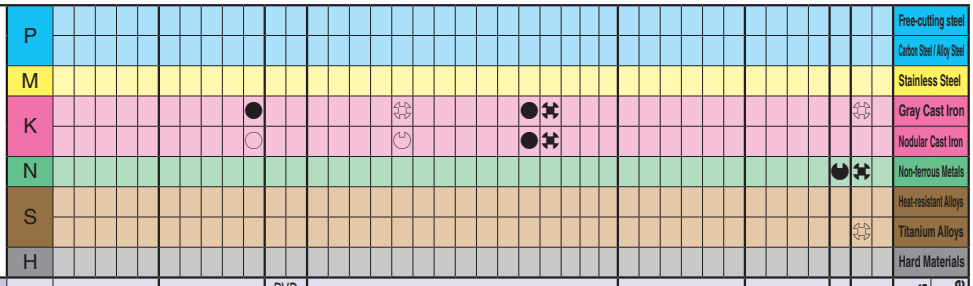


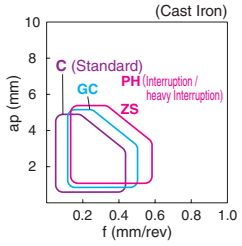


Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT MEGACOAT NANO PR1425	MEGACOAT MEGACOAT NANO PR1225	MEGACOAT MEGACOAT NANO PR1305	MEGACOAT MEGACOAT NANO PR1310	MEGACOAT MEGACOAT NANO PR1325	MEGACOAT MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Cast Iron	Roughing	TNMG	160404C	0.4										●							●						●	●		○	●														
			160408C	0.8										●							●						●	●		○	●														
			160412C	1.2										●							●						●				●														
Cast Iron	Roughing	TNMG	160408ZS	0.8										●							●						●	●	○	○	●													D14 D15 F64 F74 F75	1
			160412ZS	1.2										●							●						●	○	□		●														
Cast Iron	Roughing	TNMG	160408GC	0.8										□							●						●	●	□	○	●														
			160412GC	1.2										●							●						●				●														
Cast Iron	Without Chipbreaker	TNGA	110304	0.4																																				●		D14	-
		TNGA	160404	0.4										●																										●			
			160408	0.8										●																										●			
		TNMA	160404	0.4					●					●							●						●	●	○	○	●														
			160408	0.8					●					●							●						●	●	○	○	●														
			160412	1.2																	●						●	●	○	○	●														
			160416	1.6																	●						●				●														
			160420	2.0																	□						●																		
Non-ferrous Metals	Finishing-Medium / Sharp Edge	TNGG	160404R-A3	0.4																																			●	●	D14 D15 F64 F74 F75	
			160404L-A3	0.4																																			●	●		
			160408R-A3	0.8																																			●	●		
			160408L-A3	0.8																																			●	●		
Non-ferrous Metals	Medium-Roughing / Sharp Edge	TNGG	160404AH	0.4																																			●	●		2
			160408AH	0.8																																			●	●		
Non-ferrous Metals	Medium-Roughing	TNMG	160404AH	0.4																																			●	●		
			160408AH	0.8																																			●	●		

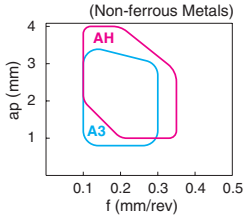
Applicable Chipbreaker Range

ap indicates radius

1



2



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60° Triangle / Negative with Hole

(mm)

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(mm)

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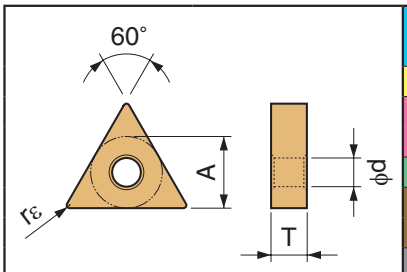
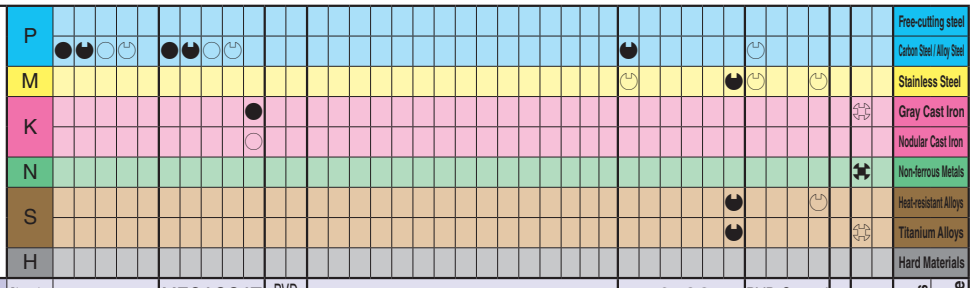
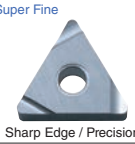
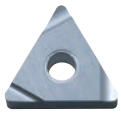




Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	Super Fine  Sharp Edge / Precision	TNEG	160402R-SSF	0.2	●	●	●	○	●	●	●		○			○																					●							D14	
			160402L-SSF	0.2	●	●	●	○	●	●	●		○			○																					●							D15	
			160404R-SSF	0.4	●	●	●	○	●	●	●		○			○																					●							F64	
			160404L-SSF	0.4	●	●	●	○	●	●	●		○			○																					●							F74	
																																												F75	
Finishing	 Surface Roughness Oriented	TNGG	110402R-S	0.2					●																																●			
			110402L-S	0.2					●																																		●			
			110404R-S	0.4					●																																			D14	
			110404L-S	0.4					●																																			F75	
			110408R-S	0.8					●																																				
			110408L-S	0.8					●																																				
		TNGG	160401R-S	0.1		●		○		●		○			○																														
			160401L-S	0.1		●		○		●		○			○																													D14	
			160402R-S	0.2	●	●	●	○	●	●	●	○	●	●	○																●				●	●				●			D15	
			160402L-S	0.2	●	●	●	○	●	●	●	○	●	●	○																●				●	●				●			F64	
			160404R-S	0.4	●	●	●	○	●	●	●	○	●	●	○																●				●	●				●			F74	1
			160404L-S	0.4	●	●	●	○	●	●	●	○	●	●	○																●				●	●				●				
			160408R-S	0.8	●	●	●	○	●	●	●	○			○																●				●	●				●			F75	
			160408L-S	0.8	●	●	●	○	●	●	●	○			○																●				●	●				●				
Finishing-Medium	-B : Finishing-Medium	TNGG	110302R-B	0.2	●		●		●	●																															●			
			110302L-B	0.2	●		●		●	●																															●			
			110304R-B	0.4	●		●		●	●																															●		D14	
			110304L-B	0.4	●		●		●	●																															●			
		TNGG	160304R-B	0.4					●																																			-	
			160304L-B	0.4					●																																				
		TNGG	160402R-B	0.2	●	●	●	○	●	●	●	●	○			○																●						●				●		D14	
			160402L-B	0.2	●	●	●	○	●	●	●	●	○			○																●						●				●		D15	
			160404R-B	0.4	●	●	●	○	●	●	●	●	○	●		○																●						●						F64	
			160404L-B	0.4	●	●	●	○	●	●	●	●	○	●		○																●						●						F74	
			160408R-B	0.8	●		●		●																																			F75	
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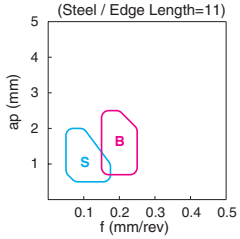
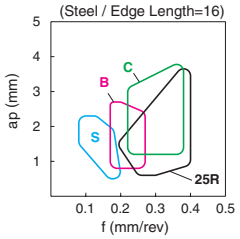
Applicable Chipbreaker Range

ap indicates radius

1





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60° Triangle / Negative with Hole

(mm)

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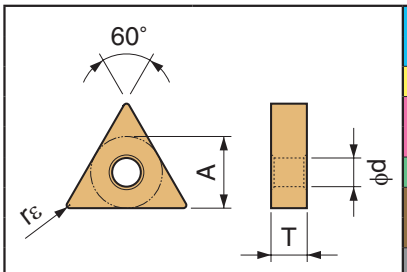
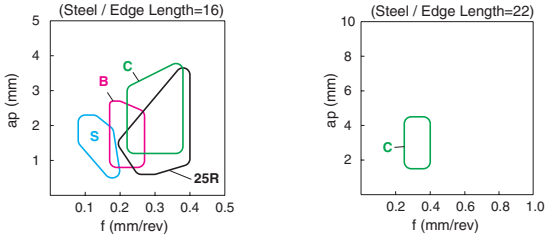


		Dimension (mm)	Cermet					MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide																		MEGACOAT MEGACOAT NANO					PVD Coated Carbide				DLC	Carbide			
Insert Handed Insert shows Right-hand	Description	rε	TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium-Roughing	TNGG 160402R-C	0.2		●		○			●		○			○																												D14	
	TNGG 160402L-C	0.2		●		○			●		○			○																													
	TNGG 160404R-C	0.4	●	●	●	○	●	●	●	●	○	●	●	○																							●					●		
	TNGG 160404L-C	0.4	●	●	●	○	●	●	●	●	○	●	●	○																							●					●	D15	
	TNGG 160408R-C	0.8	●	●	●	○	●	●	●	●	○	●	●	○																							●					●	F64	
	TNGG 160408L-C	0.8	●	●	●	○	●	●	●	●	○	●	●	○																							●					●	F74	
	TNGG 160412R-C	1.2	●		●		●	●			○	●																														F75	
	TNGG 160412L-C	1.2	●		●		●	●			○	●																															
	TNGG 160416R-C	1.6										●																																
	TNGG 220404R-C	0.4		●		○	●		●			●																														D14	
	TNGG 220404L-C	0.4		●		○	●		●			●																															
	TNGG 220408R-C	0.8		●		○	●		●			●																														F74	
	TNGG 220408L-C	0.8		●		○	●		●			●																															
	TNGG 110402R	0.2					●																																				1
	TNGG 110402L	0.2					●																																			
	TNGG 110404R	0.4					●																																		D14	
	TNGG 110404L	0.4					●																																		F75	
	TNGG 110408R	0.8					●																																			
	TNGG 110408L	0.8					□																																			
	TNMG 160404R-C	0.4	●	●		○	●	●	●	●	○			○																												D14	
	TNMG 160404L-C	0.4	●	●		○	●	●	●	●	○			○																													
	TNMG 160408R-C	0.8	●	●		○	●	●	●	●	○			○																												D15	
	TNMG 160408L-C	0.8	●	●		○	●	●	●	●	○			○																												F64	
	TNMG 160412R-C	1.2					●																																		F74	
-C : Medium-Roughing																																										
Medium - Roughing	TNGG 160404R-25R	0.4	●	●	●	○	●	●	●		○			○																							●		●			●	F75	
	TNGG 160404L-25R	0.4	●	●	●	○	●	●	●		○			○																							●		●			●		
	TNGG 160408R-25R	0.8	●	●	●	○	●	●	●		○			○																							●		●			●		
	TNGG 160408L-25R	0.8	●	●	●	○	●	●	●		○			□																							●		●			●		
Low cutting force																																										

Applicable Chipbreaker Range

ap indicates radius

1



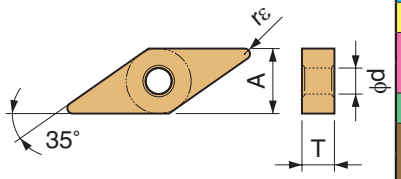
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

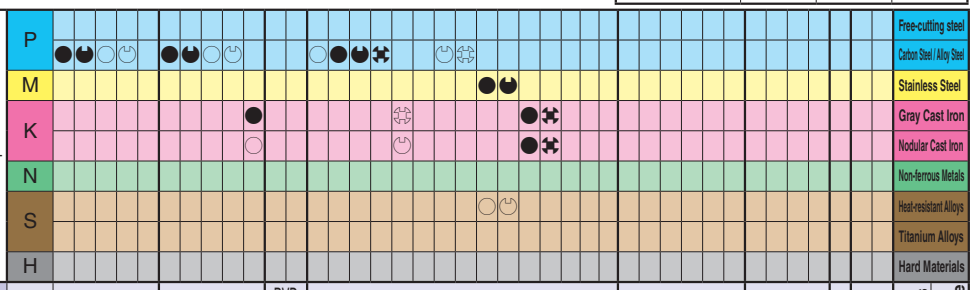
Inserts are sold in 10 piece boxes

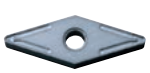
35° Rhombic / Negative with Hole

(mm)

Description	A	T	φd
VN_1604_	9.525	4.76	3.81





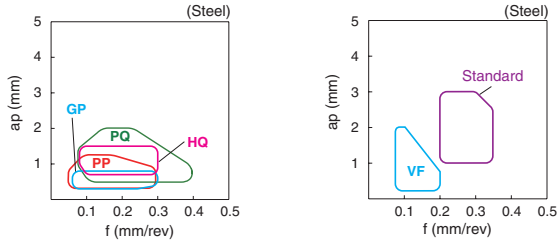
Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing		VNMG 160402PP	0.2	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		VNMG 160404PP	0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		VNMG 160408PP	0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		VNMG 160412PP	1.2	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
Finishing		VNMG 160402GP	0.2	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●																							
		VNMG 160404GP	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●																							
		VNMG 160408GP	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●																							
Finishing-Medium	NEW	VNMG 160404R-VC	0.4	●	●				●	●						●	●	●	●																									
		VNMG 160404L-VC	0.4	●	●				●	●						●	●	●	●																									
		VNMG 160408R-VC	0.8	●	●				●	●						●	●	●	●																									
		VNMG 160408L-VC	0.8	●	●				●	●						●	●	●	●																									
		VNMG 160412R-VC	1.2	●	●				●	●						●	●	●	●																									
		VNMG 160412L-VC	1.2	●	●				●	●						●	●	●	●																									
Finishing-Medium		VNMG 160404VF	0.4	●	●	●	○		●	●	●	○			○	●	●	●	●		●	●																							
		VNMG 160408VF	0.8	●	●	●	○		●	●	●	○			○	●	●	●	●		●	●																							
		VNMG 160412VF	1.2		●		○			●		○			○	●	●	●	●		●	●																							
Finishing-Medium		VNMG 160404PQ	0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		VNMG 160408PQ	0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		VNMG 160412PQ	1.2	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
Finishing-Medium		VNMG 160404HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●																							
		VNMG 160408HQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●																							
		VNMG 160412HQ	1.2		●		○	●		●		○		●	○	●	●	●	●	●	●	●																							
Medium		VNMG 160404TN-V	0.4					●																																			
		VNMG 160408TN-V	0.8					●																																			
		VNMG 160412TN-V	1.2					●																																			
Roughing		VNMG 160404	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●	●	●	○	○	●															
		VNMG 160408	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●	●	●	●	●	●	●	●	○	○	●															

D16
D17
D18
1

Applicable Chipbreaker Range

ap indicates radius

1



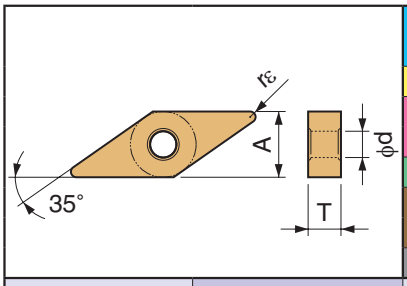
Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability

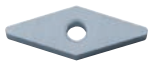
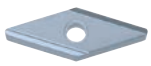
35° Rhombic / Negative with Hole

(mm)

Description	A	T	φd
VN_1604_	9.525	4.76	3.81



P	Free-cutting steel / Carbon Steel / Alloy Steel
M	Stainless Steel
K	Gray Cast Iron / Nodular Cast Iron
N	Non-ferrous Metals
S	Heat-resistant Alloys / Titanium Alloys
H	Hard Materials

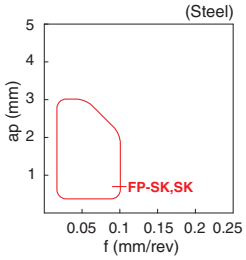
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium	NEW Sharp Edge / Polished	VNGG 160402MFP-SK	<0.2																				●	●						●	●				●												1
		160404MFP-SK	<0.4																				●	●						●	●				●											
	NEW	VNGG 160402M-SK	<0.2	●	●	●			●	●	●																																		
		160404M-SK	<0.4	●	●	●			●	●	●																																		
Stainless Steel / Heat-Resistant Alloys	Finishing-Medium	VNMG 160404MQ	0.4																				●	●								●	●	●				●				●				
		160408MQ	0.8																				●	●								●	●	●				●				●				
	Medium-Roughing	VNMG 160404MS	0.4																				●	●								●	●	●				●				●		D16	2
		160408MS	0.8																				●	●								●	●	●				●				●		D17	
		160412MS	1.2																				●	●								●	●	●				●						D18	
	Medium-Roughing	VNMG 160404MU	0.4																				●	●								●	●	●				●				●			
		160408MU	0.8																				●	●								●	●	●				●				●			
Cast Iron	 Without Chipbreaker	VNGA 160404	0.4									●																														●			-
		160408	0.8									●																														●			
Medium		VNGG 160402R	0.2	●	●	●	○	●	●	●	●	○	●	○																								●							3
		160402L	0.2	●	●	●	○	●	●	●	●	○	●	○																								●							
		160404R	0.4	●	●	●	○	●	●	●	●	○	●	○																								●				●			
		160404L	0.4	●	●	●	○	●	●	●	●	○	●	○																								●				●			
		160408R	0.8	●	●	●		●	●			○																										□				●			
		160408L	0.8	●	●	●		●	●			○																														●			

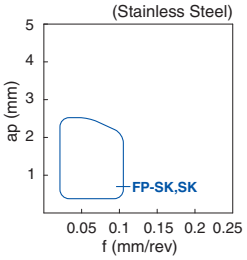
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1





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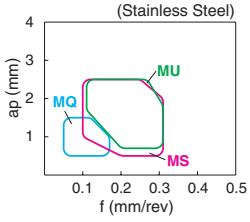

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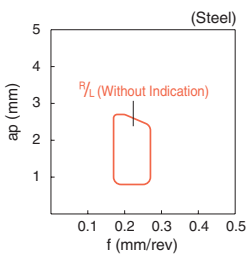


● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

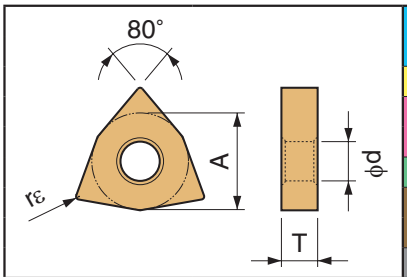
80° Trigon / Negative with Hole

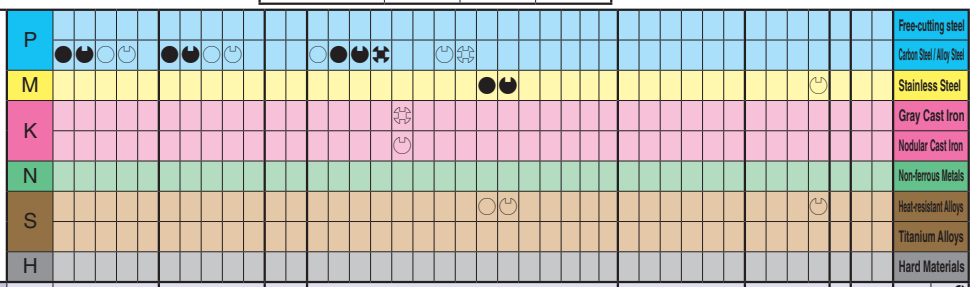
(mm)

Description	A	T	φd
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	A	T	φd
WN_0804_	12.70	4.76	5.16



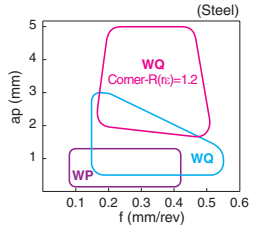


Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	Finishing	WNMG 080404WP	0.4	●	●	●	○		●	●	●	○			○	●	●	●	●	●	●	●																							
		WNMG 080408WP	0.8	●	●		○		●	●	●	○			○	●	●	●	●	●	●	●																							
With Wiper Edge	Finishing-Medium	WNMG 080404WQ	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●	□	●	●																							
		WNMG 080408WQ	0.8	●	●		○		●	●	●	○		●	○	●	●	●	●	●	●	●																							
		WNMG 080412WQ	1.2		●		○			●		○			○	●	●	●	●	●	●	●																							
Finishing		WNMG 080402PP	0.2	●	●	●	○		●	●	●	○				●	●	●	●																										
		WNMG 080404PP	0.4	●	●	●	○		●	●	●	○				●	●	●	●																										
		WNMG 080408PP	0.8	●	●	●	○		●	●	●	○				●	●	●	●																										
		WNMG 080412PP	1.2	●	●	●	○		●	●	●	○				●	●	●	●																										
Finishing		WNMG 060404GP	0.4		●			●		●				●							●	●																							
		WNMG 060408GP	0.8		●			●		●				●							●																							
		WNMG 080404GP	0.4	●	●	●	○	●	●	●	●	○		●	○																													
		WNMG 080408GP	0.8	●	●	●	○	●	●	●	●	○		●	○																													
Finishing-Medium		WNMG 080404PQ	0.4	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		WNMG 080408PQ	0.8	●	●	●	○		●	●	●	○				●	●	●	●		●	●																							
		WNMG 080412PQ	1.2													●	●	●	●		●	●																							
Finishing-Medium		WNMG 06T304HQ	0.4					●										●	●			●																							
		WNMG 06T308HQ	0.8					●										●	●			●																							
		WNMG 060404HQ	0.4		●			●		●				●		●	●	●	●		●	●																							
		WNMG 060408HQ	0.8		●			●		●				●		●	●	●	●		●	●																							
		WNMG 080404HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●																●					
		WNMG 080408HQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●	●	●																●					
		WNMG 080412HQ	1.2	●			○	●	●		●	○		●	○	●	●	●	●	●	●	●																							
Finishing-Medium / Up Facing		WNMG 080404CQ	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●	●	●	●																							
		WNMG 080408CQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●	●	●	●																							
		WNMG 080412CQ	1.2		●		○	●		●		○			○	●	●	●	●	●	●	●																							
Finishing-Medium / Up Facing		WNMG 080408CJ	0.8													●	●	●	●	□	●	●	□																							
		WNMG 080412CJ	1.2													●	●	●	●	□	●	●	●																							

Applicable Chipbreaker Range

ap indicates radius

1



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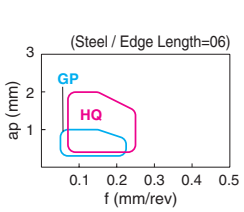
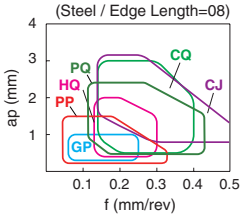




Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

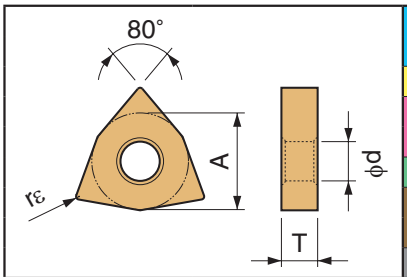
80° Trigon / Negative with Hole

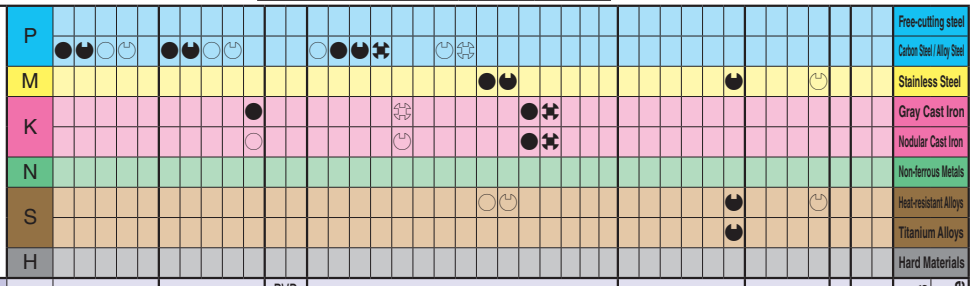
(mm)

Description	A	T	φd
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	A	T	φd
WN_0804_	12.70	4.76	5.16



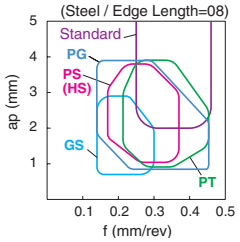


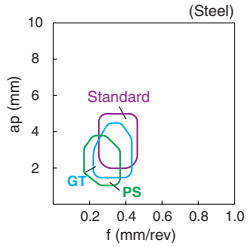
Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing		WNMG 060404GS 060408GS	0.4 0.8	● ●				●	● ●				●	●	● ●	●	● ●		● ●	●																							D20 F76	
Medium - Roughing		WNMG 080404GS 080408GS 080412GS	0.4 0.8 1.2									○ ○		● ●	○ ○	● ●	● ●	● ●	● ●		● ●	●																								
Medium - Roughing	NEW	WNMG 080404PG 080408PG 080412PG 080416PG	0.4 0.8 1.2 1.6	● ●	● ●				● ●	●						● ●	● ●	● ●	● ●																	● ●								
Medium - Roughing		WNMG 080404PS 080408PS 080412PS 080416PS	0.4 0.8 1.2 1.6			●					● ●	○ ○				● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	●														●				
Medium - Roughing		WNMG 080404HS 080408HS 080412HS	0.4 0.8 1.2				○ ○ □	○ ○ ○						○ ○ ○	○ ○ ○						○ ○ □	○ ○																						1
Medium-Roughing / High Feed Rate		WNMG 080408PT 080412PT	0.8 1.2													● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	●																		D20 F77 F78	
Medium-Roughing / High Feed Rate		WNMG 080408GT 080412GT	0.8 1.2											●		● ●	● ●	● ●	● ●		● ●	●																						
Roughing		WNMG 080404 080408 080412	0.4 0.8 1.2	● ●		● ●		● ●	● ●		● ●		● ●			● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	○ ○	○ ○	○ ○											● ●				
Roughing	NEW	WNMG 080408PH 080412PH	0.8 1.2													● ●	● ●	● ●	● ●						● ●	● ●																		2 3

Applicable Chipbreaker Range

ap indicates radius

1





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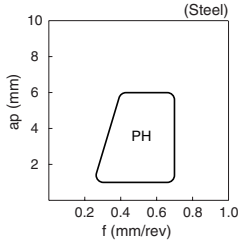

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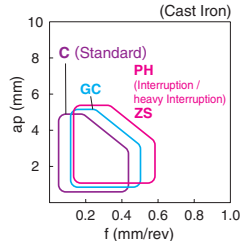


● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

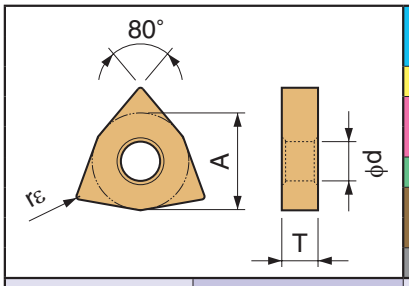
80° Trigon / Negative with Hole

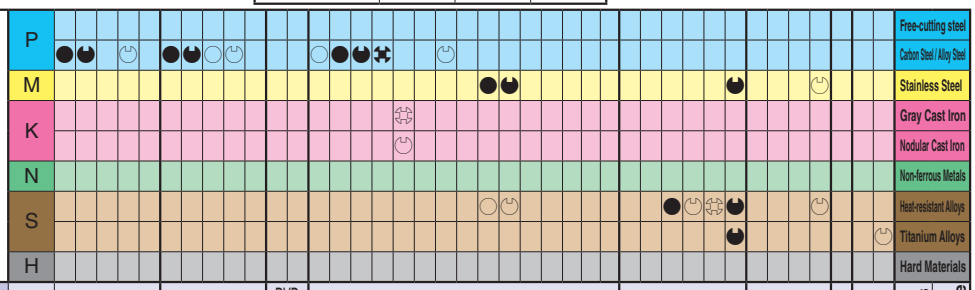
(mm)

Description	A	T	φd
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	A	T	φd
WN_0804_	12.70	4.76	5.16



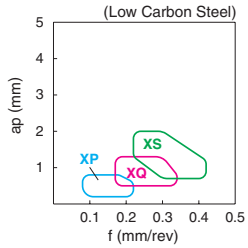


Insert	Description	Dimension (mm) rε	Cermet					MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide											MEGACOAT MEGACOAT NANO					PVD Coated Carbide				DLC	Carbide		Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
			TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Low Carbon Steel	Finishing	WNMG 080404XP 080408XP	0.4 0.8	●● ●●	●● ●●	○● □●	○● ○●	●● ●●	●● ●●	●● ●●	○○ ○○		●○ ●○	●● ●●	●● ●●	●● ●●	●● ●●		●● ●●																					
Low Carbon Steel	Medium	WNMG 080404XQ 080408XQ	0.4 0.8	●● ●●		○ ○●	○ ○●	●● ●●	●● ●●	●● ●●	○○ ○○		●○ ●○	●● ●●	●● ●●	●● ●●	●● ●●	□ 	●● ●●																				1
Low Carbon Steel	Roughing	WNMG 080408XS	0.8		●	□			●		○		●○		●●	●●	●●	□	●●																				
Stainl e ss Steel / Heat-Resistant Alloys	Medium-Roughing / Sharp Edge	WNGG 080404TK 080408TK	0.4 0.8																										●● ●●	●● ●●							● ●		D20 F77 F78	
	Medium - Roughing	WNMG 080404TK 080408TK	0.4 0.8																			●● ●●							●● ●●	●● ●●	●● ●●		●						
	Finishing-Medium	WNMG 080404MQ 080408MQ	0.4 0.8																			●● ●●							●● ●●	●● ●●	●● ●●	●● ●●	●				●		2
	Medium - Roughing	WNMG 080404MS 080408MS 080412MS	0.4 0.8 1.2																			●● ●● ●●							●● ●● ●●	●● ●● ●●	●● ●● ●●	●● ●● ●●	● ● ●				●		
	Medium - Roughing	WNMG 080404MU 080408MU	0.4 0.8																			●● ●●							●● ●●	●● ●●	●● ●●	●● ●●	●				●		

Applicable Chipbreaker Range

ap indicates radius

1



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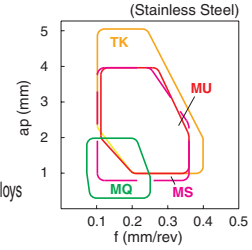


Heat-resistant Alloys
Titanium Alloys
B6

Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

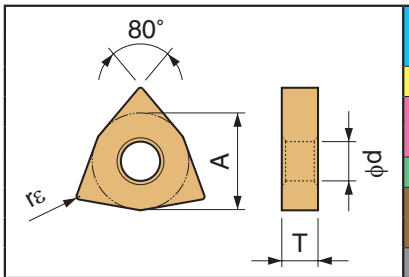
80° Trigon / Negative with Hole

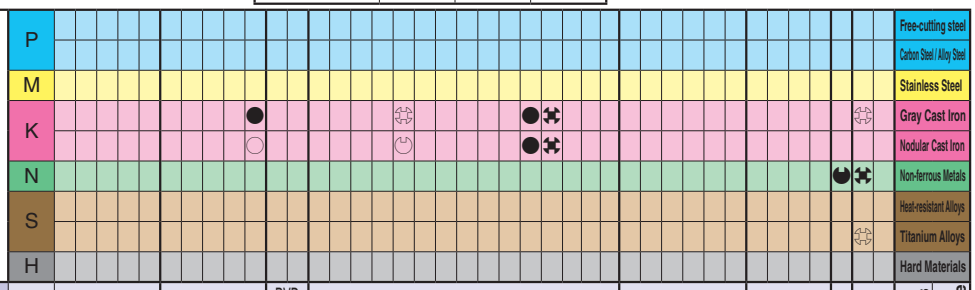
(mm)

Description	A	T	φd
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	A	T	φd
WN_0804_	12.70	4.76	5.16



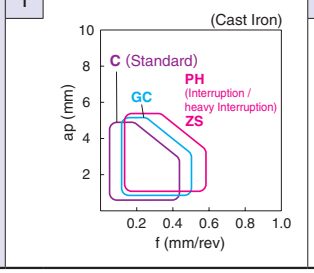


Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Cast Iron	Roughing	WNMG 080404C 080408C 080412C	0.4 0.8 1.2																● ●						●● ●●	● ●		○ ○	● ●● ●●																
Cast Iron	Roughing	WNMG 080408ZS 080412ZS	0.8 1.2																●● ●	●					●● ●●	● ●		○ ○	● ●																1
Cast Iron	Roughing	WNMG 080408GC 080412GC	0.8 1.2																● □						●● ●●	○ □		○ □	● ●														D20 F77 F78	
Cast Iron	Without Chipbreaker	WNMA 080408 080412	0.8 1.2										●						● ●						●● ●●	□ ○		○ ○	● ●																-
Non-ferrous Metals	Medium-Roughing / Sharp Edge	WNGG 080404AH 080408AH	0.4 0.8																																				● ●	● ●			2
Finishing	Surface Roughness Oriented	WNGG 060402R-S 060402L-S 060404R-S 060404L-S 060408R-S 060408L-S	0.2 0.2 0.4 0.4 0.8 0.8					● ● ● ● ● ●					●																												● ● ● ● ● ●		D20 F76	3
Medium		WNGG 060404R 060404L	0.4 0.4					● ●																																● ●			

Applicable Chipbreaker Range

ap indicates radius

1



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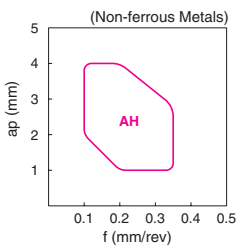

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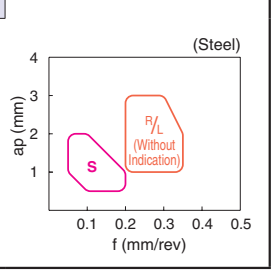


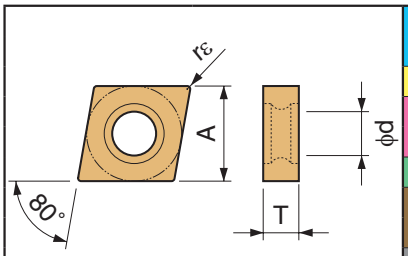
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

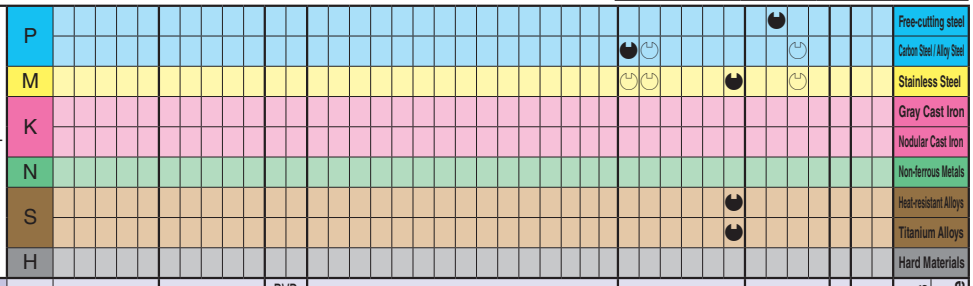
Inserts are sold in 10 piece boxes

Small Double Sided Tools / 80° Rhombic

(mm)

Description	A	T	φd
CN_U0703_	7.5	3.18	3.6

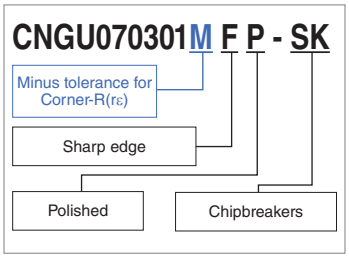


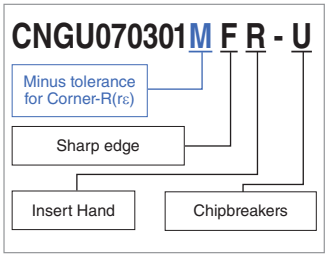


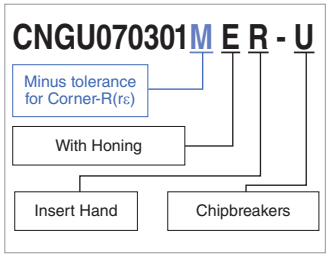
Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium	Sharp Edge	CNGU 070301MF-SK	<0.1																																									E38	B48 1
		CNGU 070302MF-SK	<0.2																																									
Finishing-Medium	Sharp Edge / Polished	CNGU 070301MFP-SK	<0.1																												●	●			●									
		CNGU 070302MFP-SK	<0.2																												●	●			●									
Medium - Roughing	With Honing	CNMU 070302E-GK	0.2																												●	●			●			●						
		CNMU 070304E-GK	0.4																												●	●			●		●	●						
Finishing	Sharp Edge	CNGU 0703005MFR-F	<0.05																													●					□	□						
		CNGU 070301MFR-F	<0.1																												●	●			●		□	□						
		CNGU 070302MFR-F	<0.2																												●	●			●		□	□	●					
		CNGU 070304MFR-F	<0.4																												●	●			●		□	□						
Low Feed	Sharp Edge	CNGU 0703005MFR-U	<0.05																													●					□	●						
		CNGU 070301MFR-U	<0.1																												●	●			●		□	●						
		CNGU 070302MFR-U	<0.2																												●	●			●		□	●						
		CNGU 070304MFR-U	<0.4																												●	●			●		●	●						
Low Feed	With Honing	CNGU 070301MER-U	<0.1																																			●						
		CNGU 070302MER-U	<0.2																																			●						
		CNGU 070304MER-U	<0.4																																			●						

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Small Double Sided Tools Identification System







When a minus tolerance is specified for the corner-R(rε)

If a minus tolerance is specified for the corner-R(rε) as shown in the Fig.1, using an insert with corner-R(rε)=0.2 mm may result in larger radius than specified.
Use an insert the corner of which R(rε) has a minus tolerance.

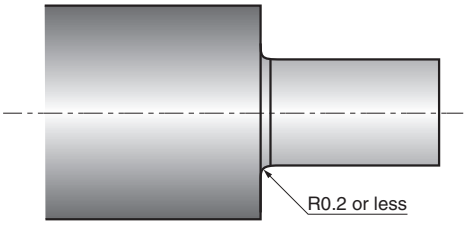


Fig.1 Example of a specified corner-R in the drawing

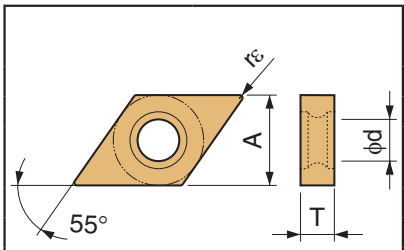
Inserts are sold in 10 piece boxes

● : Std. Item □ : Deleted from the next catalogue

Small Double Sided Tools / 55° Rhombic

(mm)

Description	A	T	φd
DN_U0803_	7.0	3.18	3.6

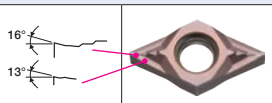
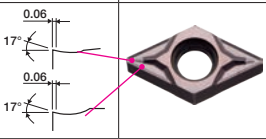
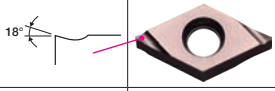
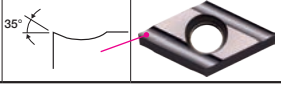


	Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium	Sharp Edge	DNGU 080301MF-SK	<0.1																																		●						
		DNGU 080302MF-SK	<0.2																																		●						
		DNGU 080304MF-SK	<0.4																																		●						
Finishing-Medium	Sharp Edge / Polished	DNGU 080301MFP-SK	<0.1																												●	●			●								
		DNGU 080302MFP-SK	<0.2																												●	●			●								
		DNGU 080304MFP-SK	<0.4																												●	●			●								
Medium - Roughing	With Honing	DNMU 080302E-GK	0.2																												●	●			●			●					
		DNMU 080304E-GK	0.4																												●	●			●		●	●					
Finishing	Sharp Edge	DNGU 0803005MFR-F	<0.05																													●					□	□					
		DNGU 080301MFR-F	<0.1																												●	●			●		□	●					
		DNGU 080302MFR-F	<0.2																												●	●			●		●	●					
		DNGU 080304MFR-F	<0.4																												●	●			●		□	□					
Low Feed	Sharp Edge	DNGU 0803005MFR-U	<0.05																													●					□	●					
		DNGU 080301MFR-U	<0.1																												●	●			●		□	●					
		DNGU 080302MFR-U	<0.2																												●	●			●		●	●					
		DNGU 080304MFR-U	<0.4																												●	●			●		□	●					
Low Feed	With Honing	DNGU 080301MER-U	<0.1																																		●	●					
		DNGU 080302MER-U	<0.2																																		□	●					
		DNGU 080304MER-U	<0.4																																		□	●					

E38 E48 2

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Chipbreaker Selection (Negative Inserts)

Cutting Range	Name	Cross-section	Advantages
Finishing-Medium	SK		A low cutting force chipbreaker designed for chip control in steel and stainless steel. Cutting performance is similar to comparable sized positive inserts.
Medium - Roughing	GK		Good chip evacuation at wide range by breaker dot and wide chip pocket.
Finishing	F		Good chip control at finishing to light machining with low cutting force.
Low Feed	U		Good chip control at low feed rate and varied ap with low cutting force.

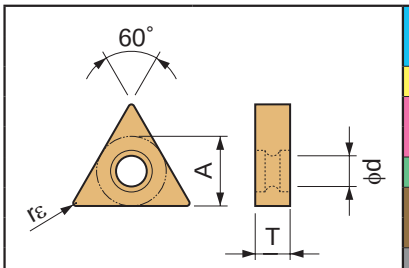
● : Std. Item □ : Deleted from the next catalogue

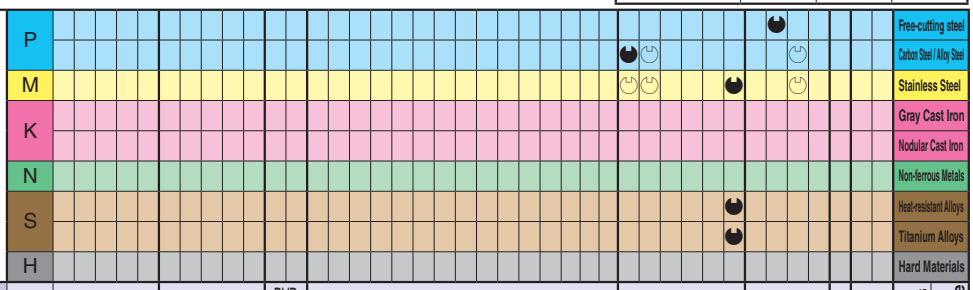
Inserts are sold in 10 piece boxes

Small Double Sided Tools / 60° Triangle

(mm)

Description	A	T	φd
TN_U0903_	5.56	3.18	3.0



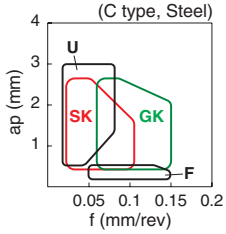


Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) rε	Cermet					MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide														MEGACOAT MEGACOAT NANO					PVD Coated Carbide			DLC	Carbide			Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
					TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Finishing	Sharp Edge	TNGU	0903005MFR-F	<0.05																											●	●			●		●	●					
			090301MFR-F	<0.1																											●	●			●		●	●					
			090302MFR-F	<0.2																											●	●			●		●	●					
			090304MFR-F	<0.4																											●	●			●		●	●					
Low Feed	Sharp Edge	TNGU	0903005MFR-U	<0.05																											●	●			●		●	●			E39	3	
			090301MFR-U	<0.1																											●	●			●		●	●					
			090302MFR-U	<0.2																											●	●			●		●	●					
			090304MFR-U	<0.4																											●	●			●		●	●					
Low Feed	With Honing	TNGU	090301MER-U	<0.1																																	□	●	□				
			090302MER-U	<0.2																																	□	●	□				
			090304MER-U	<0.4																																	□	●	□				

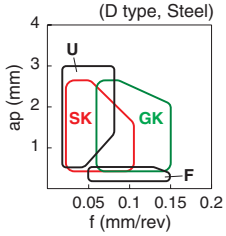
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1



2



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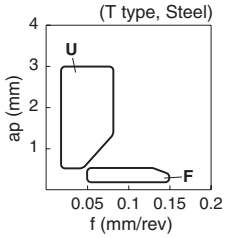


Inserts are sold in 10 piece boxes

● : Std. Item □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

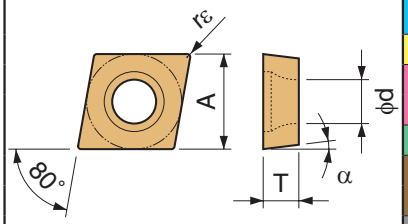
(mm)

80° Rhombic / Positive with Hole

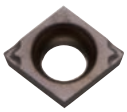
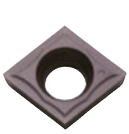
*Thickness of CC_0301_ and CC_0401_ are different

Description	A	T	ϕd	α
*CC_0301_	3.5	1.4	1.9	7°
*CC_0401_	4.3	1.8	2.3	7°

Description	A	T	ϕd	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	 Sharp Edge	*CCGT 030101M-CF	<0.1																																		●	●					F19 F39	
		030102M-CF	<0.2																																		●	●						
		*CCGT 040101M-CF	<0.1																																		●	●						
		040102M-CF	<0.2																																		●	●						
Minute ap	Sharp Edge / Polished	*CCGT 030101MP-CF	<0.1																												●	●			●			●		●				
		030102MP-CF	<0.2																												●	●			●			●		●				
		*CCGT 040101MP-CF	<0.1																												●	●			●			●		●				
		040102MP-CF	<0.2																												●	●			●			●		●				
Finishing	Sharp Edge	CCGT 060201MF-GF	<0.1																																			●						
		060202MF-GF	<0.2																																			●						
		CCGT 09T301MF-GF	<0.1																																			●						
		09T302MF-GF	<0.2																																			●						
		09T304MF-GF	<0.4																																			●						
Finishing	Sharp Edge / Polished	CCGT 060201MFP-GF	<0.1																												●	●			●			●						
		060202MFP-GF	<0.2																												●	●			●			●						
		060204MFP-GF	<0.4																												●	●			●			●						
		CCGT 09T301MFP-GF	<0.1																												●	●			●			●						
		09T302MFP-GF	<0.2																												●	●			●			●						
		09T304MFP-GF	<0.4																												●	●			●			●						
Finishing	NEW Sharp Edge / Polished	CCGT 060201MFP-SK	<0.1																												●	●			●						●			
		060202MFP-SK	<0.2																												●	●			●						●			
		060204MFP-SK	<0.4																												●	●			●						●			
		CCGT 09T301MFP-SK	<0.1																												●	●			●						●			
		09T302MFP-SK	<0.2																												●	●			●						●			
		09T304MFP-SK	<0.4																												●	●			●						●			
Finishing	NEW Sharp Edge / Polished	CCGT 060201MP-CK	<0.1																												●	●			●						●			
		060202MP-CK	<0.2																												●	●			●						●			
		CCGT 09T301MP-CK	<0.1																												●	●			●						●			
		09T302MP-CK	<0.2																												●	●			●						●			
Finishing-Medium	 Sharp Edge	CCGT 060201MF-GQ	<0.1																																			●						
		060202MF-GQ	<0.2																																			●						
		CCGT 09T301MF-GQ	<0.1																																			●						
		09T302MF-GQ	<0.2																																			●						
		09T304MF-GQ	<0.4																																			●						

Ref. to the table below

1

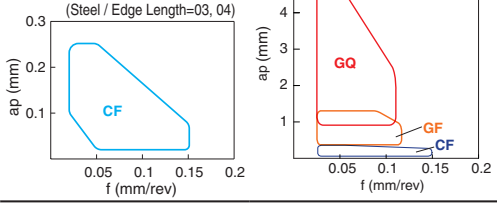
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Insert Description	Ref. to Page for Applicable Toolholders
CC..0602 type	E22,E23,E34,F39
CC..09T3 type	E22,E23,E34,F39,F65

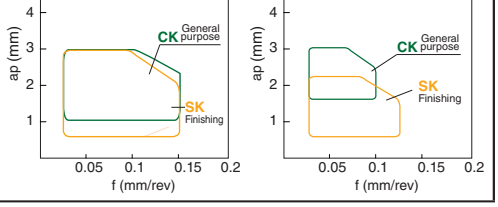
Applicable Chipbreaker Range
ap indicates radius

1

· Chip control Oriented



· Low cutting force



● : Std. Item

Inserts are sold in 10 piece boxes

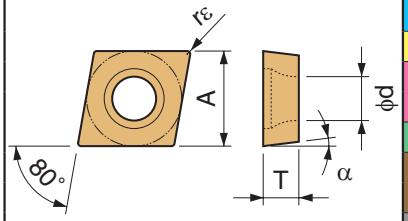
Turning Indexable Inserts

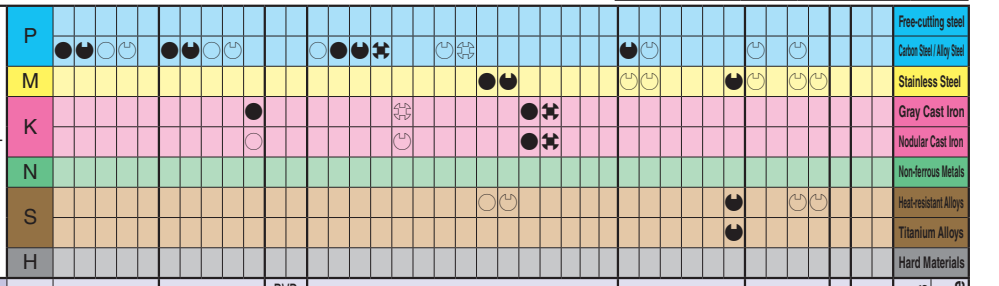
How to read pages of "Turning Inserts" B13

(mm)

Description	A	T	φd	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°

80° Rhombic / Positive with Hole



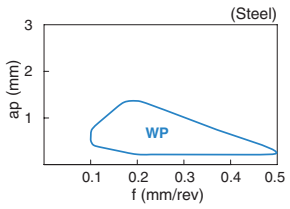


Insert	Description	Dimension (mm) rε	Cermet					MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide																MEGACOAT MEGACOAT NANO					PVD Coated Carbide				DLC	Carbide			Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
			TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Finishing-Medium	Sharp Edge / Polished	CCGT 060201MFP-GQ	<0.1																										●	●			●			●					Ref. to the table below B49	B49
		CCGT 060202MFP-GQ	<0.2																										●	●			●			●						
		CCGT 060204MFP-GQ	<0.4																										●	●			●			●						
		CCGT 09T301MFP-GQ	<0.1																										●	●			●			●						1
		CCGT 09T302MFP-GQ	<0.2																										●	●			●			●						
		CCGT 09T304MFP-GQ	<0.4																										●	●			●			●						
With Wiper Edge	NEW Finishing	CCMT 060202WP	0.2	●	●			●	●						●	●	●	●											●	●													
		CCMT 060204WP	0.4	●	●			●	●						●	●	●	●											●	●													
		CCMT 09T304WP	0.4	●	●			●	●						●	●	●	●											●	●												1	
		CCMT 09T308WP	0.8	●	●			●	●						●	●	●	●											●	●													
Finishing		CCMT 060202PP	0.2	●	●	●	○	●	●	●	○				●	●	●	●											●	●				●									
		CCMT 060204PP	0.4	●	●	●	○	●	●	●	○				●	●	●	●											●	●				●									
		CCMT 09T302PP	0.2	●	●	●	○	●	●	●	○				●	●	●	●											●	●				●									
		CCMT 09T304PP	0.4	●	●	●	○	●	●	●	○				●	●	●	●											●	●				●									
		CCMT 09T308PP	0.8	●	●	●	○	●	●	●	○				●	●	●	●											●	●				●									
Finishing-Medium		CCMT 060202GK	0.2	●	●	●	○	●	●	●	○			○	●	●	●	●		●	●	●	●	●						●				●	●		●	●					
		CCMT 060204GK	0.4	●	●	●	○	●	●	●	○			○	●	●	●	●		●	●	●	●	●		●				●				●	●		●	●					
		CCMT 09T302GK	0.2	●	●	●	○	●	●	●	○			○	●	●	●	●		●	●	●	●	●						●				●	●		●	●					
		CCMT 09T304GK	0.4	●	●	●	○	●	●	●	○			○	●	●	●	●		●	●	●	●	●		●				●				●	●		●	●					
		CCMT 120404GK	0.4	●	●	●	○	●	●	●	○			○	●	●	●	●		●	●	●	●	●		●									●		●	●				E23	
		CCMT 120408GK	0.8	●	●	●	○	●	●	●	○			○	●	●	●	●		●	●	●	●	●		●									●		●	●					
		CCMT 120412GK	1.2											□	●	●	●	●		□	●	●		●											●		□	●					
Finishing-Medium		CCMT 060202HQ	0.2	●	●	●	○	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●				●	●		●	●					
		CCMT 060204HQ	0.4	●	●	●	○	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●				●	●		●	●					
		CCMT 09T302HQ	0.2	●	●	●	○	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●				●	●		●	●					
		CCMT 09T304HQ	0.4	●	●	●	○	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●				●	●		●	●					
		CCMT 09T308HQ	0.8	●	●	●	○	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●				●	●		●	●					2
Medium		CCMT 060201	0.1	●	●	●	○	●	●	●	○	●	●	○																					●							
		CCMT 060202	0.2	●	●	●	○	●	●		○	●	●	○																					●							
		CCMT 060204	0.4	●	●	●	○	●	●		○	●	●	○																					●							
		CCMT 09T301	0.1	●	●	●	○	●	●		○	●	●	○																					●							
		CCMT 09T302	0.2	●	●	●	○	●	●		○	●	●	○																					●							
		CCMT 09T304	0.4	●	●	●	○	●	●		○	●	●	○																					●							
		CCMT 09T308	0.8	●	●	●	○	●	●		○	●	●	□	●	●	●	●	●	●	●		●	●	●	●		○	●	●					●	●		●	●					
		CCGT 0602005M	<0.05																																			●				
		CCGT 060201M	<0.1																																			●				
		CCGT 060202M	<0.2																																			●				
		CCGT 060204M	<0.4																																			●				
		CCGT 09T3005M	<0.05																																			●				
		CCGT 09T301M	<0.1																																			●				
		CCGT 09T302M	<0.2																																			●				
		CCGT 09T304M	<0.4																																			●				

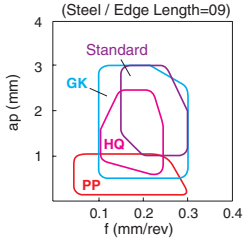
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1



2



Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

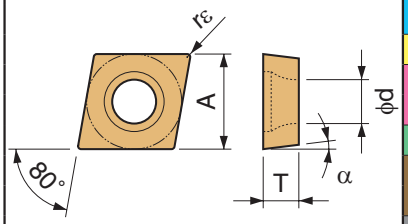
(mm)

80° Rhombic / Positive with Hole

*Thickness of CC_0301_ and CC_0401_ are different

Description	A	T	ϕd	α
*CC_0301_	3.5	1.4	1.9	7°
*CC_0401_	4.3	1.8	2.3	7°

Description	A	T	ϕd	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

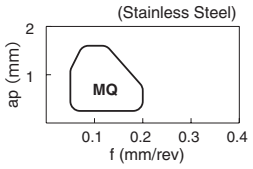
Insert (Handed Insert shows Left-hand)	Description		Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium		CCGT 0602005MF	<0.05																											●	●			●				●							
		CCGT 060201MF	<0.1																											●	●			●			□	●							
		CCGT 060202MF	<0.2																											●	●			●			●	●							
		CCGT 060204MF	<0.4																											●	●			●			●	●							B50
		CCGT 09T3005MF	<0.05																											●	●			●				●							
		CCGT 09T301MF	<0.1																											●	●			●			●	●							
		CCGT 09T302MF	<0.2																											●	●			●			●	●							
	Sharp Edge	CCGT 09T304MF	<0.4																											●	●			●			●	●							2
Stainless Steel / Heat-Resistant Alloys		CCMT 09T304MQ	0.4																					●	●							●	●	●					●			●		Ref. to the table below B49	
	Finishing-Medium	CCMT 09T308MQ	0.8																					●	●							●	●	●					●			●				1
Finishing	Super Fine	*CCET 0301003R-FSF	0.03																																		●							
		*CCET 0301003L-FSF	0.03																																		●							
		030101R-FSF	0.1			●		●																													●							
		030101L-FSF	0.1			●		●																													●							
		030102R-FSF	0.2			●		●																													●							
		030102L-FSF	0.2			●		●																													●							
		030104R-FSF	0.4			●		●																													●							
		030104L-FSF	0.4			●		●																													●							
		*CCET 0401003R-FSF	0.03																																		●							
		*CCET 0401003L-FSF	0.03																																		●							
		040101R-FSF	0.1			●																															●							
		040101L-FSF	0.1			●		●																													●							
		040102R-FSF	0.2			●		●																													●							
		040102L-FSF	0.2			●		●																													●							
		040104R-FSF	0.4			●																															●							
		040104L-FSF	0.4			●		●																													●							F19 F39	2
		*CCET 0301005MR-FSF	<0.05																												●													
		*CCET 0301005ML-FSF	<0.05																												●								●					
		030101MR-FSF	<0.1																												●								□					
		030101ML-FSF	<0.1																												●								●					
		030102MR-FSF	<0.2																												●								●					
		030102ML-FSF	<0.2																												●								●					
		030104MR-FSF	<0.4																												●													
		030104ML-FSF	<0.4																												●								●					
		*CCET 0401005MR-FSF	<0.05																												●								□					
		*CCET 0401005ML-FSF	<0.05																												●								□					
		040101MR-FSF	<0.1																												●								●					
		040101ML-FSF	<0.1																												●								●					
		040102MR-FSF	<0.2																												●								●					
		040102ML-FSF	<0.2																												●								●					
		040104MR-FSF	<0.4																												●													
	Sharp Edge / Precision	040104ML-FSF	<0.4																												●								●					

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

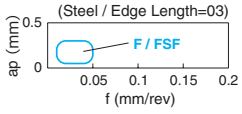
Applicable Chipbreaker Range

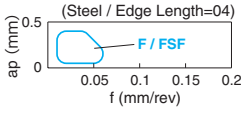
ap indicates radius

1



2





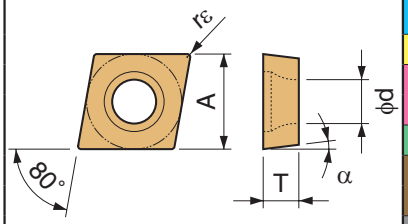
● : Std. Item □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

80° Rhombic / Positive with Hole

*Thickness of CC_0301_ and CC_0401_ are different (mm)

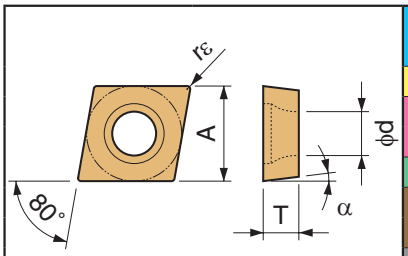
Description	A	T	ϕd	α
*CC_0301_	3.5	1.4	1.9	7°
*CC_0401_	4.3	1.8	2.3	7°



P ● ● ○ ↻ ● ● ○ ↻ ↻ ● ↻ ↻ ↻

80° Rhombic / Positive with Hole

Description	A	T	φd	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°



P: Free-cutting steel, Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron, Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys, Titanium Alloys
H: Hard Materials

Insert (Handed Insert shows Left-hand)	Description		Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed, Super Fine	CCET	0602003FR-USF	0.03																																									
		0602003FL-USF	0.03																																									
		060201FR-USF	0.1			●		●																																			
		060201FL-USF	0.1			●		●																																			
		060202FR-USF	0.2			●		●																																			
		060202FL-USF	0.2			●		●																																			
	CCET	09T3003FR-USF	0.03					●																																			
		09T3003FL-USF	0.03					●																																			
		09T301FR-USF	0.1			●		●																																			
		09T301FL-USF	0.1			●		●																																			
		09T302FR-USF	0.2			●		●																																			
		09T302FL-USF	0.2			●		●																																			
	CCET	0602005MFR-USF	<0.05																													●							●				
		0602005MFL-USF	<0.05																													●							●				
		060201MFR-USF	<0.1																													●							●				
		060201MFL-USF	<0.1																													●							●				
		060202MFR-USF	<0.2																													●							●				
		060202MFL-USF	<0.2																													●							●				
	CCET	09T3005MFR-USF	<0.05																													●							●				
		09T3005MFL-USF	<0.05																													●							●				
		09T301MFR-USF	<0.1																													●							●				
		09T301MFL-USF	<0.1																													●							●				
		09T302MFR-USF	<0.2																													●							●				
		09T302MFL-USF	<0.2																													●							●				
Low Feed, NEW, Sharp Edge	CCET	0602005MFR-U	<0.05																												●				●					●				
		0602005MFL-U	<0.05																												●				●					●				
		060201MFR-U	<0.1	●	●				●	●																					●				●					●				
		060201MFL-U	<0.1	●	●				●	●																					●				●					●				
		060202MFR-U	<0.2	●	●				●	●																					●				●					●				
		060202MFL-U	<0.2	●	●				●	●																					●				●					●				
	CCET	09T3005MFR-U	<0.05																												●				●					●				
		09T3005MFL-U	<0.05																												●				●					●				
		09T301MFR-U	<0.1	●	●				●	●																					●				●					●				
		09T301MFL-U	<0.1	●					●																						●				●					●				
		09T302MFR-U	<0.2	●	●				●	●																					●				●					●				
		09T302MFL-U	<0.2	●					●																						●				●					●				
		09T304MFR-U	<0.4																												●				●					●				
		09T304MFL-U	<0.4																												●				●					●				
Low Feed, Sharp Edge	CCGT	0602003FR-U	0.03																																			●			●			
		0602003FL-U	0.03																																			●			●			
		060201FR-U	0.1			●	○	●				○																										●			●			
		060201FL-U	0.1			●	□	●				○																										●			●			
		060202FR-U	0.2			●	○	●				○																										●			●			
		060202FL-U	0.2			●	○	●				○			●	○																						●			●			
	CCGT	09T3003FR-U	0.03					●																														●			●			
		09T3003FL-U	0.03					□																														●			●			
		09T301FR-U	0.1			●	○	●																														●			●			
		09T301FL-U	0.1			●		●																														●			●			
		09T302FR-U	0.2			●	○	●																														●			●			
		09T302FL-U	0.2			●		●																														●			●			

Ref. to the table below B49

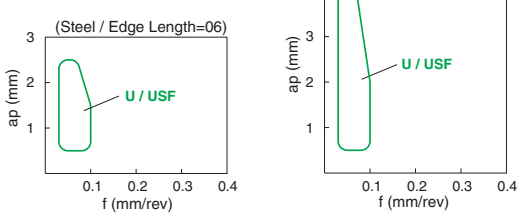
1

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



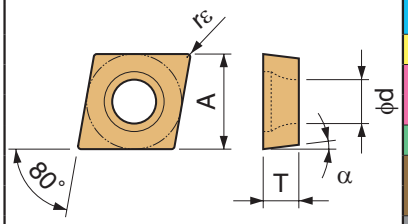
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

(mm)

Description	A	T	φd	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°

80° Rhombic / Positive with Hole



P M K N S H

Free-cutting steel / Carbon Steel / Alloy Steel / Stainless Steel / Gray Cast Iron / Nodular Cast Iron / Non-ferrous Metals / Heat-resistant Alloys / Titanium Alloys / Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed	CCGT 0602005MFR-U	<0.05																												●						●	●							
	CCGT 0602005MFL-U	<0.05																												●						□	●							
	CCGT 060201MFR-U	<0.1																												●						●	●							
	CCGT 060201MFL-U	<0.1																												●						□	●							
	CCGT 060202MFR-U	<0.2																												●						●	●							
	CCGT 060202MFL-U	<0.2																												●						●	●							
	CCGT 060204MFR-U	<0.4																												●							●							
	CCGT 060204MFL-U	<0.4																												●							●							
	CCGT 09T3005MFR-U	<0.05																												●						●	●							
	CCGT 09T3005MFL-U	<0.05																												●						●	●							
	CCGT 09T301MFR-U	<0.1																												●						●	●							
	CCGT 09T301MFL-U	<0.1																												●						□	●							
	CCGT 09T302MFR-U	<0.2																												●						●	●							
	CCGT 09T302MFL-U	<0.2																												●						●	●							
	CCGT 09T304MFR-U	<0.4																												●							●							
	CCGT 09T304MFL-U	<0.4																												●							●							
Low Feed	CCGT 060201ER-U	0.1	●		●		●	●			○																								●								
	CCGT 060201EL-U	0.1	●		●		●	●			○																								●								
	CCGT 060202ER-U	0.2	●	●	●	○	●	●	●		○																								●								
	CCGT 060202EL-U	0.2	●	●	●	○	●	●	●		○		○																						●								
	CCGT 060204ER-U	0.4	●	●	●	○	●	●	●		○																								●								
	CCGT 060204EL-U	0.4	●	●	●	○	●	●	●		○		○																						●								
	CCGT 09T301ER-U	0.1	●		●		●	●			○																								●								
	CCGT 09T301EL-U	0.1	●		●		●	●			○																								●								
	CCGT 09T302ER-U	0.2	●	●	●	○	●	●	●		○																								●								
	CCGT 09T302EL-U	0.2	●		●		●	●			○																								●								
	CCGT 09T304ER-U	0.4	●	●	●	○	●	●	●		○																								●								
	CCGT 09T304EL-U	0.4	●		●		●	●			○																								●								
With Honing	CCGT 060201MER-U	<0.1																																			□						
	CCGT 060201MEL-U	<0.1																																			□						
	CCGT 060202MER-U	<0.2																																			●						
	CCGT 060202MEL-U	<0.2																																			●						
	CCGT 060204MER-U	<0.4																																			●						
	CCGT 060204MEL-U	<0.4																																			●						
	CCGT 09T301MER-U	<0.1																																			●						
	CCGT 09T301MEL-U	<0.1																																			□						
	CCGT 09T302MER-U	<0.2																																			●						
	CCGT 09T302MEL-U	<0.2																																			●						
	CCGT 09T304MER-U	<0.4																																			●						
	CCGT 09T304MEL-U	<0.4																																			●						

Ref. to the table below **B49**

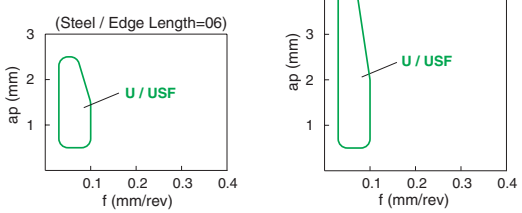
1

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

80° Rhombic / Positive with Hole

Description	A	T	ϕd	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
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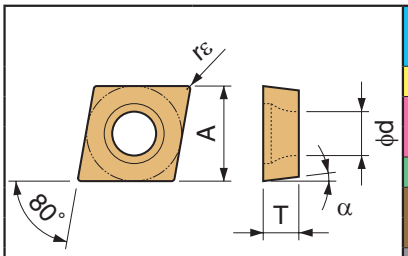

P Free-cutting steel / Carbon Steel / Alloy Steel
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S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

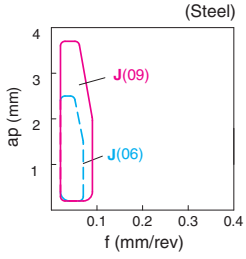
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed	CCET 0602005MFR-J	<0.05																												●	●			●										
NEW	CCET 060201MFR-J	<0.1																												●	●			●										
	CCET 060201MFL-J	<0.1																												●	●			●										
	CCET 060202MFR-J	<0.2																												●	●			●										
	CCET 060202MFL-J	<0.2																												●	●			●										
	CCET 09T301MFR-J	<0.1																												●	●			●										
	CCET 09T301MFL-J	<0.1																												●	●			●										
	CCET 09T302MFR-J	<0.2																												●	●			●										
	CCET 09T302MFL-J	<0.2																												●	●			●										
	CCET 09T304MFR-J	<0.4																												●	●			●										
Sharp Edge	CCET 09T304MFL-J	<0.4																												●	●			●										
Non-ferrous Metals	CCGT 09T304AH	0.4																																					●	●	●			Ref. to the table below B49	1
Finishing-Medium / Sharp Edge	CCGT 09T308AH	0.8																																					●	●	●				
Non-ferrous Metals	CCGT 09T302R-A3	0.2																																					●	●	●				
	CCGT 09T302L-A3	0.2																																					●	●	●				
	CCGT 09T304R-A3	0.4																																					●	●	●				
	CCGT 09T304L-A3	0.4																																					●	●	●				
	CCGT 09T308R-A3	0.8																																					●	●	●				
	CCGT 09T308L-A3	0.8																																					●	●	●				
Finishing-Medium / Sharp Edge	CCGT 120402R-A3	0.2																																					●	●	●				
	CCGT 120402L-A3	0.2																																					●	●	●				
	CCGT 120404R-A3	0.4																																					●	●	●				
	CCGT 120404L-A3	0.4																																					●	●	●				
	CCGT 120408R-A3	0.8																																					●	●	●				
	CCGT 120408L-A3	0.8																																					●	●	●				
Cast Iron	CCGW 060201	0.1																																							●				
Without Chipbreaker	CCGW 060202	0.2																																							●				
	CCGW 09T300	0.0																																							●			Ref. to the table below B49	-
	CCGW 09T301	0.1																																							●				
	CCGW 09T302	0.2																																							●				
	CCGW 09T304	0.4																																							●				

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

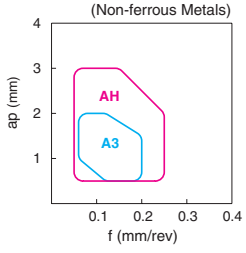
Applicable Chipbreaker Range

ap indicates radius

1 (Steel)



2 (Non-ferrous Metals)



● : Std. Item

Inserts are sold in 10 piece boxes

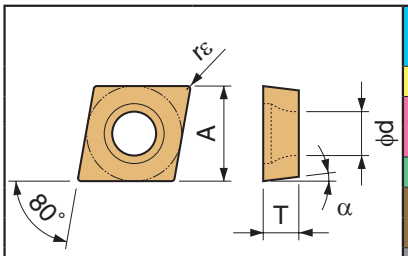
80° Rhombic / Positive with Hole

(mm)

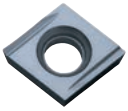
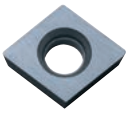
Description	A	T	φd	α
CPMT0802_	7.94	2.38	3.3	11°
CPMT0903_	9.525	3.18	4.4	11°

(mm)

Description	A	T	φd	α
CP_0802_	7.94	2.38	3.5	11°
CP_0903_	9.525	3.18	4.5	11°



P: Free-cutting steel, Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron, Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys, Titanium Alloys
H: Hard Materials

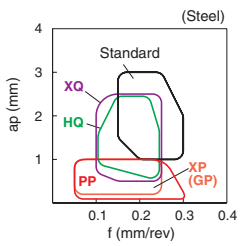
Insert (Handed Insert shows Left-hand)		Description		Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	PVD Coated Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing		CPMT	080202PP	0.2	●	●	●	○		●	●	●	●				●	●	●	●											●	●			●								
			080204PP	0.4	●	●	●	○		●	●	●	○				●	●	●	●											●	●			●								
		CPMT	090302PP	0.2	●	●	●	○		●	●	●	●				●	●	●	●											●	●			●								
			090304PP	0.4	●	●	●	○		●	●	●	○				●	●	●	●											●	●			●								
			090308PP	0.8	●	●	●	○		●	●	●	○				●	●	●	●											●	●			●								
Finishing		CPMT	080204GP	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●								●				●		●						
		CPMT	090304GP	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●								●				●	●	●						
			090308GP	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●								●				●	●	□						
Finishing-Medium		CPMH	080204HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●					●				●	●	●	●					
			080208HQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●					●				●	●	●	●					
		CPMH	090304HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●					●				●	●	●	●					
			090308HQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●					●				●	●	●	●					
Medium		CPMH	080204	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●	●	●	●	●	●	●	●	□	○	●	●				●	●	●	●					1
			080208	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●	□	●	●	●	●	●	●			●	●				●	●	●	●					
		CPMH	090304	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●	□	●	●	●	●	●	●	○	○	●	●				●	●	●	●					
			090308	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●				●	●	●	●					
Low Carbon Steel	Finishing	CPMT	080204XP	0.4	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●								●				●	●		●					
		CPMT	090304XP	0.4	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●								●				●	●		●					
			090308XP	0.8	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●								●				●	●		●					
Low Carbon Steel	Finishing-Medium	CPMT	090304XQ	0.4	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●																				
			090308XQ	0.8	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●																				
Finishing-Medium		CPMH	080204R-Y	0.4	●		●		●	●					●																			●		●		●			
			080204L-Y	0.4	●		●	○	●	●					●	○																			●		●		●			
			080208L-Y	0.8																																			●			
		CPMH	090304R-Y	0.4	●		●		●	●					●																			●		●		●				2
			090304L-Y	0.4	●		●	○	●	●					●	○																			●		●		●				
			090308R-Y	0.8																																			●			
			090308L-Y	0.8					●						●																			●				●			
Cast Iron	 Without Chipbreaker	CPMB	080202	0.2																																	●				
			080204	0.4																																	●				
			080208	0.8																																	●				
		CPMB	090302	0.2																																	●				
			090304	0.4																																	●				
			090308	0.8																																	●				

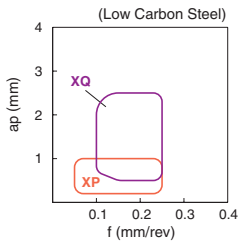
F41

Applicable Chipbreaker Range

ap indicates radius

1





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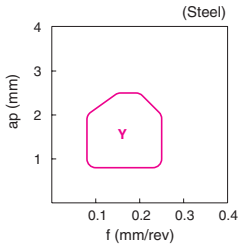


Inserts are sold in 10 piece boxes

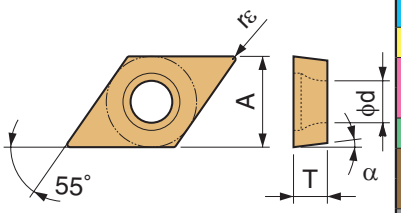
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

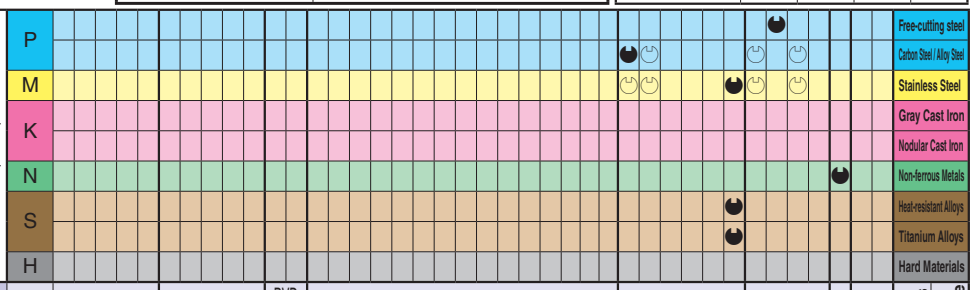
(mm)

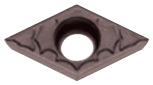
55° Rhombic / Positive with Hole

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

Description	A	T	ϕd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°





Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	 Sharp Edge	DCGT 070202CF	0.2																																	●								
		DCGT 11T302CF	0.2																																	●								
		DCGT 070201M-CF	<0.1																																		□	●							
		070202M-CF	<0.2																																		●	●							
		DCGT 11T301M-CF	<0.1																																		●	●							
		11T302M-CF	<0.2																																		●	●							
Minute ap	Sharp Edge / Polished	DCGT 070201MP-CF	<0.1																													●	●			●			●		●				
		070202MP-CF	<0.2																													●	●			●			●		●				
		DCGT 11T301MP-CF	<0.1																													●	●			●			●		●				
		11T302MP-CF	<0.2																													●	●			●			●		●				
Finishing	Sharp Edge	DCGT 070201MF-GF	<0.1																																			●							
		070202MF-GF	<0.2																																			●							
		DCGT 11T301MF-GF	<0.1																																			●							
		11T302MF-GF	<0.2																																			●							
		11T304MF-GF	<0.4																																			●							
Finishing	Sharp Edge / Polished	DCGT 070201MFP-GF	<0.1																													●	●			●			●						
		070202MFP-GF	<0.2																													●	●			●			●						
		070204MFP-GF	<0.4																													●	●			●			●						
		DCGT 11T301MFP-GF	<0.1																													●	●			●			●						
		11T302MFP-GF	<0.2																													●	●			●			●						
		11T304MFP-GF	<0.4																													●	●			●			●						
Finishing	NEW Sharp Edge / Polished	DCGT 070201MFP-SK	<0.1																													●	●			●					●				
		070202MFP-SK	<0.2																													●	●			●					●				
		070204MFP-SK	<0.4																													●	●			●					●				
		DCGT 11T301MFP-SK	<0.1																													●	●			●					●				
		11T302MFP-SK	<0.2																													●	●			●					●				
		11T304MFP-SK	<0.4																													●	●			●					●				
Finishing		DCGT 070201CK	0.1																																		●								
		070202CK	0.2																																		●								
		DCGT 11T301CK	0.1																																		●								
		11T302CK	0.2																																		●								
		DCGT 070201M-CK	<0.1																																			●	●						
		070202M-CK	<0.2																																			●	●						
		DCGT 11T301M-CK	<0.1																																			●	●						
		11T302M-CK	<0.2																																			●	●						

Ref. to the table above

1

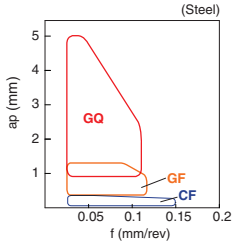
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

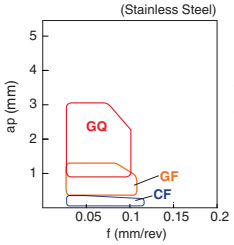
Applicable Chipbreaker Range

ap indicates radius

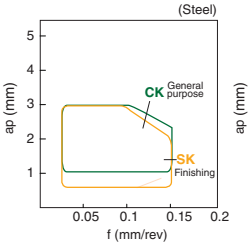
1

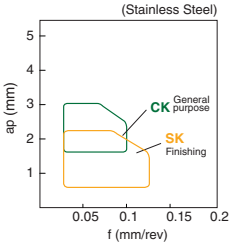
·Chip control Oriented





·Low cutting force





● : Std. Item □ : Deleted from the next catalogue

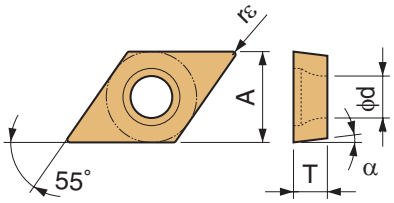
Inserts are sold in 10 piece boxes

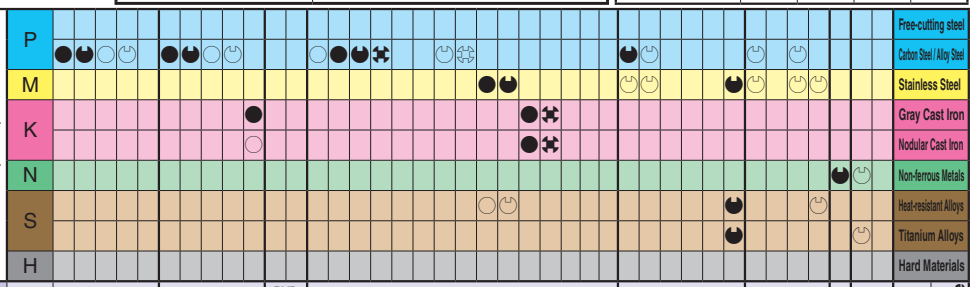
(mm)

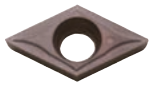
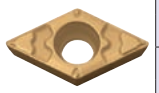
55° Rhombic / Positive with Hole

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

Description	A	T	ϕd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°





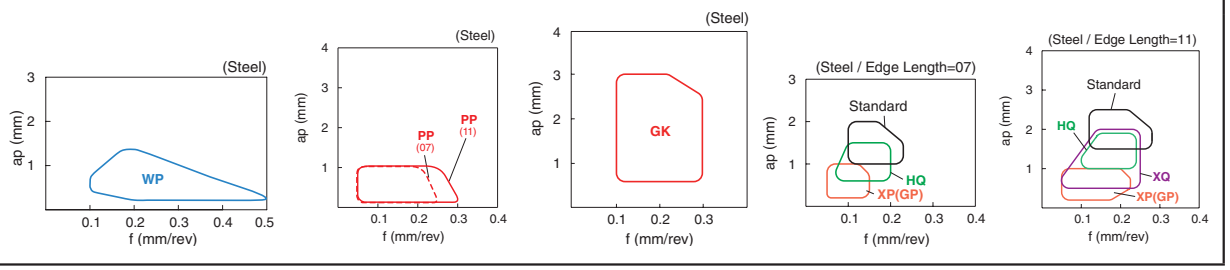
Insert	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	PVD Coated Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	Sharp Edge / Polished	DCGT 070201MP-CK	<0.1																											●	●							●	●			Ref. to the table above	B57 1
		DCGT 070202MP-CK	<0.2																											●	●							●	●				
		DCGT 11T301MP-CK	<0.1																											●	●							●	●	●			
		DCGT 11T302MP-CK	<0.2																											●	●							●	●	●			
Finishing-Medium	 Sharp Edge	DCGT 070201MF-GQ	<0.1																																			●				
		DCGT 070202MF-GQ	<0.2																																			●				
		DCGT 070204MF-GQ	<0.4																																			●				
		DCGT 11T301MF-GQ	<0.1																																			●				
		DCGT 11T302MF-GQ	<0.2																																			●				
		DCGT 11T304MF-GQ	<0.4																																			●				
Finishing-Medium	Sharp Edge / Polished	DCGT 070201MFP-GQ	<0.1																											●	●							●					
		DCGT 070202MFP-GQ	<0.2																											●	●							●					
		DCGT 070204MFP-GQ	<0.4																											●	●							●					
		DCGT 11T301MFP-GQ	<0.1																											●	●							●					
		DCGT 11T302MFP-GQ	<0.2																											●	●							●					
		DCGT 11T304MFP-GQ	<0.4																											●	●							●					
With Wiper Edge	NEW Finishing	DCMX 070204WP	0.4	●	●				●	●							●	●	●	●										●	●												
		DCMX 11T304WP	0.4	●	●				●	●							●	●	●	●										●	●												
Finishing		DCMT 070202PP	0.2	●	●	●	○		●	●	●	○				●	●	●	●												●	●				●								
		DCMT 070204PP	0.4	●	●	●	○		●	●	●	○				●	●	●	●												●	●				●								
		DCMT 11T302PP	0.2	●	●	●	○		●	●	●	○				●	●	●	●												●	●				●								
		DCMT 11T304PP	0.4	●	●	●	○		●	●	●	○				●	●	●	●												●	●				●								
		DCMT 11T308PP	0.8	●	●	●	○		●	●	●	○				●	●	●	●												●	●				●								
Finishing		DCMT 070202GP	0.2	●	●	●	○	●	●	●	●	○	●	○	●	●	●	●		●	●									●					●	●		●					1
		DCMT 070204GP	0.4	●	●	●	○	●	●	●	●	○	●	○	●	●	●	●		●	●									●					●	●		●					
		DCMT 11T304GP	0.4	●	●	●	○	●	●	●	●	○	●	○	●	●	●	●		●	●									●					●	●		●					
		DCMT 11T308GP	0.8	●	●	●	○	●	●	●	●	○	●	○	●	●	●	●		●	●									●					●	●		●					
Finishing-Medium		DCMT 070202GK	0.2	●	●	●	○		●	●	●	○		○		●	●	●	●		●	●	□	●	●						●					●	●		●	●			
		DCMT 070204GK	0.4	●	●	●	○		●	●	●	○		○		●	●	●	●		●	●	●	●	●	●	●		○	●	●					●	●		●	●			
		DCMT 070208GK	0.8	●	●	●	○		●	●	●	○		○		●	●	●	●		●	●		●	●		●			●	●					●	●		●	●			
		DCMT 11T302GK	0.2	●	●	●	○		●	●	●	○		○		●	●	●	●		●	●	●	●	●						●					●	●		●	●			
		DCMT 11T304GK	0.4	●	●	●	○		●	●	●	○		○		●	●	●	●		●	●	●	●	●		●				●					●	●		●	●			
		DCMT 11T308GK	0.8	●	●	●	○		●	●	●	○		○		●	●	●	●		●	●	●	●	●		●				●					●	●		●	●			

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



Inserts are sold in 10 piece boxes

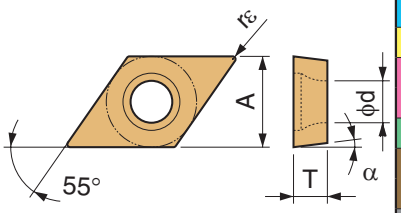
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

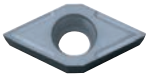
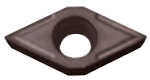
(mm)

55° Rhombic / Positive with Hole

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

Description	A	T	ϕd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°



	Insert	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium		DCMT 070202HQ	0.2	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	□								●					●			●						
		DCMT 070204HQ	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●					●			●						
		DCMT 070208HQ	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●					●			●						
		DCMT 11T302HQ	0.2	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●						●					●			●						
		DCMT 11T304HQ	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●					●			●						
		DCMT 11T308HQ	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●						●					●			●						
Medium		DCGT 070201	0.1	●	●	●	○	●	●	●	●	○		●																							●								
		DCGT 070202	0.2	●	●	●	○	●	●	●	●	○		●	○																						●								
		DCGT 070204	0.4	●	●	●	○	●	●	●	●	○		●	○																						●								
		DCGT 11T301	0.1	●	●	●		●	●	●	●	○		●																							●								
		DCGT 11T302	0.2	●	●	●	○	●	●	●	●	○		●	○																						●								
		DCGT 11T304	0.4	●	●	●	○	●	●	●	●	○		●	○																						●								
		DCMT 11T308	0.8	●	●	●	○	●	●	●	●	○	●	●	○						●					●	●		○	●							●			●					
		DCGT 0702005M	<0.05																																									
		DCGT 070201M	<0.1																																									
		DCGT 070202M	<0.2																																									
		DCGT 070204M	<0.4																																									
		DCGT 11T3005M	<0.05																																									
		DCGT 11T301M	<0.1																																									
		DCGT 11T302M	<0.2																																									
		DCGT 11T304M	<0.4																																									
Medium	 Sharp Edge	DCGT 0702005MF	<0.05																												●	●			●				●					
		DCGT 070201MF	<0.1																												●	●			●			●	●					
		DCGT 070202MF	<0.2																												●	●			●			●	●					
		DCGT 070204MF	<0.4																												●	●			●			●	●					
		DCGT 11T3005MF	<0.05																												●	●			●				●					
		DCGT 11T301MF	<0.1																												●	●			●			●	●					
		DCGT 11T302MF	<0.2																												●	●			●			●	●					
		DCGT 11T304MF	<0.4																												●	●			●			●	●					
Low Carbon Steel	Finishing	DCMT 070204XP	0.4	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●						
		DCMT 11T302XP	0.2	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●						
		DCMT 11T304XP	0.4	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●						
		DCMT 11T308XP	0.8	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●						
Low Carbon Steel	Finishing-Medium	DCMT 11T304XQ	0.4	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●																						
		DCMT 11T308XQ	0.8	●	●		○		●	●	●	○		●	○	●	●	●	●		●	●																						

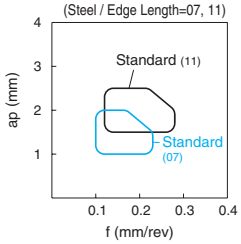
Ref. to the table above

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

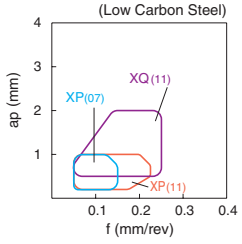
Applicable Chipbreaker Range

ap indicates radius

1



2



● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

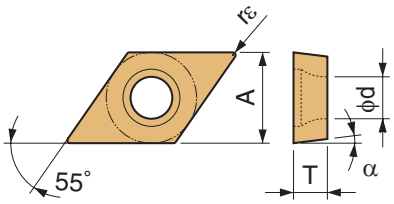
How to read pages of "Turning Inserts" B13

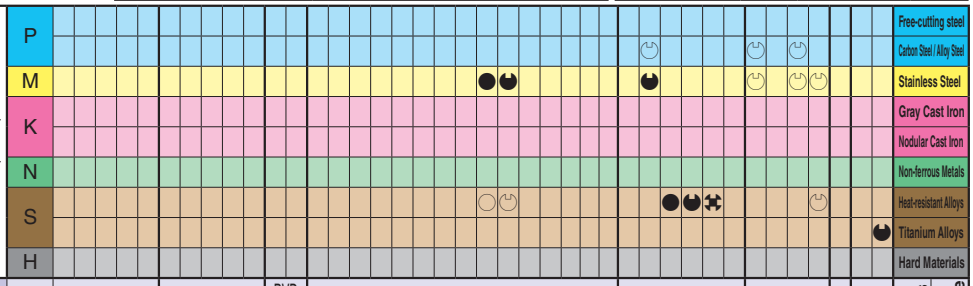
55° Rhombic / Positive with Hole

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

(mm)

Description	A	T	ϕd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°





Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Stainless Steel / Heat-Resistant Alloys	DCMT 070202MQ	0.2																					●	●							●	●	●				●					●			
	DCMT 070204MQ	0.4																					●	●							●	●	●				●					●			
	DCMT 11T302MQ	0.2																					●	●															●						1	
	DCMT 11T304MQ	0.4																					●	●							●	●	●				●					●			
	DCMT 11T308MQ	0.8																					●	●							●	●	●				●					●			
Finishing-Medium																																													
Finishing	DCET 0702003R-FSF	0.03																																			●								
	DCET 0702003L-FSF	0.03																																			●								
	070201R-FSF	0.1																																			●								
	070201L-FSF	0.1																																			●								
	070202R-FSF	0.2					●																														●								
	070202L-FSF	0.2					●																														●								
	070204R-FSF	0.4					●																														●								
	070204L-FSF	0.4					●																														●								
	DCET 11T3003R-FSF	0.03																																			●								
	DCET 11T3003L-FSF	0.03																																			●								
	11T301R-FSF	0.1					●																														●								
	11T301L-FSF	0.1					□																														●								
	11T302R-FSF	0.2					●																														●								
	11T302L-FSF	0.2					●																														●								
	11T304R-FSF	0.4					●																														●								
	11T304L-FSF	0.4					●																														●								
	DCET 0702005MR-FSF	<0.05																													●							●						2	
	DCET 0702005ML-FSF	<0.05																													●							●						2	
	070201MR-FSF	<0.1																													●							●						2	
	070201ML-FSF	<0.1																													●							●						2	
	070202MR-FSF	<0.2																													●							●						2	
	070202ML-FSF	<0.2																													●							●						2	
	070204MR-FSF	<0.4																													●							●						2	
	070204ML-FSF	<0.4																													●							●						2	
	DCET 11T3005MR-FSF	<0.05																													●							●						2	
	DCET 11T3005ML-FSF	<0.05																													●							●						2	
	11T301MR-FSF	<0.1																													●							●						2	
	11T301ML-FSF	<0.1																													●							●						2	
	11T302MR-FSF	<0.2																													●							●						2	
	11T302ML-FSF	<0.2																													●							□						2	
	11T304MR-FSF	<0.4																													●							●						2	
	11T304ML-FSF	<0.4																													●							●						2	
Sharp Edge / Precision																																													

Super Fine

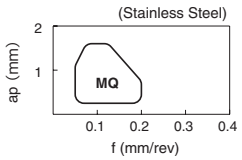
Ref. to the table above

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

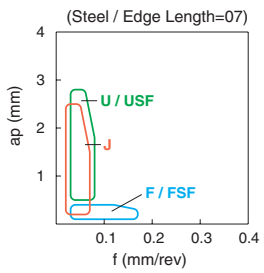
Applicable Chipbreaker Range

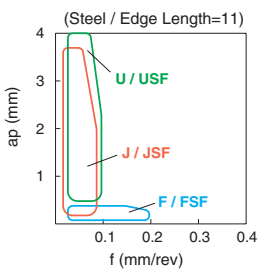
ap indicates radius

1



2





Inserts are sold in 10 piece boxes

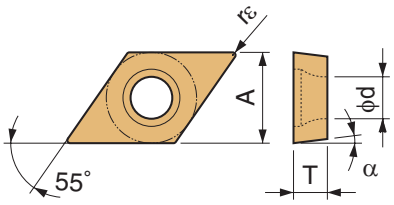
● : Std. Item □ : Deleted from the next catalogue

(mm)

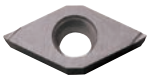
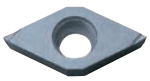
55° Rhombic / Positive with Hole

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

Description	A	T	ϕd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing NEW  Sharp Edge	DCET 0702005MR-F	<0.05																																										
	070201MR-F	<0.1	●					●																						●				●					●					
	070201ML-F	<0.1	●					●																						●				●					●					
	070202MR-F	<0.2	●					●																						●				●					●					
	070202ML-F	<0.2	●					●																						●				●					●					
	070204MR-F	<0.4	●					●																						●				●					●					
	070204ML-F	<0.4	●					●																						●				●					●					
	DCET 11T3005MR-F	<0.05																												●				●					●					
	11T301MR-F	<0.1	●					●																						●				●					●					
	11T301ML-F	<0.1	●					●																						●				●					●					
	11T302MR-F	<0.2	●					●																						●				●					●					
	11T302ML-F	<0.2	●					●																						●				●					●					
	11T304MR-F	<0.4	●					●																						●				●					●					
	11T304ML-F	<0.4	●					●																						●				●					●					
Finishing  Sharp Edge	DCGT 0702003R-F	0.03																																		●					●			
	0702003L-F	0.03																																		●					●			
	070201R-F	0.1			●		●																													●					●			
	070201L-F	0.1			●		●																													●					●			
	070202R-F	0.2			●		●																													●					●			
	070202L-F	0.2			●		●																													●					●			
	070204R-F	0.4			●		●																													●					●			
	070204L-F	0.4			●		●																													●					●			
	DCGT 11T3003R-F	0.03																																		●					●			1
	11T3003L-F	0.03																																		●					●			
	11T301R-F	0.1			●		●																													●					●			
	11T301L-F	0.1			●		●																													●					●			
	11T302R-F	0.2			●		●																													●					●			
	11T302L-F	0.2			●		●																													●					●			
	11T304R-F	0.4			●		●																													●					●			
	11T304L-F	0.4			●		●																													●					●			
	DCGT 0702005MR-F	<0.05																													●						●	●						
	0702005ML-F	<0.05																													●						●	□						
	070201MR-F	<0.1																													●							●						
	070201ML-F	<0.1																													●							●						
	070202MR-F	<0.2																													●							●						
	070202ML-F	<0.2																													●							●						
	070204MR-F	<0.4																													●							●						
	070204ML-F	<0.4																													●							●						
	DCGT 11T3005MR-F	<0.05																													●							□						
	11T3005ML-F	<0.05																													●													
	11T301MR-F	<0.1																													●							●						
	11T301ML-F	<0.1																													●							●						
	11T302MR-F	<0.2																													●						●	●						
	11T302ML-F	<0.2																													●						●	●						
	11T304MR-F	<0.4																													●						●	●						
	11T304ML-F	<0.4																													●						●	●						

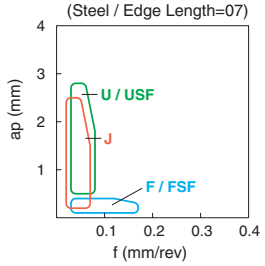
Ref. to the table above

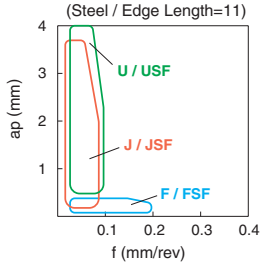
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1





● : Std. Item □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

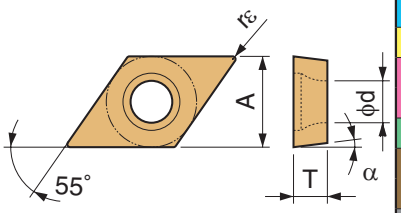
How to read pages of "Turning Inserts" B13

55° Rhombic / Positive with Hole

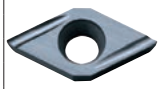
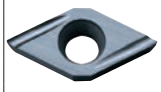
Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

(mm)

Description	A	T	ϕd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert Handed Insert shows Left-hand	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed Super Fine  Sharp Edge / Precision	DCET 0702003FR-USF	0.03																																●								
	DCET 0702003FL-USF	0.03																																●								
	070201FR-USF	0.1					□																											●								
	070201FL-USF	0.1																																●								
	070202FR-USF	0.2					●																											●								
	070202FL-USF	0.2					●																											●								
	DCET 11T3003FR-USF	0.03																																●								
	11T3003FL-USF	0.03																																●								
	11T301FR-USF	0.1					●																											●								
	11T301FL-USF	0.1					□																											●								
	11T302FR-USF	0.2					●																											●								
	11T302FL-USF	0.2					●																											●								
	DCET 0702005MFR-USF	<0.05																													●					●						
	0702005MFL-USF	<0.05																													●											
	070201MFR-USF	<0.1																													●					●						
	070201MFL-USF	<0.1																													●					●						
	070202MFR-USF	<0.2																													●					●						
	070202MFL-USF	<0.2																													●					●						
	DCET 11T3005MFR-USF	<0.05																													●											
	11T3005MFL-USF	<0.05																													●											
	11T301MFR-USF	<0.1																													●					●						
	11T301MFL-USF	<0.1																													●					●						
	11T302MFR-USF	<0.2																													●					●						
	11T302MFL-USF	<0.2																													●					●						
Low Feed NEW Sharp Edge	DCET 0702005MFR-U	<0.05																													●			●					●			
	070201MFR-U	<0.1	●					●																							●			●					●			
	070201MFL-U	<0.1	●					●																							●			●					●			
	070202MFR-U	<0.2	●	●				●	●																						●			●					●			
	070202MFL-U	<0.2	●	●				●	●																						●			●					●			
	DCET 11T3005MFR-U	<0.05																													●			●					●			
	11T301MFR-U	<0.1	●					●																							●			●					●			
	11T301MFL-U	<0.1	●					●																							●			●					●			
	11T302MFR-U	<0.2	●	●				●	●																						●			●					●			
	11T302MFL-U	<0.2	●	●				●	●																						●			●					●			
	11T304MFR-U	<0.4																													●			●					●			
Low Feed  Sharp Edge	DCGT 0702003FR-U	0.03																																●					●			
	0702003FL-U	0.03																																●					●			
	070201FR-U	0.1			●	○	●							□																				●					●			
	070201FL-U	0.1			●	□	●																											●					●			
	070202FR-U	0.2			●	○	●				○		□	○																				●					●			
	070202FL-U	0.2			●	○	●				○		□	○																				●					●			
	DCGT 11T3003FR-U	0.03					●																											●					●			
	11T3003FL-U	0.03					●																											●					●			
	11T301FR-U	0.1			●		●																											●					●			
	11T301FL-U	0.1			●		●																											●					●			
	11T302FR-U	0.2			●	○	●				○		●	○																				●					●			
	11T302FL-U	0.2			●	○	●				○			○																				●					●			

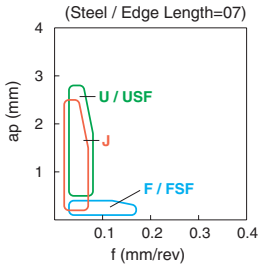
Ref. to the table above

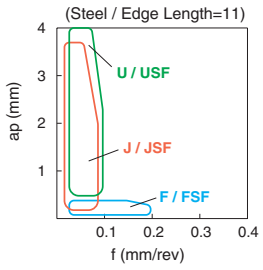
1

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1





Inserts are sold in 10 piece boxes

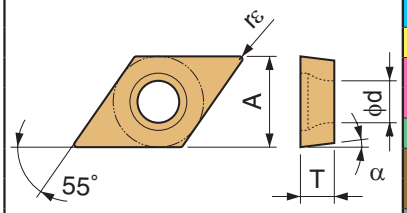
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

(mm)

55° Rhombic / Positive with Hole

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

Description	A	T	ϕd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°



	Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P	●●	●●	○	↻					
M						●		↻	↻
K									
N									
S									
H									

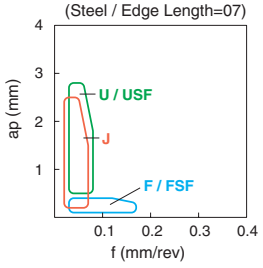
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet					MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide																MEGACOAT MEGACOAT NANO					PVD Coated Carbide			DLC	Carbide		Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
			TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Low Feed	DCGT 0702003MFR-U	<0.03																																	□	●				Ref. to the table above	1
	DCGT 0702003MFL-U	<0.03																																	□	●					
	DCGT 0702005MFR-U	<0.05																												●					□	●					
	DCGT 0702005MFL-U	<0.05																												●					□	●					
	DCGT 070201MFR-U	<0.1																												●					●	●					
	DCGT 070201MFL-U	<0.1																												●					●	●					
	DCGT 070202MFR-U	<0.2																												●					●	●					
	DCGT 070202MFL-U	<0.2																												●					●	●					
	DCGT 070204MFR-U	<0.4																												●					□	●					
	DCGT 070204MFL-U	<0.4																												●					□	●					
	DCGT 11T3005MFR-U	<0.05																												●					●	●					
	DCGT 11T3005MFL-U	<0.05																												●					●	●					
	DCGT 11T301MFR-U	<0.1																												●					●	●					
	DCGT 11T301MFL-U	<0.1																												●					●	□					
	DCGT 11T302MFR-U	<0.2																												●					●	●					
	DCGT 11T302MFL-U	<0.2																												●					●	●					
	DCGT 11T304MFR-U	<0.4																												●					●	●					
	DCGT 11T304MFL-U	<0.4																												●					●	●					
Low Feed	DCGT 070201ER-U	0.1	●		●			●																											●						
	DCGT 070201EL-U	0.1	●		●			●																											●						
	DCGT 070202ER-U	0.2	●		●	○	●	●			○			□																					●						
	DCGT 070202EL-U	0.2	●		●	□	●	●			○																								●						
	DCGT 070204ER-U	0.4	●	●	●	○	●	●	●					○																					●						
	DCGT 070204EL-U	0.4	●	●	●	○	●	●	●					○																					●						
	DCGT 11T301ER-U	0.1	●		●		●	●																											●						
	DCGT 11T301EL-U	0.1	●		●			●																											●						
	DCGT 11T302ER-U	0.2	●	●	●	○	●	●	●	●	○		●	○																					●						
	DCGT 11T302EL-U	0.2	●	●	●	○	●	●	●	●	○		●	○																					●						
	DCGT 11T304ER-U	0.4	●	●	●	○	●	●	●	●	○		●	○																					●						
	DCGT 11T304EL-U	0.4	●	●	●	○	●	●	●	●	○		●	○																					●						
With Honing	DCGT 070201MER-U	<0.1																																		●					
	DCGT 070202MER-U	<0.2																																		●					
	DCGT 070202MEL-U	<0.2																																		●					
	DCGT 070204MER-U	<0.4																																		●					
	DCGT 070204MEL-U	<0.4																																		□					
	DCGT 11T301MER-U	<0.1																																		●					
	DCGT 11T301MEL-U	<0.1																																		□					
	DCGT 11T302MER-U	<0.2																																		●					
	DCGT 11T302MEL-U	<0.2																																		●					
	DCGT 11T304MER-U	<0.4																																		●					
	DCGT 11T304MEL-U	<0.4																																		●					

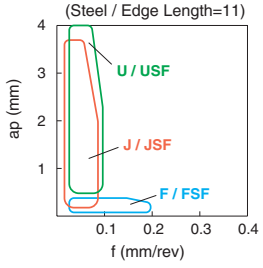
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1





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Inserts are sold in 10 piece boxes

Turning Indexable Inserts

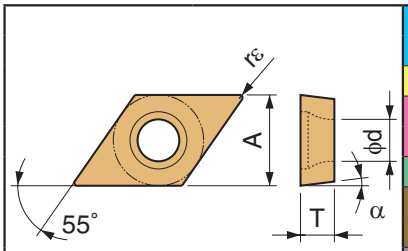
How to read pages of "Turning Inserts" B13

(mm)

55° Rhombic / Positive with Hole

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

Description	A	T	φd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed / Super Fine / Sharp Edge / Precision	DCET 11T3003FR-JSF	0.03																																	●								
	11T3003FL-JSF	0.03																																	●								
	11T301FR-JSF	0.1																																	●								
	11T301FL-JSF	0.1																																	●								
	11T302FR-JSF	0.2					●																												●								
	11T302FL-JSF	0.2					●																												●								
	DCET 11T3005MFR-JSF	<0.05																												●							●						
	11T3005MFL-JSF	<0.05																												●													
	11T301MFR-JSF	<0.1																												●							●						
	11T301MFL-JSF	<0.1																												●							□						
	11T302MFR-JSF	<0.2																												●							●						
	11T302MFL-JSF	<0.2																												●							●						
Low Feed / NEW / Sharp Edge	DCET 0702005MFR-J	<0.05																												●	●				●								
	070201MFR-J	<0.1																												●	●				●								
	070201MFL-J	<0.1																												●	●				●								
	070202MFR-J	<0.2																												●	●				●								
	070202MFL-J	<0.2																												●	●				●								
	DCET 11T3005MFR-J	<0.05																												●					●								
	11T301MFR-J	<0.1	●					●																						●					●								
	11T301MFL-J	<0.1	●					●																						●					●								
	11T302MFR-J	<0.2	●					●																						●					●								
	11T302MFL-J	<0.2	●					●																						●					●								
	11T304MFR-J	<0.4																												●					●								
Low Feed / Sharp Edge	DCGT 11T3003FR-J	0.03																																	●						●		
	11T301FR-J	0.1			●		●																												●						●		
	11T301FL-J	0.1			●																														●						●		
	11T302FR-J	0.2			●		●																												●						●		
	11T302FL-J	0.2			●		●																												●						●		
	DCGT 11T3005MFR-J	<0.05																												●							●						
	11T3005MFL-J	<0.05																												●													
	11T301MFR-J	<0.1																												●							●	●					
	11T301MFL-J	<0.1																												●							□						
	11T302MFR-J	<0.2																												●							●	●					
	11T302MFL-J	<0.2																												●								●					
	11T304MFR-J	<0.4																												●							●	●					
Sharp Edge	11T304MFL-J	<0.4																												●							●	●					

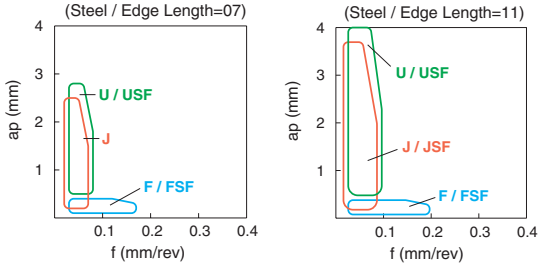
Ref. to the table above: 1

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



Inserts are sold in 10 piece boxes

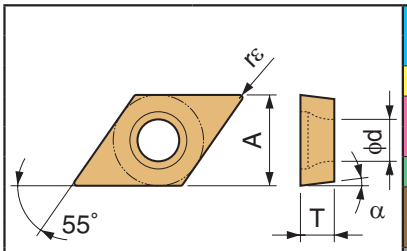
● : Std. Item □ : Deleted from the next catalogue

55° Rhombic / Positive with Hole

(mm)

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	E24~E27,E35,F43~F45
DC..11 type	E20,E24~E27,E35,F43~F45,F65

Description	A	T	φd	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°



P: Free-cutting steel, Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron, Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys, Titanium Alloys
H: Hard Materials

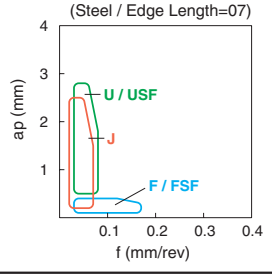
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed	DCGT 11T3003ER-J	0.03																																	●					●			
	DCGT 11T301ER-J	0.1	●		●		●	●																											●					●			
	DCGT 11T301EL-J	0.1	●		●			●																											□								
	DCGT 11T302ER-J	0.2	●		●		●	●																											●					●			
	DCGT 11T302EL-J	0.2	●		●		●	●																											●					●			
	DCGT 11T304ER-J	0.4	●		●	○	●	●																											●					●			
	DCGT 11T304EL-J	0.4	●		●	○	●	●																											●					●			
	DCGT 11T3005MER-J	<0.05																																			●							
	DCGT 11T301MER-J	<0.1																																			●							
	DCGT 11T302MER-J	<0.2																																			●							
	DCGT 11T304MER-J	<0.4																																			●							
	DCGT 11T304MEL-J	<0.4																																			●							
With Honing																																												
Non-ferrous Metals	DCGT 11T304AH	0.4																																							●	●			
	DCGT 11T308AH	0.8																																							●	●			
Finishing-Medium / Sharp Edge																																												
Non-ferrous Metals	DCGT 11T302R-A3	0.2																																							●	●			
	DCGT 11T302L-A3	0.2																																							●	●			
	DCGT 11T304R-A3	0.4																																							●	●			
	DCGT 11T304L-A3	0.4																																							●	●			
	DCGT 11T308R-A3	0.8																																							●				
	DCGT 11T308L-A3	0.8																																							●				
Finishing-Medium / Sharp Edge																																												
Cast Iron	DCGW 070201	0.1																																								●			
	DCGW 070202	0.2																																								●			
	DCGW 11T301	0.1																																								●			
	DCGW 11T302	0.2																																								●			
	DCGW 11T304	0.4																																								●			
Without Chipbreaker																																											Ref. to the table above	

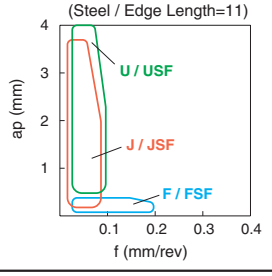
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

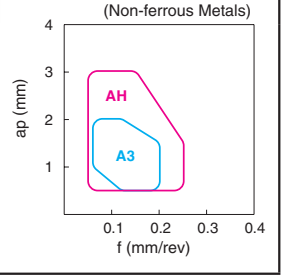
ap indicates radius

1





2



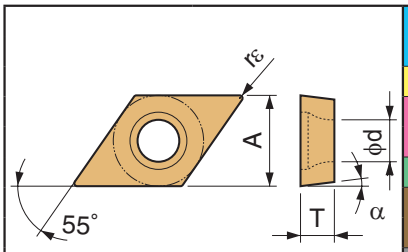
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

55° Rhombic / Positive with Hole

(mm)

Description	A	T	ϕd	α
DP_0702_	6.35	2.38	2.8	11°
DP_11T3_	9.525	3.97	4.4	11°



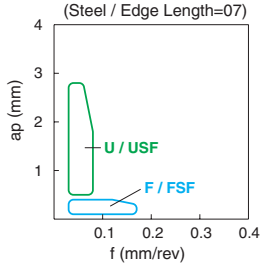
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

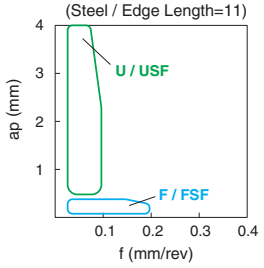
Insert (Handed Insert shows Left-hand)		Description		Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	Super Fine	DPET	0702003R-FSF	0.03																																	●								
			070201R-FSF	0.1																																	●								
			070202R-FSF	0.2					□																												●								
			070202L-FSF	0.2					□																												●								
		DPET	11T3003R-FSF	0.03																																	●								
			11T301R-FSF	0.1																																	●								
			11T302R-FSF	0.2					●																												●								
			11T302L-FSF	0.2					●																												●								
		DPET	0702005MR-FSF	<0.05																																				□						
			070201MR-FSF	<0.1																																				□						
			070202MR-FSF	<0.2																																				●						
			070202ML-FSF	<0.2																																				●						
		DPET	11T3005MR-FSF	<0.05																																				□						
			11T301MR-FSF	<0.1																																				●						
			11T302MR-FSF	<0.2																																				●						
	Sharp Edge / Precision																																													
Low Feed	Super Fine	DPET	0702003FR-USF	0.03																																	●							E28	1
			070201FR-USF	0.1																																	●								
			070201FL-USF	0.1																																	●								
			070202FR-USF	0.2					□																												●								
			070202FL-USF	0.2					□																												●								
		DPET	11T3003FR-USF	0.03																																	●								
			11T3003FL-USF	0.03																																	□								
			11T301FR-USF	0.1																																	●								
			11T301FL-USF	0.1																																	●								
			11T302FR-USF	0.2					●																												●								
			11T302FL-USF	0.2					●																												●								
		DPET	0702005MFR-USF	<0.05																																				●						
			070201MFR-USF	<0.1																																				●						
			070202MFR-USF	<0.2																																				●						
		DPET	11T3005MFR-USF	<0.05																																				●						
			11T301MFR-USF	<0.1																																				●						
			11T302MFR-USF	<0.2																																				●						
	Sharp Edge / Precision																																													

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1





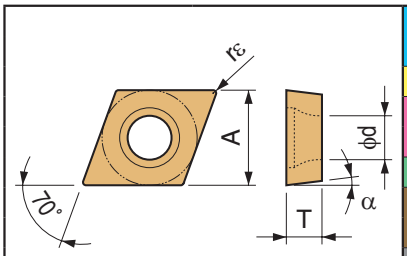
Inserts are sold in 10 piece boxes

● : Std. Item □ : Deleted from the next catalogue

70° Rhombic / Positive with Hole

(mm)

Description	A	T	ϕd	α
JC_0301_	3.5	1.4	1.9	7°

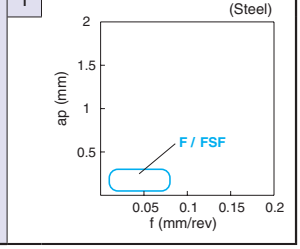


		Dimension (mm)	Cermet					MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide																		MEGACOAT MEGACOAT NANO					PVD Coated Carbide			DLC	Carbide		Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Insert Handed Insert shows Left-hand	Description	rε	TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Finishing	Super Fine																																										
	JCET 030101R-FSF	0.1																																	●							
	030101L-FSF	0.1					□																												●							
	030102R-FSF	0.2					●																												●							
	030102L-FSF	0.2					●																												●							
	030104L-FSF	0.4																																	●							
	JCET 030101MR-FSF	<0.1																																			●						
	030101ML-FSF	<0.1																																			●						
	030102MR-FSF	<0.2																																			●						
	030102ML-FSF	<0.2																																			●						
	Sharp Edge / Precision																																										
Finishing	NEW																																										
	JCET 030102MR-F	<0.2																												●				●									
	030102ML-F	<0.2																												●				●									
	030104MR-F	<0.4																												●				●							F46	1
	030104ML-F	<0.4																												●				●								
	Sharp Edge																																										
Finishing	JCGT 030101R-F	0.1																																	●							
	030101L-F	0.1					●																												●					●		
	030102R-F	0.2					●																												●					●		
	030102L-F	0.2					●																												●					●		
	030104R-F	0.4					●																												●							
	030104L-F	0.4					●																												●					●		
	JCGT 030101ML-F	<0.1																																			□						
	030102MR-F	<0.2																																			●						
	030102ML-F	<0.2																																			●						
	030104ML-F	<0.4																																			●						
	Sharp Edge																																										

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1



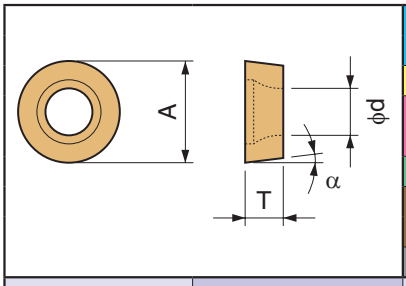
● : Std. Item □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

Round / Positive with Hole

(mm)

Description	A	T	ϕd	α
RC_1003_	10.0	3.18	3.6	7°
RC_1204_	12.0	4.76	4.2	7°



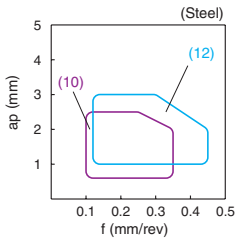
Insert		Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium	*	RCMX 1003M0	-	●		○	●		●					○	●	●	●	●	□	●	●			●																		D19	1
Medium	*	RCMX 1204M0	-	●		○	●		●					○	●	●	●	●	□	●	●			●	●	●		○	●															
Non-ferrous Metals	Finishing-Medium	RCGX 1003M0-AQ	-																																				●		D19	2

*Chipbreaker shape of RCMX... varies by grade (cermet / PVD coated cermet / CVD coated carbide)

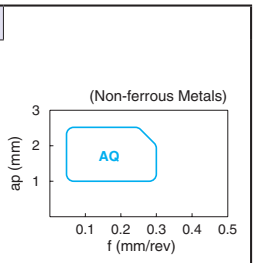
Workpiece	Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P	●	●	○	●	●	✖	↻		
M			●				↻		
K			●	●	●	✖			
N						●			
S			↻					●	
H									

Applicable Chipbreaker Range
ap indicates radius

1



2



Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

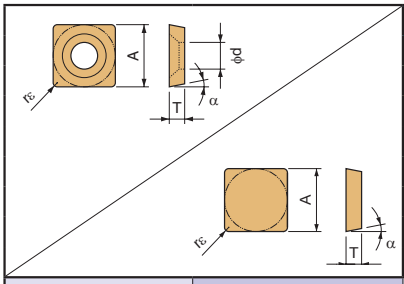
90° Square / Positive with Hole
90° Square / Positive without Hole

(mm)

Description	A	T	φd	α
SC_09T3_	9.525	3.97	4.4	7°
SP_0903_	9.525	3.18	4.5	11°

(mm)

Description	A	T	φd	α
SP_0903_	9.525	3.18	-	11°
SP_1203_	12.7	3.18	-	11°
SP_1204_	12.7	4.76	-	11°



P M K N S H — Free-cutting steel / Carbon Steel / Alloy Steel / Stainless Steel / Gray Cast Iron / Nodular Cast Iron / Non-ferrous Metals / Heat-resistant Alloys / Titanium Alloys / Hard Materials

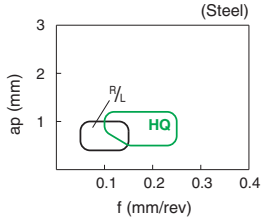
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing-Medium		SCMT 09T304HQ	0.4	●		●		●	●		●				●	●	●	●		●	●	●																		-	1
		SCMT 09T308HQ	0.8	●		●		●	●		●				●	●	●	●		●	●	●																			
Finishing		SPGH 090304L	0.4					●																																F60	
		SPGH 090308L	0.8					●																																	
Finishing		SPGR 090304R	0.4	●		●		●	●			●																													
		SPGR 090304L	0.4	●		●		●	●			●																													
		SPGR 090308R	0.8	●		●		●	●																																
		SPGR 090308L	0.8	●		●		●	●																																
		SPGR 120304R	0.4	●		●		●	●																																2
		SPGR 120304L	0.4	●		●		●	●																																
		SPGR 120308R	0.8	●		●		●	●			●																													
		SPGR 120308L	0.8	●		●		●	●			●																													
Medium		SPMR 090304G	0.4					●			○	●	●																												
		SPMR 090308G	0.8					●			○	●	●																												
		SPMR 120304G	0.4					●			○	●	●																												
		SPMR 120308G	0.8					●			○	●	●																												
Medium		SPMR 090304	0.4												●	●	●	●		●	●			●													●			E42	
		SPMR 090308	0.8												●	●	●	●		●	●			●													●			F60	
		SPMR 120304	0.4												●	●	●	●		●	●			●													●				
		SPMR 120308	0.8												●	●	●	●		●	●			●													●				
Cast Iron		SPGN 090304	0.4									●																										●		
		SPGN 090308	0.8									●																										●		-
		SPGN 120304	0.4									●																										●		
		SPGN 120308	0.8									●																										●		
		SPMN 090308	0.8									●																												
		SPMN 120304	0.4																●							●				●										
		SPMN 120308	0.8	●		●		●	●			●							●							●	○			●										
		SPMN 120312	1.2	●		●		●	●			●																												
		SPMN 120408	0.8																							●				●										
		SPMN 120412	1.2																							●				●										

Without Chipbreaker

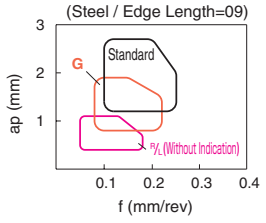
Applicable Chipbreaker Range

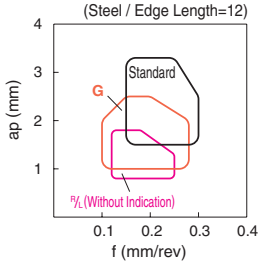
ap indicates radius

1



2





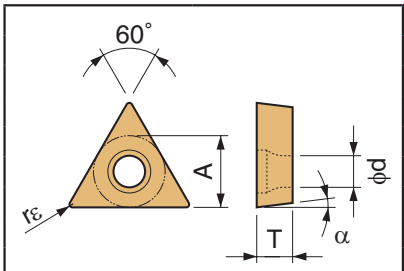
● : Std. Item ○ : Check Availability

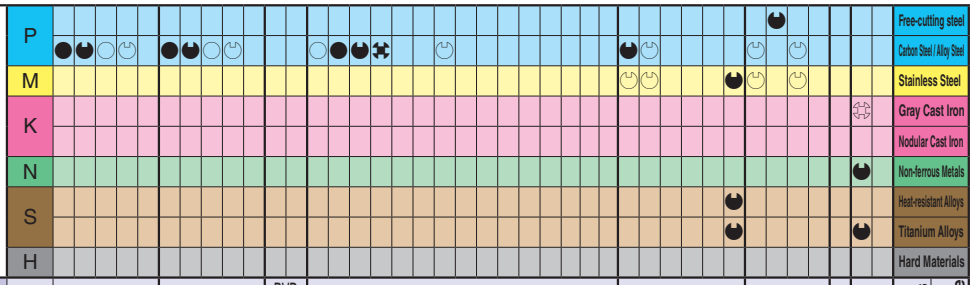
Inserts are sold in 10 piece boxes

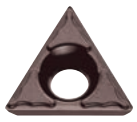
60° Triangle / Positive with Hole

(mm)

Description	A	T	φd	α
TB_0601_	3.97	1.59	2.3	5°





Insert (Handed Insert shows Left-hand)		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	 Sharp Edge	TBGT 060102CF	0.2																																	●								
		TBGT 060101M-CF	<0.1																																			●							1
		060102M-CF	<0.2																																			●	●						
Minute ap	Sharp Edge / Polished	TBGT 060101MP-CF	<0.1																													●	●			●			□					
		060102MP-CF	<0.2																													●	●			●			●					
Finishing		TBMT 060102DP	0.2	●	●	●	○	●	●	●	●	○		○	●	●	●	●		●	●																							
		060104DP	0.4	●	●	●	○	●	●	●	●	○		○	●	●	●	●		●	●																							
Finishing		TBET 0601005MR	<0.05																												●				●								
		0601005ML	<0.05																												●				●								
		060101MR	<0.1																												●				●								
		060101ML	<0.1																												●				●								
		060102MR	<0.2																												●				●								
		060102ML	<0.2																												●				●								
		060104MR	<0.4																												●				●								
		060104ML	<0.4																												●				●								
		TBGT 0601003L	0.03																																	●								
		060101R	0.1					□																											●					●			
		060101L	0.1					●																											●					●			
		060102R	0.2	●		●		●	●																										●					●			
		060102L	0.2	●	●	●	○	●	●	●	●	○		●	○																				●					●			
		060104R	0.4	●		●		●	●																										●					●			
		060104L	0.4	●	●	●	○	●	●	●	●	○		●	○																				●					●			
		TBGT 0601005MR	<0.05																																		□		●					
		0601005ML	<0.05																																		□		●					
		060101MR	<0.1																																		□							
		060101ML	<0.1																																		□		●					
		060102MR	<0.2																																				●					
		060102ML	<0.2																																				●					
		060104MR	<0.4																																				●					
		060104ML	<0.4																																				●					
Cast Iron	Without Chipbreaker	TBGW 060102	0.2					●																																●			
		060104	0.4					●																																●			

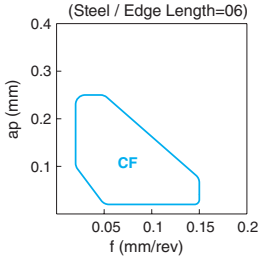
F49
F51

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



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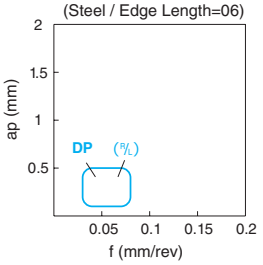


Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

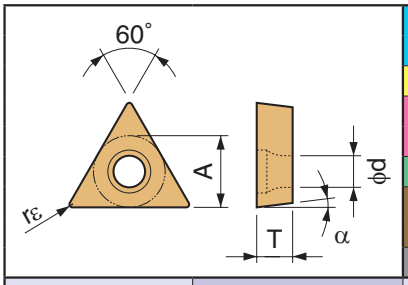
(mm)

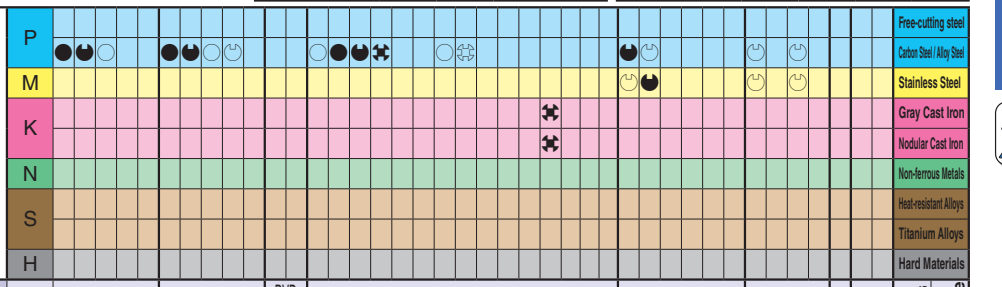
Description	A	T	ϕd	α
TC_0802_	4.76	2.38	2.3	7°
TC_0902_	5.56	2.38	2.5	7°

(mm)

Description	A	T	ϕd	α
TC_1102_	6.35	2.38	2.8	7°
TC_1103_	6.35	3.18	2.8	7°
TC_16T3_	9.525	3.97	4.4	7°

60° Triangle / Positive with Hole





Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	TCMX 090204WP	0.4	●	●				●	●						●	●	●	●												●	●														1
Finishing	TCMX 110204WP	0.4	●	●				●	●						●	●	●	●												●	●														
Finishing-Medium	TCMT 090202HQ	0.2	●	●	●		●	●	●	●	○				●	●	●	●																									F47	
	TCMT 090204HQ	0.4	●	●	●		●	●	●	●	○				●	●	●	●																										
	TCMT 110202HQ	0.2	●	●	●		●	●	●	●	○				●	●	●	●			●																						
	TCMT 110204HQ	0.4	●	●	●	○	●	●	●	●	○				●	●	●	●		●	●	●			●	●																
	TCMT 110208HQ	0.8	●	●	●	○	●	●	●	●	○				●	●	●	●		●	●	●			●	●																
	TCMT 16T304HQ	0.4		●					●		○																									●						-	
	TCMT 16T308HQ	0.8		●					●		○															●										●							
	TCMT 16T312HQ	1.2																		●						●																
Low Feed	TCET 0802003FR-USF	0.03																																		●						2	
Super Fine	TCET 0802003FL-USF	0.03																																		●							
	TCET 080201FR-USF	0.1																																		●							
	TCET 080202FR-USF	0.2																																		●							
	TCET 1103003FR-USF	0.03																																		●						E29	
	TCET 1103003FL-USF	0.03																																		●							
	TCET 110301FR-USF	0.1					●																													●							
	TCET 110301FL-USF	0.1					●																													●							
	TCET 110302FR-USF	0.2					●																													●							
	TCET 110302FL-USF	0.2					●																													●							
Sharp Edge / Precision	TCET 1103005MFR-USF	<0.05																																				●					
	TCET 110301MFR-USF	<0.1																																				●					
	TCET 110302MFR-USF	<0.2																																				●					

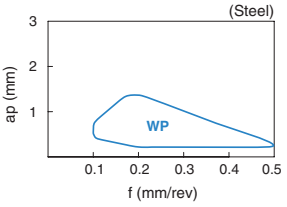
NEW

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

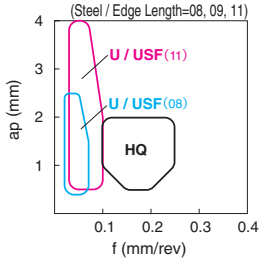
Applicable Chipbreaker Range

ap indicates radius

1



2



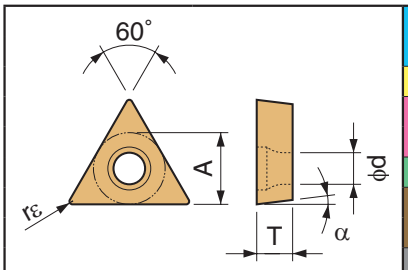
● : Std. Item ○ : Check Availability

Inserts are sold in 10 piece boxes

60° Triangle / Positive with Hole

(mm)

Description	A	T	φd	α
TC_0802_	4.76	2.38	2.3	7°
TC_1103_	6.35	3.18	2.8	7°



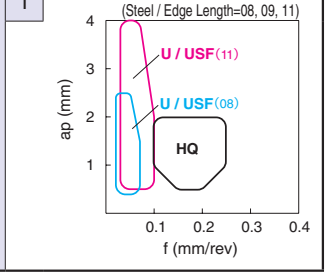
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed	TCGT 0802003FR-U	0.03																																	●								
	080201FR-U	0.1					●																												●					●			
	080201FL-U	0.1					●																												●					●			
	080202FR-U	0.2				○	●																												●					●			
	080202FL-U	0.2					●																												●					●			
	TCGT 1103003FR-U	0.03																																	●					●			
	110301FR-U	0.1					●																												●					●			
	110301FL-U	0.1					●																												●					●			
	110302FR-U	0.2				○	●																												●					●			
	110302FL-U	0.2					●																												●					●			
	TCGT 0802005MFR-U	<0.05																													●												
	0802005MFL-U	<0.05																													●												
	080201MFR-U	<0.1																													●												
	080201MFL-U	<0.1																													●												
	080202MFR-U	<0.2																													●							□					
	080202MFL-U	<0.2																													●												
	TCGT 1103005MFR-U	<0.05																													●							●					
	1103005MFL-U	<0.05																													●												
	110301MFR-U	<0.1																													●							●					
	110301MFL-U	<0.1																													●												
	110302MFR-U	<0.2																													●							□	●				
	110302MFL-U	<0.2																													●								●				
	110304MFR-U	<0.4																													●							□	●				
	110304MFL-U	<0.4																													●								●				
Sharp Edge																																										E29	1
Low Feed	TCGT 080202ER-U	0.2					●																												●								
	080202EL-U	0.2					●																												●								
	TCGT 110301ER-U	0.1				○	●																												□								
	110301EL-U	0.1				○	□																																				
	110302ER-U	0.2				○	●																												●								
	110302EL-U	0.2				○	●																												●								
	110304ER-U	0.4				○	●																												●								
	110304EL-U	0.4				○	●																												●								
	TCGT 080202MER-U	<0.2																																				●					
	TCGT 110301MER-U	<0.1																																				□					
	110301MEL-U	<0.1																																				□					
	110302MER-U	<0.2																																				●					
	110302MEL-U	<0.2																																				●					
	110304MER-U	<0.4																																				●					
	110304MEL-U	<0.4																																				●					
With Honing																																										

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

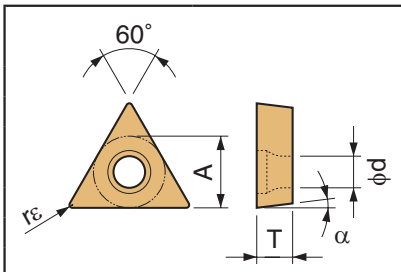
60° Triangle / Positive with Hole
60° Triangle / Positive without Hole

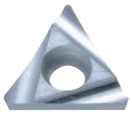
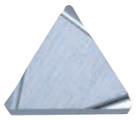
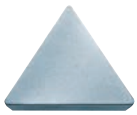
(mm)

Description	A	T	φd	α
TCG_0601_	3.97	1.59	-	7°
TC_0802_	4.76	2.38	2.3	7°

(mm)

Description	A	T	φd	α
TC_1103_	6.35	3.18	2.8	7°

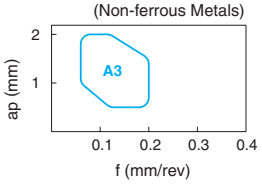


Insert (Handed Insert shows Left-hand)		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	TCGT 110302R-A3	0.2																																						●	●		E29	1
		TCGT 110302L-A3	0.2																																						●	●			
		TCGT 110304R-A3	0.4																																						●	●			
		TCGT 110304L-A3	0.4																																						●	●			
		TCGT 110308R-A3	0.8																																						●				
		TCGT 110308L-A3	0.8																																						●				
Cast Iron	Without Chipbreaker	TCGW 080201	0.1																																							●		-	
		TCGW 080202	0.2																																							●			
		TCGW 110301	0.1																																							●			
		TCGW 110302	0.2																																							●			
		TCGW 110304	0.4																																							●			
Finishing	 Sharp Edge	TCGR 060102L-F	0.2					●																																			-	2
		TCGR 060104L-F	0.4					●																																					
Cast Iron	 Without Chipbreaker	TCGN 060102	0.2					●																																			-	-
		TCGN 060104	0.4					●																																					

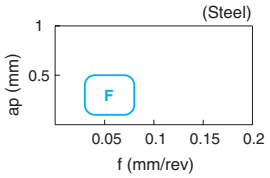
Applicable Chipbreaker Range

ap indicates radius

1



2



● : Std. Item

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

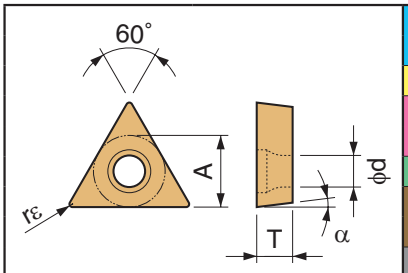
How to read pages of "Turning Inserts" B13

60° Triangle / Positive with Hole

(mm)

Description	A	T	ϕd	α
TP_0802_	4.76	2.38	2.3	11°
TPMT0902_	5.56	2.38	2.8	11°

Description	A	T	ϕd	α
TP_0902_	5.56	2.38	3.0	11°
TP_1103_	6.35	3.18	3.3	11°
TPMT1603_	9.525	3.18	4.4	11°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	Sharp Edge	TPGT 080202CF	0.2																																	●							Ref. to the table below	1
		TPGT 090202CF	0.2																																	●								
		TPGT 080201M-CF 080202M-CF	<0.1 <0.2																																			●							
		TPGT 090201M-CF 090202M-CF	<0.1 <0.2																																			●							
Minute ap	Sharp Edge / Polished	TPGT 080201MP-CF 080202MP-CF	<0.1 <0.2																												● ●	● ●			● ●			●							
		TPGT 090201MP-CF 090202MP-CF	<0.1 <0.2																												● ●	● ●			● ●			●							
With Wiper Edge	NEW Finishing	TPMX 090204WP	0.4	●	●				●	●						●	●	●	●												●	●													
		TPMX 110304WP	0.4	●	●				●	●						●	●	●	●												●	●													
Finishing		TPMT 090202PP 090204PP	0.2 0.4	● ●	● ●	● ●	○ ○		● ●	● ●	● ●	○ ○				● ●	● ●	● ●	● ●												● ●	● ●			● ●										
		TPMT 110302PP 110304PP 110308PP	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●	○ ○ ○		● ● ●	● ● ●	● ● ●	○ ○ ○				● ● ●	● ● ●	● ● ●	● ● ●												● ● ●	● ● ●			● ● ●										
Finishing		TPMT 090202GP 090204GP	0.2 0.4	● ●	● ●	● ●	○ ○	● ●	● ●	● ●	● ●	○ ○		□ ○	○ ○	● ●	● ●	● ●	● ●			● ●									● ●				● ●			● ●	● ●						
		TPMT 110304GP 110308GP	0.4 0.8	● ●	● ●	● ●	○ ○	● ●	● ●	● ●	● ●	○ ○		● ●	○ ○	● ●	● ●	● ●	● ●			● ●									● ●				● ●			● ●	● ●						
		TPMT 160304GP	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●			●	●								●				●			●	●						

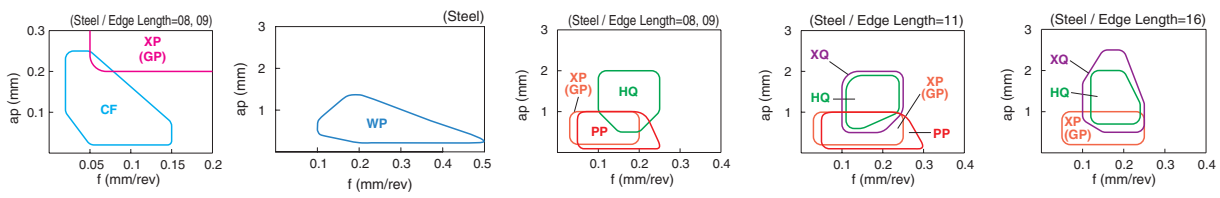
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Insert Description	Ref. to Page for Applicable Toolholders
TP..0802 type	**E29,F49,F51**
TP..0902 type	**F49,F51**

Insert Description	Ref. to Page for Applicable Toolholders
TP..1103 type	**E29,F49,F50**
TP..1603 type	**F49,F50**

Applicable Chipbreaker Range
ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

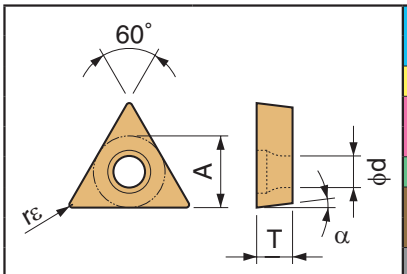
60° Triangle / Positive with Hole

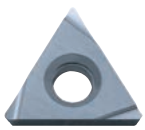
(mm)

Description	A	T	ϕd	α
TP_0802_	4.76	2.38	2.3	11°
TPMT0902_	5.56	2.38	2.8	11°

(mm)

Description	A	T	ϕd	α
TP_0902_	5.56	2.38	3.0	11°
TP_1103_	6.35	3.18	3.3	11°
TPMT1603_	9.525	3.18	4.4	11°



		Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
P	Free-cutting steel																																												
P	Carbon Steel / Alloy Steel																																												
M	Stainless Steel																																												
K	Gray Cast Iron																																												
K	Nodular Cast Iron																																												
N	Non-ferrous Metals																																												
S	Heat-resistant Alloys																																												
S	Titanium Alloys																																												
H	Hard Materials																																												
Finishing-Medium			TPMT 090202HQ	0.2	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●	●					
			090204HQ	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●					●					●	●		●	●					
			TPMT 110302HQ	0.2	●	●	●	○	●	●	●	●	○			○	●	●	●	●		●	●									●					●	●		●	●					
			110304HQ	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●	●	●	○			●					●	●		●	●					
			110308HQ	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●		●	●	●	●	●		●	○			●					●	●		●	●					
			TPMT 160302HQ	0.2	●		●		●	●							●	●	●	●		●	●									●					●	●		●	●					
			160304HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●		●	○			●					●	●		●	●					
			160308HQ	0.8	●	●	●		●	●	●	●	○		●		●	●	●	●		●	●	●	●	●		●	□			●					●	●		●	●					
Low Carbon Steel	Finishing		TPMT 090204XP	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●	●					
			TPMT 110304XP	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●	●					
			110308XP	0.8	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●								
			TPMT 160304XP	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●								
			160308XP	0.8	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●									●					●	●								
Low Carbon Steel	Finishing-Medium		TPMT 110304XQ	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●																							
			110308XQ	0.8	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●																							
			TPMT 160304XQ	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●																							
			160308XQ	0.8	●	●	●	○		●	●	●	○		●	○	●	●	●	●		●	●																							
Finishing			TPGH 080201R	0.1					□																						●					●	●			●					
			080201L	0.1					●																						●					●	●			●					
			080202R	0.2		●		○	●		●		○	●		○															●					●	●			●					
			080202L	0.2	●	●	●	○	●	●	●	●	○	●	●	○															●					●	●			●					
			080204R	0.4		●		○	●		●		○	●		○															●					●	●			●					
			080204L	0.4	●	●	●	○	●	●	●	●	○	●	●	○															●					●	●			●					
			TPGH 090201R	0.1																											●					●	●			●					
			090201L	0.1					●																						●					●	●			●					
			090202R	0.2		●		○	●		●		○	●		○															●					●	●			●					
			090202L	0.2	●	●	●	○	●	●	●	●	○	●	●	○															●					●	●			●					
			090204R	0.4		●		○	●		●		○	●		○															●					●	●			●					
			090204L	0.4	●	●	●	○	●	●	●	●	○	●	●	○															●					●	●			●					
			TPGH 110202R	0.2																											●					●	●			●					
			110202L	0.2	●		●		●	●																					●					●	●			●					
			110204R	0.4					●					●																	●					●	●			●					
			110204L	0.4	●		●		●	●				●	●																●					●	●			●					
			TPGH 110302R	0.2		●		○	●		●		○	●		○															●					●	●			●					
			110302L	0.2	●	●	●	○	●	●	●	●	○	●	●	○															●					●	●			●					
			110304R	0.4		●		○	●		●		○	●		○															●					●	●			●					
			110304L	0.4	●	●	●	○	●	●	●	●	○	●	●	○															●					●	●			●					
			110308R	0.8	●		●		●	●																					●					●	●			●					
			110308L	0.8	●	●	●		●	●	●		○		●																●					●	●			●					
			TPGH 160302R	0.2	●		●		●	●																					●					●	●			●					
			160302L	0.2	●		●		●	●																					●					●	●			●					
			160304R	0.4	●	●	●	○	●	●	●			●																	●					●	●			●					
			160304L	0.4	●	●	●	○	●	●	●	●	○	●	●	○															●					●	●			●					
			160308R	0.8					□					●																	●					●									
			160308L	0.8	●		●		●	●				●																	●					●	●			●					

Ref. to the table below B74 — Applicable Chipbreaker Range: B74 1

F50 — Applicable Chipbreaker Range: B76 1

Ref. to the table below B74

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

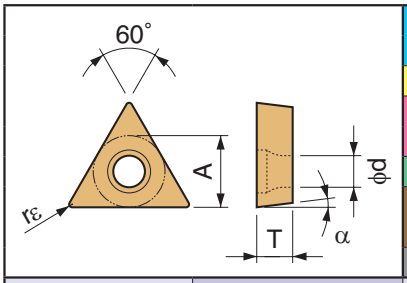
60° Triangle / Positive with Hole

(mm)

Description	A	T	ϕd	α
TP_0802_	4.76	2.38	2.3	11°
TP_0902_	5.56	2.38	3.0	11°
TP_1102_	6.35	2.38	3.5	11°

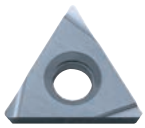
(mm)

Description	A	T	ϕd	α
TP_1103_	6.35	3.18	3.3	11°
TP_1603_	9.525	3.18	4.5	11°
TP_1604_	9.525	4.76	4.4	11°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

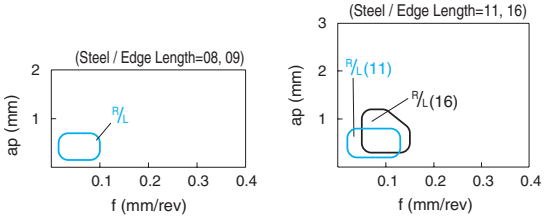
Insert (Handed Insert shows Left-hand)	Description		Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	TPGH	080201ML	<0.1																																			●						Ref. to the table below B74	1
		080202MR	<0.2																																		●	●						
		080202ML	<0.2																																		●	●						
		080204MR	<0.4																																		●	●						
		080204ML	<0.4																																		●	●						
	TPGH	090201ML	<0.1																																			●						
		090202MR	<0.2																																		●	●						
		090202ML	<0.2																																		●	●						
		090204MR	<0.4																																		●	●						
		090204ML	<0.4																																		●	●						
	TPGH	110202ML	<0.2																																		●	●						
		110204MR	<0.4																																			●					F50	1
		110204ML	<0.4																																		●	●						
	TPGH	110302MR	<0.2																																		●	●						
		110302ML	<0.2																																		●	●						
		110304MR	<0.4																																		●	●						
		110304ML	<0.4																																		●	●						
		110308ML	<0.8																																		●	●						
	TPGH	160302ML	<0.2																																			●					Ref. to the table below B74	
		160304MR	<0.4																																			●						
		160304ML	<0.4																																		●	●						
		160308ML	<0.8																																			●						



· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item

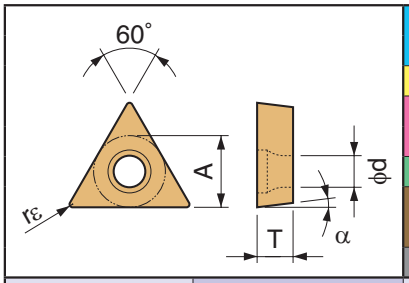
60° Triangle / Positive with Hole

(mm)

Description	A	T	φd	α
TP_0802_	4.76	2.38	2.3	11°
TP_0902_	5.56	2.38	3.0	11°
TP_1102_	6.35	2.38	3.5	11°

(mm)

Description	A	T	φd	α
TP_1103_	6.35	3.18	3.3	11°
TP_1603_	9.525	3.18	4.5	11°
TP_1604_	9.525	4.76	4.4	11°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

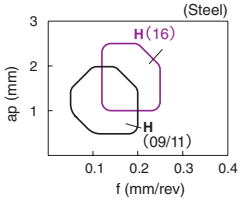
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium	TPGH 090201L-H	0.1				○					○																		●				●										Ref. to the table below B74	1
	090202L-H	0.2				○					○																		●				●											
	090204L-H	0.4				○					○																		●				●											
	TPGH 110302R-H	0.2					●																						●				●	●										
	110302L-H	0.2	●	●	●	○	●	●	●		○		●	○															●				●	●							●			
	110304R-H	0.4		●		○	●		●		○			○															●				●	●										
	110304L-H	0.4	●	●	●	○	●	●	●		○		●	○															●				●	●							●			
	110308R-H	0.8					●																						●				●	●										
	110308L-H	0.8	●	●	●	○	●	●	●		○			○															●				●	●							●			
	TPGH 160304R-H	0.4					●																						●				●	●										
	160304L-H	0.4	●	●	●	○	●	●	●		○		●	○															●				●	●							●			
	160308R-H	0.8					●						□																●				●	●										
	160308L-H	0.8					●																						●				●	●							●			
	TPGT 160402L-H	0.2	●		●		●	●																																			-	
	160404L-H	0.4	●		●		●	●																																				
	160408L-H	0.8					●																																					
	TPGH 110302ML-H	<0.2																																				●					Ref. to the table below B74	
	110304MR-H	<0.4																																				□						
	110304ML-H	<0.4																																				●						
	TPGH 160304ML-H	<0.4																																				●						
	160308MR-H	<0.8																																				□						
	160308ML-H	<0.8																																				□						

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

60° Triangle / Positive with Hole

(mm)

Description	A	T	φd	α
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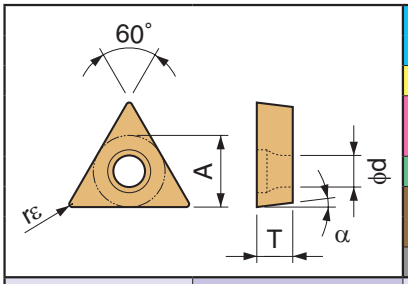
TP_0902_	5.56	2.38	3.0	11°
TP_1102_	6.35	2.38	3.5	11°

(mm)

Description	A	T	φd	α
TP_1103_	6.35	3.18	3.3	11°
TP_1603_	9.525	3.18	4.5	11°
TP_1604_	9.525	4.76	4.4	11°



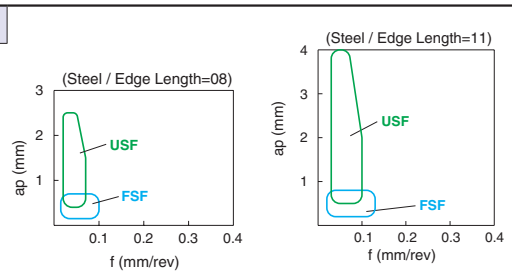
P: Free-cutting steel; Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron; Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys; Titanium Alloys
H: Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing / Super Fine	TPET 0802003L-FSF	0.03																																		●								
	080201R-FSF	0.1																																		●								
	080201L-FSF	0.1					●																													●								
	080202R-FSF	0.2					●																													●								
	080202L-FSF	0.2					●																													●								
	TPET 1103003R-FSF	0.03																																		●								
	1103003L-FSF	0.03																																		●								
	110301R-FSF	0.1					●																													●								
	110301L-FSF	0.1					●																													●								
	110302R-FSF	0.2					●																													●								
	110302L-FSF	0.2					●																													●								
	TPET 080202ML-FSF	<0.2																																				●							
	TPET 1103005ML-FSF	<0.05																																				●							
	110301MR-FSF	<0.1																																				●							
	110301ML-FSF	<0.1																																				●							
	110302MR-FSF	<0.2																																				●							
	110302ML-FSF	<0.2																																				●							
Low Feed / Super Fine	TPET 080201FL-USF	0.1																																		●								
	080202FR-USF	0.2					●																													●								
	080202FL-USF	0.2					●																													●								
	TPET 1103003FR-USF	0.03																																		●								
	1103003FL-USF	0.03																																		●								
	110301FR-USF	0.1					●																													●								
	110301FL-USF	0.1					●																													●								
	110302FR-USF	0.2					●																													●								
	110302FL-USF	0.2					●																													●								
	TPET 080202MFR-USF	<0.2																																				●							
	080202MFL-USF	<0.2																																				●							
	TPET 1103005MFL-USF	<0.05																																				□							
	110301MFL-USF	<0.1																																				●							
	110302MFR-USF	<0.2																																				●							
	110302MFL-USF	<0.2																																				●							
Finishing / Sharp Edge / Precision																																										Ref. to the table below B74	1
Low Feed / Sharp Edge / Precision																																											

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item □ : Deleted from the next catalogue

How to read pages of "Turning Inserts" B13

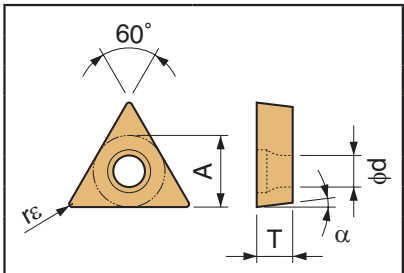
60° Triangle / Positive with Hole

(mm)

Description	A	T	φd	α
TP_0802_	4.76	2.38	2.3	11°
TP_0902_	5.56	2.38	3.0	11°
TP_1102_	6.35	2.38	3.5	11°

(mm)

Description	A	T	φd	α
TP_1103_	6.35	3.18	3.3	11°
TP_1603_	9.525	3.18	4.5	11°
TP_1604_	9.525	4.76	4.4	11°



Insert	Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Cast Iron	TPGB 080202	0.2				○	●					●																												●		Ref. to the table below B74	-
	TPGB 080204	0.4		●		○	●		●		○	●		○																										●			
	TPGB 080208	0.8					●																																				
	TPGB 090202	0.2					●																																		●			
	TPGB 090204	0.4		●		○	●		●		○	●		○																										●			
	TPGB 1102005	0.05					●																																	●			
	TPGB 110201	0.1					●																																	●			
	TPGB 110202	0.2					●																																	●		F50	
	TPGB 110204	0.4	●		●		●	●																																●			
	TPGB 1103005	0.05					●																																	●			
	TPGB 110301	0.1					●																																	●			
	TPGB 110302	0.2	●	●	●	○	●	●	●		○			○																										●			
	TPGB 110304	0.4	●	●	●	○	●	●	●		○	●		○																										●		Ref. to the table below B74	
	TPGB 110308	0.8	●	●	●	○	●	●	●		○	●		○																										●			
	TPGB 160304	0.4	●		●		●	●				●																												●			
	TPGB 160308	0.8	●		●		●	●																																●			

Without Chipbreaker

● : Std. Item ○ : Check Availability

Inserts are sold in 10 piece boxes

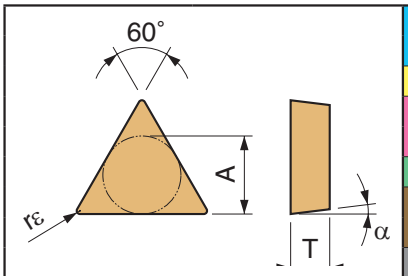
Turning Indexable Inserts

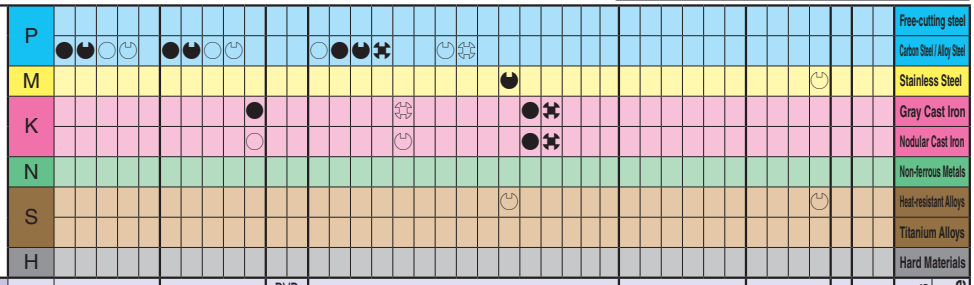
How to read pages of "Turning Inserts" B13

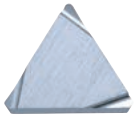
60° Triangle / Positive without Hole

(mm)

Description	A	T	φd	α
TP_0902_	5.56	2.38	-	11°
TP_1103_	6.35	3.18	-	11°
TP_1603_	9.525	3.18	-	11°



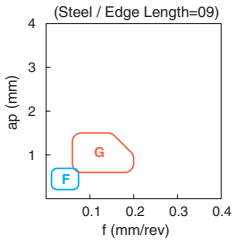


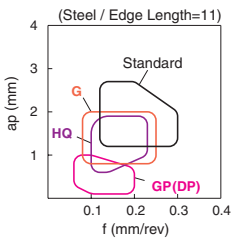
Insert Handed Insert shows Left-hand		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing		TPMR 110304DP 110308DP	0.4 0.8					● ●																																				
		TPMR 160304DP 160308DP	0.4 0.8					● ●																																				
Finishing		TPMR 110304GP	0.4		●		○	●		●				●	○																												E43	
		TPMR 160304GP	0.4		●		○	●		●				●	○	●	●	●	●		●	●																						F61	
Finishing-Medium		TPMR 110304HQ 110308HQ	0.4 0.8		● ●			● ●		● ●		○ ○		● ●		● ●	● ●	● ●	● ●		● ●	● ●	□ □		● ●																● ●				
		TPMR 160304HQ 160308HQ	0.4 0.8	● ●	● ●	● ●		● ●	● ●	● ●	● ●	○ ○		● ●		● ●	● ●	● ●	● ●		● ●	● ●	● ●		● ●																● ●				
Medium		TPMR 090202G 090204G	0.2 0.4					● ●														● ●																				F61	1
		TPMR 110304G 110308G	0.4 0.8					● ●					● ●																															
		TPMR 160304G 160308G	0.4 0.8					● ●					● ●																														E43	
Medium		TPMR 110304 110308	0.4 0.8	● ●		● ●		● ●	● ●				● ●			● ●	● ●	● ●	● ●		● ●	● ●			● ●	● ●	○ ○	□ ○													● ●			F61	
		TPMR 160304 160308	0.4 0.8	● ●		● ●		● ●	● ●		● ●		● ●			● ●	● ●	● ●	● ●	● ●	● ●	● ●			● ●	● ●	○ ○	□ ○	●												● ●				
Finishing	 Sharp Edge	TPGR 090202R-F 090202L-F	0.2 0.2					● ●																																		F61	
		090204R-F 090204L-F	0.4 0.4					● ●																																			

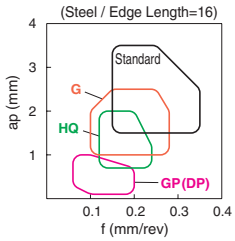
Applicable Chipbreaker Range

ap indicates radius

1







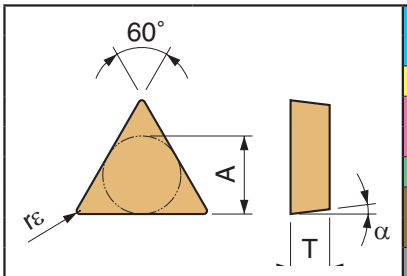
Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

(mm)

Description	A	T	φd	α
TP_0902_	5.56	2.38	-	11°
TP_1103_	6.35	3.18	-	11°
TP_1603_	9.525	3.18	-	11°

60° Triangle / Positive without Hole



P: Free-cutting steel, Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron, Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys, Titanium Alloys
H: Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing / Finishing-Medium / Medium	TPGR 110302R-A	0.2			●		●	●	●					○																														
	TPGR 110302L-A	0.2	●	●		○	●	●	●			●		○																														
	TPGR 110304R-A	0.4			●		●																																		●			
	TPGR 110304L-A	0.4	●	●		○	●	●	●			●		○																												●			
	TPGR 110304R-B	0.4			●		●																																						
	TPGR 110304L-B	0.4	●	●		○	●	●	●		○		●	○																															
	TPGR 110308R-B	0.8			●		●																																						
	TPGR 110308L-B	0.8	●				●	●			○																																		
	TPGR 160302R-B	0.2	●		●		●	●				●		○																														E43 F61	1
	TPGR 160302L-B	0.2	●	●	●	○	●	●	●	●	○	●	●	○																															
	TPGR 160304R-B	0.4	●		●		●	●				●		○																												●			
	TPGR 160304L-B	0.4	●	●	●	○	●	●	●	●	○	●	●	○																												●			
	TPGR 160308R-B	0.8	●		●		●	●				●		○																												●			
	TPGR 160308L-B	0.8	●	●	●	○	●	●	●			●		○																												●			
	TPGR 160304R-C	0.4	●		●		●	●																																					
	TPGR 160304L-C	0.4	●	●	●	○	●	●	●	●	○		●	○																															
	TPGR 160308R-C	0.8	●		●		●	●																																					
	TPGR 160308L-C	0.8	●	●	●	○	●	●	●				●	○																															
Cast Iron	TPGN 090202	0.2					□																																		●		F61	
	TPGN 090204	0.4					●																																		●			
	TPGN 090208	0.8					●																																					
	TPGN 110302	0.2																																							●			-
	TPGN 110304	0.4	●		●		●	●				●																													●			
	TPGN 110308	0.8	●		●		●	●				●																													●			
	TPGN 160304	0.4	●		●		●	●				●																													●			
	TPGN 160308	0.8	●		●		●	●				●																													●		E43 F61	
	TPGN 160312	1.2																																							●			
	TPMN 110304	0.4																	●							●			●												●			
	TPMN 110308	0.8																	●						●	●		○	●												●			
	TPMN 160304	0.4										●							●						●	●		○	●												●			
	TPMN 160308	0.8										●							●						●	●		○	●												●			
	TPMN 160312	1.2																								●		○	●															

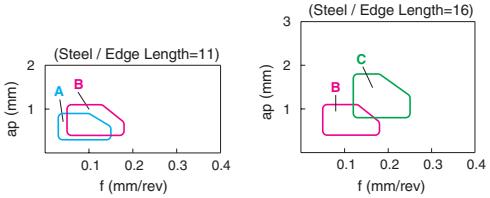
-A : Finishing
-B : Finishing-Medium
-C : Medium

Without Chipbreaker

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

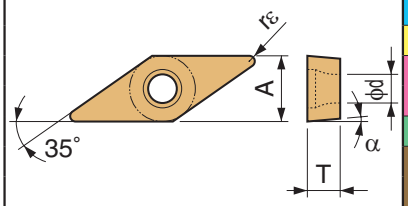
Turning Indexable Inserts

How to read pages of "Turning Inserts" B13

35° Rhombic / Positive with Hole

(mm)

Description	A	T	ϕd	α
VB_1103_	6.35	3.18	2.8	5°
VB_1604_	9.525	4.76	4.4	5°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	VBMT 110302PP	0.2	●	●	●			●	●	●					●	●	●	●												●	●				●										
	VBMT 110304PP	0.4	●	●	●			●	●	●					●	●	●	●												●	●				●										
	VBMT 110308PP	0.8	●	●	●			●	●	●					●	●	●	●												●	●				●										
	VBMT 160404PP	0.4	●	●	●			●	●	●					●	●	●	●												●	●				●										
	VBMT 160408PP	0.8	●	●	●			●	●	●					●	●	●	●												●	●				●										
	VBMT 160412PP	1.2	●	●	●			●	●	●					●	●	●	●												●	●				●										
Finishing	VBMT 110304GP	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●									●					●	●		●						
	VBMT 160404GP	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●															●		●						
	VBMT 160408GP	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●															●		●						
Finishing	VBMT 110302VF	0.2	●	●	●	○		●	●	●	○		●	○	●	●	●	●	□	●	●									●					●	●		●						1
	VBMT 110304VF	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●	●	●	●	●								●					●	●		●						
	VBMT 110308VF	0.8	●	●	●	○		●	●	●	○		□	○	●	●	●	●	●	●	●	□								●					●	●		●						
	VBMT 160402VF	0.2	●	●	●	○		●	●	●	○		●	○	●	●	●	●	●	●	●															●		●						
	VBMT 160404VF	0.4	●	●	●	○		●	●	●	○		●	○	●	●	●	●	●	●	●	●														●		●						
	VBMT 160408VF	0.8	●	●	●	○		●	●	●	○		●	○	●	●	●	●	●	●	●	●														●		●						
	VBMT 160412VF	1.2	●	●	●	□		●	●	●	□			○	●	●	●	●			●	●																●						
Finishing-Medium	VBMT 110304HQ	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●			●	●	●	●						●					●	●		●	●					
	VBMT 110308HQ	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●			●	●	●	●						●					●	●		●	●					
	VBMT 160404HQ	0.4	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●			●	●	●	●												●		●	●					
	VBMT 160408HQ	0.8	●	●	●	○	●	●	●	●	○	●	●	○	●	●	●	●			●	●	●	●												●		●	●					
	VBMT 160412HQ	1.2	●	●	●	○		●	●	●	○		●	○	●	●	●	●			●	●	●													●		●						
Finishing	Super Fine VBET 1103003R-FSF	0.03					●																													●								
	VBET 1103003L-FSF	0.03					●																													●								
	VBET 110301R-FSF	0.1					●																													●								
	VBET 110301L-FSF	0.1					●																													●								
	VBET 110302R-FSF	0.2					●																													●								
	VBET 110302L-FSF	0.2					●																													●								
	VBET 1103005MR-FSF	<0.05																													●							●					2
	VBET 1103005ML-FSF	<0.05																													●							●					
	VBET 110301MR-FSF	<0.1																													●							●					
	VBET 110301ML-FSF	<0.1																													●							●					
	VBET 110302MR-FSF	<0.2																													●							●					
	VBET 110302ML-FSF	<0.2																													●							●					

Sharp Edge / Precision

Ref. to the table below

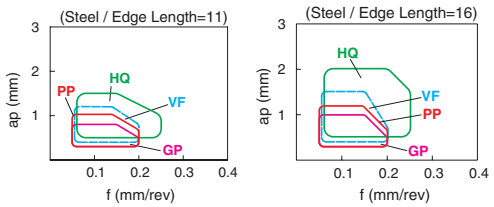
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Insert Description	Ref. to Page for Applicable Toolholders
VB..1103 type	**E30,E31,E36,F52,F54,F57**
VB..1604 type	**E30,E31,F52,F54,F57**

Applicable Chipbreaker Range

ap indicates radius

1



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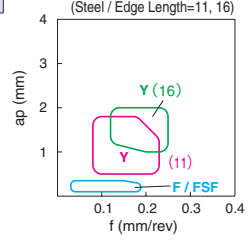


Inserts are sold in 10 piece boxes

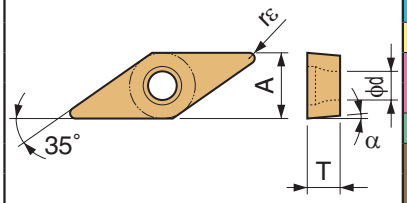
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

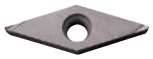
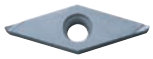
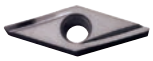
How to read pages of "Turning Inserts" B13

(mm)

35° Rhombic / Positive with Hole

Description	A	T	ϕd	α
VB_1103_	6.35	3.18	2.8	5°
VB_1604_	9.525	4.76	4.4	5°



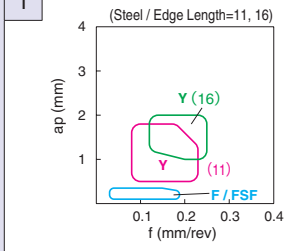
	Insert (Handed Insert shows Left-hand)		Description		Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	MEGACOAT Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT MEGACOAT NANO PR1425	MEGACOAT MEGACOAT NANO PR1225	MEGACOAT MEGACOAT NANO PR1305	MEGACOAT MEGACOAT NANO PR1310	MEGACOAT MEGACOAT NANO PR1325	MEGACOAT MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	NEW	 Sharp Edge	VBET	1103005MR-F	<0.05																												●				●						E30,E31,E36,F52,F54,F57	1
				1103005ML-F	<0.05																												●				●							
				110301MR-F	<0.1		●					●																					●				●							
				110301ML-F	<0.1		●					●																					●				●							
				110302MR-F	<0.2	●	●				●	●																					●				●							
				110302ML-F	<0.2	●	●				●	●																					●				●							
Finishing		 Sharp Edge	VBGT	1103003R-F	0.03																																●			●			E30,E31,E36,F52,F54,F57	1
				1103003L-F	0.03																																●			●				
				110301R-F	0.1				○	●				○																							●			●				
				110301L-F	0.1				○	●				○																							●			●				
				110302R-F	0.2			●	○	●				○		○																					●			●				
				110302L-F	0.2			●	○	●				○		○																					●			●				
			VBGT	1103005MR-F	<0.05																													●					●					
				1103005ML-F	<0.05																													●					●					
				110301MR-F	<0.1																													●					●	●				
				110301ML-F	<0.1																													●					●	●				
				110302MR-F	<0.2																													●						●	●			
				110302ML-F	<0.2																													●						●	●			
Finishing-Medium	NEW		VBET	1103005MR-Y	<0.05																												●				●						E30,E31,E36,F52,F54,F57	1
				1103005ML-Y	<0.05																												●				●							
				110301MR-Y	<0.1																												●				●							
				110301ML-Y	<0.1																												●				●							
				110302MR-Y	<0.2	●	●				●	●																					●				●							
				110302ML-Y	<0.2	●	●				●	●																					●				●							
				110304MR-Y	<0.4	●	●				●	●																					●				●							
				110304ML-Y	<0.4	●	●				●	●																					●				●							

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Insert Description	Ref. to Page for Applicable Toolholders
VB..1103 type	E30,E31,E36,F52,F54,F57
VB..1604 type	E30,E31,F52,F54,F57

Applicable Chipbreaker Range
ap indicates radius

1



● : Std. Item ○ : Check Availability

Inserts are sold in 10 piece boxes

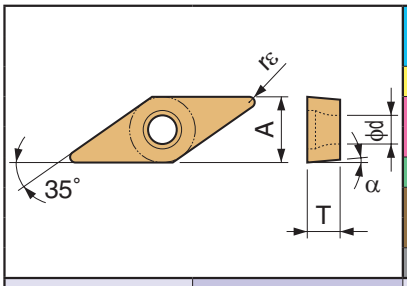
Turning Indexable Inserts

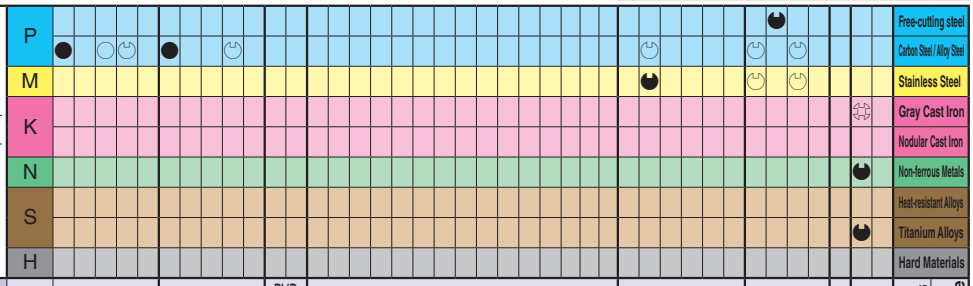
How to read pages of "Turning Inserts" B13

35° Rhombic / Positive with Hole

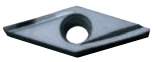
(mm)

Description	A	T	ϕd	α
VB_1103_	6.35	3.18	2.8	5°
VB_1604_	9.525	4.76	4.4	5°





Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet				MEGACOAT Cermet				PVD Coated Cermet		CVD Coated Carbide																MEGACOAT MEGACOAT NANO					PVD Coated Carbide			DLC	Carbide		Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
			TN610	TN620	TN6010	TN6020	TN60	PV710	PV720	PV7010	PV7025	PV7005	PV90	PV7020	CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PR930	PR1005	PR1025	PR1125	PDL025	KW10	SW05		
Finishing-Medium	VBGT 1103003R-Y	0.03																																	●					●		
	VBGT 1103003L-Y	0.03																																	●					●		
	VBGT 110301R-Y	0.1				○	●			○																									●					●		
	VBGT 110301L-Y	0.1				○	●			○																									●					●		
	VBGT 110302R-Y	0.2			●	○	●			○				○																					●					●		
	VBGT 110302L-Y	0.2			●	○	●			○				○																					●					●		
	VBGT 110304R-Y	0.4			●	○	●			○				○																					●					●		
	VBGT 110304L-Y	0.4			●	○	●			○				○																					●					●		
	VBGT 110308R-Y	0.8					●																												●					●		
	VBGT 110308L-Y	0.8					●																												●					●		
	VBGT 160402R-Y	0.2	●		●	○	●	●		○																									●					●		
	VBGT 160402L-Y	0.2	●		●	○	●	●		○																									●					●		
	VBGT 160404R-Y	0.4	●		●	○	●	●		○				○																					●					●		
	VBGT 160404L-Y	0.4	●		●	○	●	●		○				○																					●					●		
	VBGT 160408R-Y	0.8					●																												●					●		
	VBGT 160408L-Y	0.8					●																												●					●		
	VBGT 1103005MR-Y	<0.05																												●						●	●				
	VBGT 1103005ML-Y	<0.05																												●						●	●				
	VBGT 110301MR-Y	<0.1																												●						●	●				
	VBGT 110301ML-Y	<0.1																												●						●	●				
	VBGT 110302MR-Y	<0.2																												●						●	●				
	VBGT 110302ML-Y	<0.2																												●						●	●				
	VBGT 110304MR-Y	<0.4																												●						●	●				
	VBGT 110304ML-Y	<0.4																												●						●	●				
	VBGT 110308MR-Y	<0.8																												●											
	VBGT 110308ML-Y	<0.8																												●											
	VBGT 160402MR-Y	<0.2																												●						●	●				
	VBGT 160402ML-Y	<0.2																												●						●	●				
	VBGT 160404MR-Y	<0.4																												●						●	●				
	VBGT 160404ML-Y	<0.4																												●						●	●				
	VBGT 160408MR-Y	<0.8																												●											
	VBGT 160408ML-Y	<0.8																												●											



Ref. to the table below

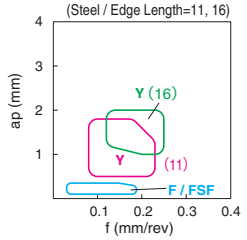
1

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Insert Description	Ref. to Page for Applicable Toolholders
VB..1103 type	**E30,E31,E36,F52,F54,F57**
VB..1604 type	**E30,E31,F52,F54,F57**

Applicable Chipbreaker Range
ap indicates radius

1



Inserts are sold in 10 piece boxes

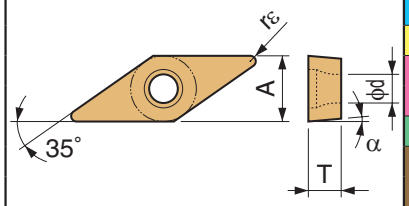
● : Std. Item ○ : Check Availability

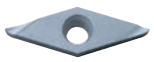
How to read pages of "Turning Inserts" B13

(mm)

35° Rhombic / Positive with Hole

Description	A	T	ϕd	α
VC_0802_	4.76	2.38	2.3	7°
VC_1604_	9.525	4.76	4.4	7°

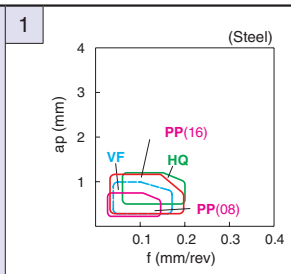


Insert (Handed Insert shows Left-hand)		Description	Dimension (mm) rε	Cermet TN610	Cermet TN620	Cermet TN6010	Cermet TN6020	Cermet TN60	MEGACOAT Cermet PV710	MEGACOAT Cermet PV720	MEGACOAT Cermet PV7010	MEGACOAT Cermet PV7025	PVD Coated Cermet PV7005	PVD Coated Cermet PV90	PVD Coated Cermet PV7020	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	CVD Coated Carbide CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	MEGACOAT NANO PR1425	MEGACOAT NANO PR1225	MEGACOAT NANO PR1305	MEGACOAT NANO PR1310	MEGACOAT NANO PR1325	MEGACOAT NANO PR1535	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	DLC PDL025	Carbide KW10	Carbide SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing		VCMT 080202PP	0.2	●	●	●			●	●	●					●	●	●	●											●	●			●							E36 F52 F54 F57	
		VCMT 080204PP	0.4	●	●	●			●	●	●					●	●	●	●											●	●			●								
		VCMT 160404PP	0.4	●	●	●			●	●	●					●	●	●	●											●	●			●							E30 E31 F52 F54 F57	
		VCMT 160408PP	0.8	●	●	●			●	●	●					●	●	●	●											●	●			●								
Finishing		VCMT 080202VF	0.2	●	●	●	○		●	●	●	○			○	●	●	●	●	●	●	●								●				●	●		●				E36 F52	1
		VCMT 080204VF	0.4	●	●	●	○		●	●	●	○			○	●	●	●	●	●	●	●								●				●	●		●					
Finishing-Medium		VCMT 080202HQ	0.2	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●								●				●	●		●				E54 F57	
		VCMT 080204HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●					●				●	●		●	●				
Non-ferrous Metals	Finishing-Medium / Sharp Edge	VCGT 160404AH	0.4																																		●	●		E30 E31 F52 F54 F57	2
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	VCGT 160404R-A3	0.4																																		●	●		
		160404L-A3	0.4																																		●	●		
		160408R-A3	0.8																																		●	●		
		160408L-A3	0.8																																		●	●		

Applicable Chipbreaker Range

ap indicates radius

1



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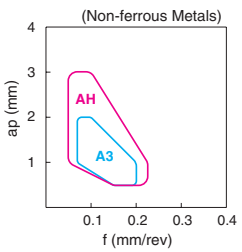


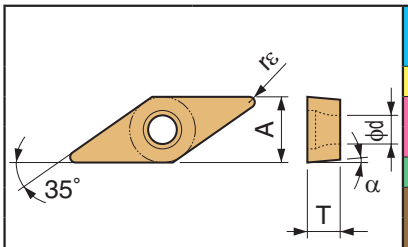
● : Std. Item ○ : Check Availability

Inserts are sold in 10 piece boxes

35° Rhombic / Positive with Hole

(mm)

Description	A	T	ϕd	α
VP_0802_	4.76	2.38	2.3	11°
VP_1103_	6.35	3.18	2.8	11°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

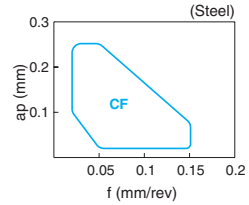
Insert		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	Sharp Edge	VPGT 110302CF	0.2																																	●								
		VPGT 110301M-CF	<0.1																																		●	●							
		110302M-CF	<0.2																																		●	●							
Minute ap	Sharp Edge / Polished	VPGT 110301MP-CF	<0.1																												●	●			●			●		●				1
		110302MP-CF	<0.2																												●	●			●			●		●				
Finishing	Sharp Edge	VPGT 110301MF-GF	<0.1																																			●							
		110302MF-GF	<0.2																																			●							
Finishing	Sharp Edge / Polished	VPGT 110301MFP-GF	<0.1																												●	●			●			●		●				2
		110302MFP-GF	<0.2																												●	●			●			●		●				
Finishing		VPGT 080201CK	0.1																																	●								
		080202CK	0.2																																	●								
		VPGT 110301CK	0.1																																	●								
		110302CK	0.2																																	●								
		VPGT 080201M-CK	<0.1																																		●	●							
		080202M-CK	<0.2																																		●	●							
		VPGT 110301M-CK	<0.1																																		●	●							
		110302M-CK	<0.2																																		●	●							
Finishing	Sharp Edge / Polished	VPGT 080201MP-CK	<0.1																												●	●			●			●		●				3
		080202MP-CK	<0.2																												●	●			●			●		●				
		VPGT 110301MP-CK	<0.1																												●	●			●			●		●				
		110302MP-CK	<0.2																												●	●			●			●		●				

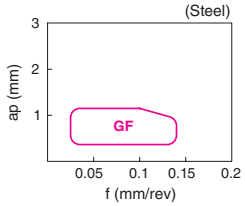
Ref. to the table below

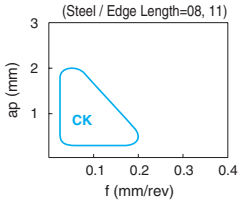
· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Insert Description	Ref. to Page for Applicable Toolholders
VP..0802 type	**E32,E33,F52**
VP..1103 type	**E21,E32,E33**

Applicable Chipbreaker Range
ap indicates radius

1


2


3


Inserts are sold in 10 piece boxes

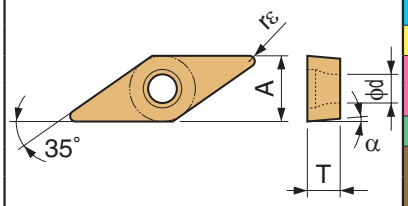
● : Std. Item

How to read pages of "Turning Inserts" B13

(mm)

35° Rhombic / Positive with Hole

Description	A	T	ϕd	α
VP_0802_	4.76	2.38	2.3	11°
VP_1103_	6.35	3.18	2.8	11°



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

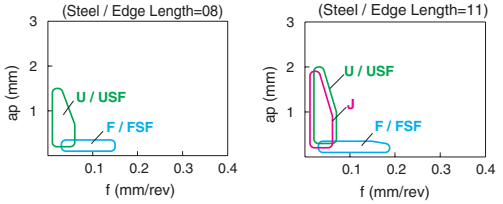
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) rε	Cermet: TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet: PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet: PV90	PV7020	CVD Coated Carbide: CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO: PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide: PR930	PR1005	PR1025	PR1125	DLC: PDL025	Carbide: KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing — Super Fine	VPET 080201R-FSF	0.1					●																													●								
	080201L-FSF	0.1					●																													●								
	080202R-FSF	0.2					●																													●								
	080202L-FSF	0.2					●																													●								
	VPET 1103003R-FSF	0.03																																		●								
	1103003L-FSF	0.03																																		●								
	110301R-FSF	0.1					●																													●								
	110301L-FSF	0.1					●																													●								
	110302R-FSF	0.2					●																													●								
	110302L-FSF	0.2					●																													●								
	VPET 080201MR-FSF	<0.1																													●							●						1
	080201ML-FSF	<0.1																													●							●						
	080202MR-FSF	<0.2																													●							●						
	080202ML-FSF	<0.2																													●							●						
	VPET 1103005MR-FSF	<0.05																													●							●						
	1103005ML-FSF	<0.05																													●							□						
	110301MR-FSF	<0.1																													●							●						
	110301ML-FSF	<0.1																													●							●						
	110302MR-FSF	<0.2																													●							●						
	110302ML-FSF	<0.2																													●							●						
Sharp Edge / Precision																																													
Finishing — NEW	VPET 080201MR-F	<0.1																												●					●										
	080201ML-F	<0.1																												●					●										
	080202MR-F	<0.2																												●					●										
	080202ML-F	<0.2																												●					●										
	VPET 1103005MR-F	<0.05																												●					●										
	110301MR-F	<0.1																												●					●										
	110302MR-F	<0.2																												●					●										
	110302ML-F	<0.2																												●					●										
Sharp Edge																																											Ref. to the table below B86	1

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

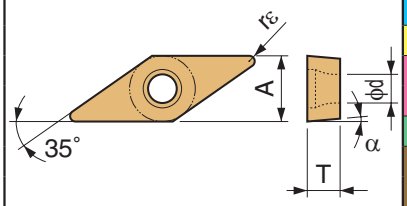
Turning Indexable Inserts

How to read pages of "Turning Inserts" B13

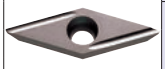
35° Rhombic / Positive with Hole

(mm)

Description	A	T	φd	α
VP_0802_	4.76	2.38	2.3	11°
VP_1103_	6.35	3.18	2.8	11°



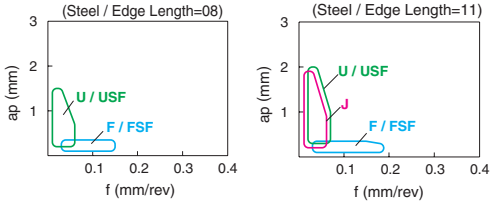
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert Handed Insert shows Left-hand	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed Super Fine Sharp Edge / Precision	VPET 080201FR-USF	0.1					●																													●							Ref. to the table below B86	1
	080201FL-USF	0.1					●																													●								
	080202FR-USF	0.2					●																													●								
	080202FL-USF	0.2					●																													●								
	VPET 1103003FR-USF	0.03																																		●								
	1103003FL-USF	0.03																																		●								
	110301FR-USF	0.1					●																													●								
	110301FL-USF	0.1					●																													●								
	110302FR-USF	0.2					●																													●								
	110302FL-USF	0.2					●																													●								
	VPET 080201MFR-USF	<0.1																													●							●						
	080201MFL-USF	<0.1																													●							□						
	080202MFR-USF	<0.2																													●							●						
	080202MFL-USF	<0.2																													●							●						
	VPET 1103005MFR-USF	<0.05																													●							●						
	1103005MFL-USF	<0.05																													●							□						
	110301MFR-USF	<0.1																													●							●						
	110301MFL-USF	<0.1																													●							●						
	110302MFR-USF	<0.2																													●							●						
	110302MFL-USF	<0.2																													●							●						
Low Feed NEW  Sharp Edge	VPET 080201MFR-U	<0.1																												●					●									
	080201MFL-U	<0.1																												●					●									
	080202MFR-U	<0.2																												●					●									
	080202MFL-U	<0.2																												●					●									
	VPET 1103005MFR-U	<0.05																												●					●									
	1103005MFL-U	<0.05																												●					●									
	110301MFR-U	<0.1																												●					●									
	110301MFL-U	<0.1																												●					●									
	110302MFR-U	<0.2																												●					●									
	110302MFL-U	<0.2																												●					●									
Low Feed NEW Sharp Edge	VPET 1103005MFR-J	<0.05																												●	●				●									
	110301MFR-J	<0.1																												●	●				●									
	110301MFL-J	<0.1																												●	●				●									
	110302MFR-J	<0.2																												●	●				●									
	110302MFL-J	<0.2																												●	●				●									

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1



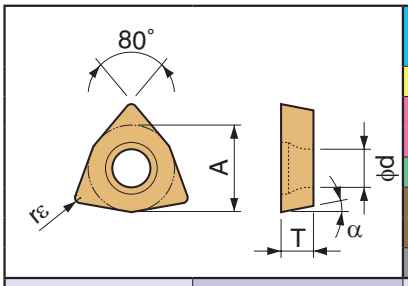
Inserts are sold in 10 piece boxes

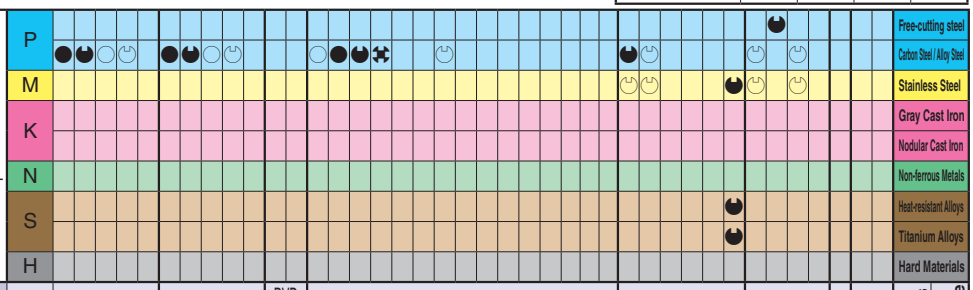
● : Std. Item □ : Deleted from the next catalogue

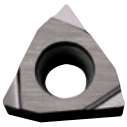
(mm)

80° Trigon / Positive with Hole

Description	A	T	ϕd	α
WB_0601_	3.97	1.59	2.3	5°
WB_0802_	4.76	2.38	2.3	5°





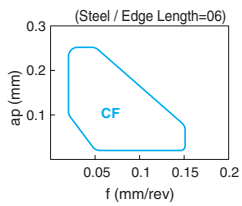
Insert (Handed Insert shows Left-hand)		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	Sharp Edge	WBGT 060101MR-CF	<0.1																																		□						F59	1
		060101ML-CF	<0.1																																		□							
		060102MR-CF	<0.2																																		●							
		060102ML-CF	<0.2																																		●							
Minute ap	Sharp Edge / Polished	WBGT 060101MPR-CF	<0.1																												●	●			●			□						1
		060101MPL-CF	<0.1																												●	●			●			●						
		060102MPR-CF	<0.2																												●	●			●			●						
		060102MPL-CF	<0.2																												●	●			●			●						
Finishing		WBMT 060102R-DP	0.2					●																							●				●	●		●						
		060102L-DP	0.2	●	●	●	○	●	●	●	●	○		○		●	●	●	●		●	●									●				●	●		●						
		060104R-DP	0.4					●																							●				●	●		●						
		060104L-DP	0.4	●	●	●	○	●	●	●	●	○		○		●	●	●	●		●	●									●				●	●		●						
		WBMT 080202R-DP	0.2					●													□	●									●				●	●		●						
		080202L-DP	0.2	●	●	●	○	●	●	●	●	○		○		●	●	●	●		●	●									●				●	●		●						
		080204R-DP	0.4					●													●	●									●				●	●		●						
		080204L-DP	0.4	●	●	●	○	●	●	●	●	○		○		●	●	●	●		●	●									●				●	●		●						
Finishing	NEW  Sharp Edge	WBET 0601005ML-F	<0.05																												●				●									2
		060101MR-F	<0.1																												●				●									
		060101ML-F	<0.1																												●				●									
		060102MR-F	<0.2	●					●																						●				●									
		060102ML-F	<0.2	●	●				●	●																					●				●									
		060104MR-F	<0.4	●					●																						●				●									
		060104ML-F	<0.4	●	●				●	●																					●				●									
		WBET 080201MR-F	<0.1	●					●																																			
		080201ML-F	<0.1	●					●																						●				●									
		080202MR-F	<0.2	●					●																																			
		080202ML-F	<0.2	●	●				●	●																					●				●									
		080204MR-F	<0.4	●					●																						●				●									
		080204ML-F	<0.4	●	●				●	●																					●				●									

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

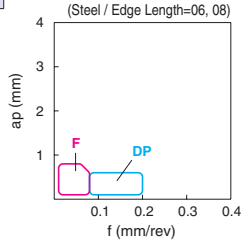
Applicable Chipbreaker Range

ap indicates radius

1



2



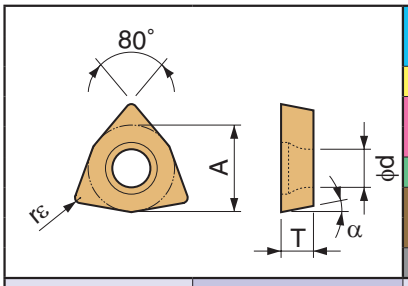
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

80° Trigon / Positive with Hole

(mm)

Description	A	T	ϕd	α
WB_0601_	3.97	1.59	2.3	5°
WB_0802_	4.76	2.38	2.3	5°



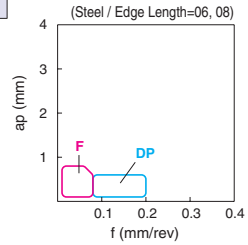
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert Handed Insert shows Left-hand	Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PVD Coated Cermet PV7005	PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	WBGT 0601003L-F	0.03					●																													●					●			
	060101R-F	0.1																																		●								
	060101L-F	0.1					●																													●					●			
	060102R-F	0.2			●		●			●																										●					●			
	060102L-F	0.2			●	○	●			●	○		●	○																						●					●			
	060104R-F	0.4			●	○	●			●			●	○																						●					●			
	060104L-F	0.4			●	○	●			●	○		●	○																						●					●			
	WBGT 0802003L-F	0.03																																		●								
	080201R-F	0.1			●																															●								
	080201L-F	0.1			●		●																													●					●			
	080202R-F	0.2			●		●			●																										●					●			
	080202L-F	0.2			●	○	●			●	○		●	○																						●					●			
	080204R-F	0.4			●	○	●			●			●	□																						●					●			
	080204L-F	0.4			●	○	●			●	○		●	○																						●					●			
	WBGT 060101ML-F	<0.1																																			●	●					F59	
	060102MR-F	<0.2																																				●						
	060102ML-F	<0.2																																			●	●						
	060104MR-F	<0.4																																				●						
	060104ML-F	<0.4																																			●	●						
	WBGT 080201ML-F	<0.1																																					●					
	080202ML-F	<0.2																																					●					
	080204MR-F	<0.4																																					●					
	080204ML-F	<0.4																																					●					
Sharp Edge																																												
Cast Iron	WBGW 060102L	0.2					●																																			●			
	060104L	0.4					●																																						
	WBGW 080202L	0.2					●																																			●			
	080204L	0.4					●																																						
Without Chipbreaker																																												

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range
ap indicates radius

1



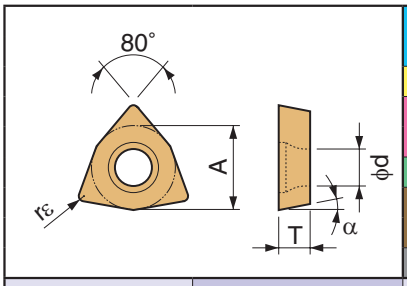
Inserts are sold in 10 piece boxes

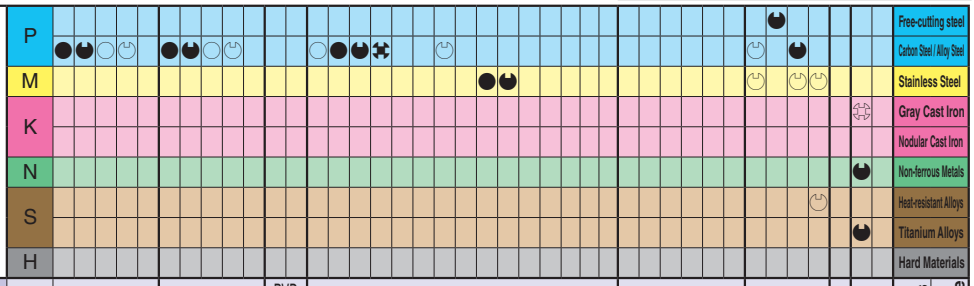
● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

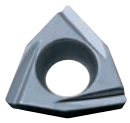
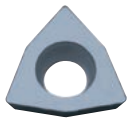
(mm)

80° Trigon / Positive with Hole

Description	A	T	ϕd	α
WP_1102_	6.35	2.38	2.8	11°
WP_1603_	9.525	3.18	4.4	11°





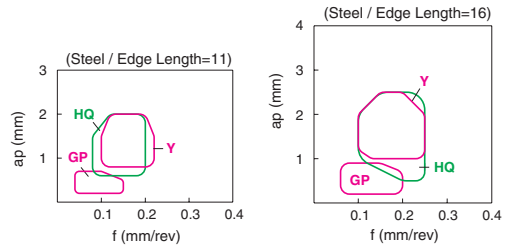
Insert (Handed Insert shows Left-hand)		Description	Dimension (mm) rε	Cermet TN610	TN620	TN6010	TN6020	TN60	MEGACOAT Cermet PV710	PV720	PV7010	PV7025	PV7005	PVD Coated Cermet PV90	PV7020	CVD Coated Carbide CA510	CA515	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4505	CA4515	CA4010	CA4115	CA4120	MEGACOAT MEGACOAT NANO PR1425	PR1225	PR1305	PR1310	PR1325	PR1535	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	DLC PDL025	Carbide KW10	SW05	Ref. to Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing		WPMT 110204GP	0.4		●			●		●				●		●	●	●	●	□	●																●		●				F59	1
		WPMT 160304GP	0.4		●			●		●				●		●	●	●	●		●	●																●		●					
Finishing-Medium		WPMT 110202HQ	0.2		●			●		●				●		●	●	●	●		●	●																●		●					
		110204HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●												●		●	●				
		WPMT 160304HQ	0.4	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●												●		●	●				1
		160308HQ	0.8	●	●	●	○	●	●	●	●	○		●	○	●	●	●	●		●	●	●	●	●												●		●	●				
Finishing-Medium		WPGT 110202L-Y	0.2					●																												●					●		
		110204R-Y	0.4																																	●							
		110204L-Y	0.4				○	●						●																						●					●	F59	
		WPGT 160304R-Y	0.4					●																												●							
		160304L-Y	0.4				○	●																												●					●		
		160308L-Y	0.8											●																						●					●		
		WPGT 110204MR-Y	<0.4																																			●						
		110204ML-Y	<0.4																																			●	●					
		WPGT 160304MR-Y	<0.4																																			●						
		160304ML-Y	<0.4																																			●						
Cast Iron	 Without Chipbreaker	WPGW 110202	0.2																																						●		
		110204	0.4																																						●		
		WPGW 160304	0.4																																						●		
		160308	0.8																																						●		

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

B

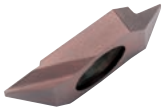
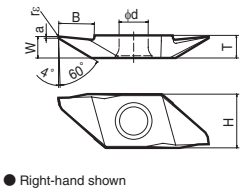
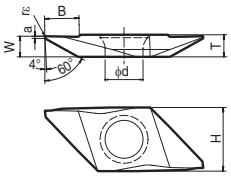
Insert (Turning)

Inserts for Back Turning (Small Tools)

NEW

P	Free-cutting steel						Ref. to Page for Applicable Toolholders
	Carbon Steel / Alloy Steel	●	◔	◔	◔		
M	Stainless Steel	◔	●	◔	◔		
K	Gray Cast Iron					●	
	Nodular Cast Iron					◔	
N	Non-ferrous Metals					●	
S	Heat-resistant Alloys	◔	●	◔	◔		
	Titanium Alloys		●			◔	
H	Hard Materials						

For KTKF toolholder

Insert (Photo shows Right-hand)		Description		Dimension (mm) W	a	B	rε	T	H	ϕd	MEGACOAT MEGACOAT NANO PR1425	PR1535	PR1225	PVD Coated Carbide PR1025	Carbide KW10	Ref. to Page for Applicable Toolholders
	 ● Right-hand shown	TKFB	12R15005M	1.5	0.25	2.6	<0.05	3.0	8.7	5.2	●	●	●	●	●	E12
		TKFB	12R28005M	2.8	0.3	4.6	<0.05	3.0	8.7	5.2	●	●	●	●	●	
		TKFB	12R28010M	2.8	0.3	4.6	<0.1	3.0	8.7	5.2	●	●	●	●	●	
		TKFB	16R38005M	3.8	0.3	6.3	<0.05	4.0	9.5	5.2	●	●	●	●	●	
		TKFB	16R38010M	3.8	0.3	6.3	<0.1	4.0	9.5	5.2	●	●	●	●	●	
	 ● Left-hand shown	TKFB	12L28005MR	2.8	0.3	4.6	<0.05	3.0	8.7	5.2		●	●			
		TKFB	12L28010MR	2.8	0.3	4.6	<0.1	3.0	8.7	5.2		●	●			
		TKFB	16L38005MR	3.8	0.3	6.3	<0.05	4.0	9.5	5.2		●	●			
		TKFB	16L38010MR	3.8	0.3	6.3	<0.1	4.0	9.5	5.2		●	●			

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

Inserts Identification System (Ref. to Tables 1 and 2)

TKFB 12 R 15 005 M R

- TKFB — Insert Type
- 12 — Insert Size
- R — Insert Hand: R: Right-hand, L: Left-hand
- 15 — Insert width
- 005 — Corner-R(rε)
- M — Indicates the corner-R(rε) has a minus tolerance
- R — Hand of Cutting Lead Angle: R: Right-hand

Table1

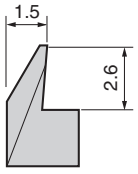
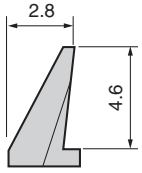
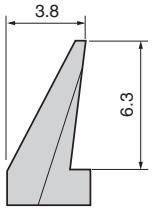
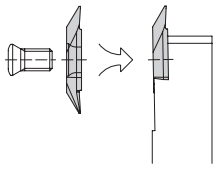
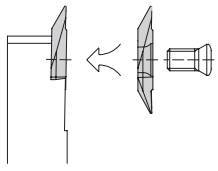
Small machining	General purpose	Large machining
 TKFB12R15..	 TKFB12R28..	 TKFB16R38..

Table 2

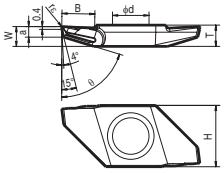
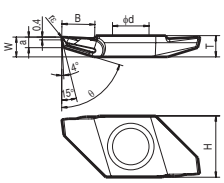
Toolholder	Right-hand (R)	Toolholder	Left-hand (L)
Insert	Right-hand (R)	Insert	Left-hand (L)
Lead angle	Right-hand (R)	Lead angle	Right-hand (R)
			

Inserts are sold in 10 piece boxes

● : Std. Item

P	Free-cutting steel				Ref. to Page for Applicable Toolholders
	Carbon Steel / Alloy Steel	●	○	○	
M	Stainless Steel	○	●	○	
K	Gray Cast Iron				
	Nodular Cast Iron				
N	Non-ferrous Metals				
S	Heat-resistant Alloys	○	●	○	
	Titanium Alloys		●		
H	Hard Materials				

For KTKF toolholder (GQ Chipbreaker) NEW

Insert (Handed Insert shows Right-hand)		Description	W	a	B	rε	T	H	ϕd	θ	MEGACOAT / MEGACOAT NANO PR1425	PR1535	PR1225	Ref. to Page for Applicable Toolholders
Polished		TKFB 12R28005P-GQ	2.8	1.5	4.6	0.05	3.0	8.7	5.2	74°	●	●	●	E12
		12R28015P-GQ				0.15					●	●	●	
		TKFB 16R38005P-GQ	3.8	1.8	6.3	0.05	4.0	9.5	5.2	72°	●	●	●	
		16R38015P-GQ				0.15					●	●	●	
		TKFB 12R28005-GQ	2.8	1.5	4.6	0.05	3.0	8.7	5.2	74°	●	●	●	
		12R28015-GQ				0.15					●	●	●	
		TKFB 16R38005-GQ	3.8	1.8	6.3	0.05	4.0	9.5	5.2	72°	●	●	●	
		16R38015-GQ				0.15					●	●	●	

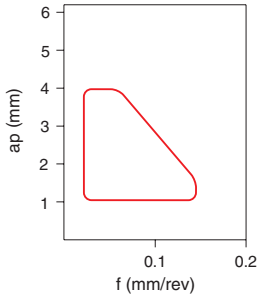
Inserts Identification System

TKFB 12 R 28 005 P -GQ

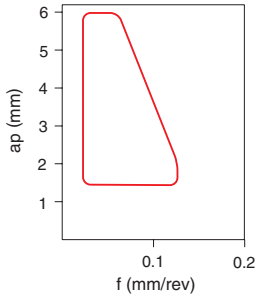
- TKFB — Insert Type
- 12 — Insert Size
- R — Insert Hand (R: Right-hand)
- 28 — Insert width
- 005 — Corner-R(rε)
- P — Polished
- GQ — GQ Chipbreaker

Applicable Chipbreaker Range

TKFB12R28...GQ



TKFB16R38...GQ



● : Std. Item

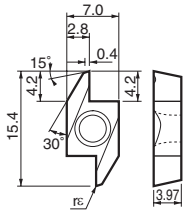
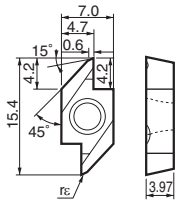
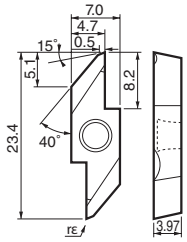
Inserts are sold in 10 piece boxes

Inserts for Back Turning (Small Tools)

NEW

P	Free-cutting steel					●			Ref. to Page for Applicable Toolholders
	Carbon Steel / Alloy Steel		●	○	○		○		
M	Stainless Steel		○	●	○		○		
K	Gray Cast Iron							●	
	Nodular Cast Iron							○	
N	Non-ferrous Metals							●	
S	Heat-resistant Alloys		○	●					
	Titanium Alloys							●	
H	Hard Materials								

● For AABS / SABS / AABW / SABW toolholders

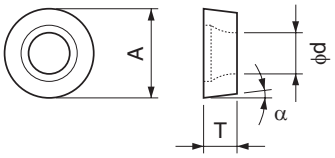
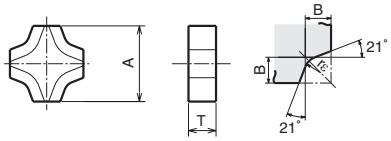
Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) rε	Cermet	MEGACOAT MEGACOAT NANO		PVD Coated Carbide			Carbide	Ref. to Page for Applicable Toolholders
					TC60M	PR1425	PR1225	PR930	PR1005	PR1025	KW10	
		ABS	15R4005 15R4015	0.05 0.15	● ●			● ●			● ●	E17
		ABS	15R4005M 15R4015M	<0.05 <0.15		● ●	● ●		● ●	● ●		
		ABW	15R4005 15R4015	0.05 0.15	● ●			● ●			● ●	E18
		ABW	15R4005M 15R4015M	<0.05 <0.15		● ●	● ●		● ●	● ●		
		ABW	23R5005 23R5015	0.05 0.15	● ●			● ●			● ●	E19
		ABW	23R5005M 23R5015M	<0.05 <0.15		● ●	● ●		□ ●	● ●		

· Insert whose corner-R(rε) dimension expressed with less than sign (e.g. < 0.05, < 0.1, < 0.2 etc.) indicate models with minus tolerance for corner-R(rε).

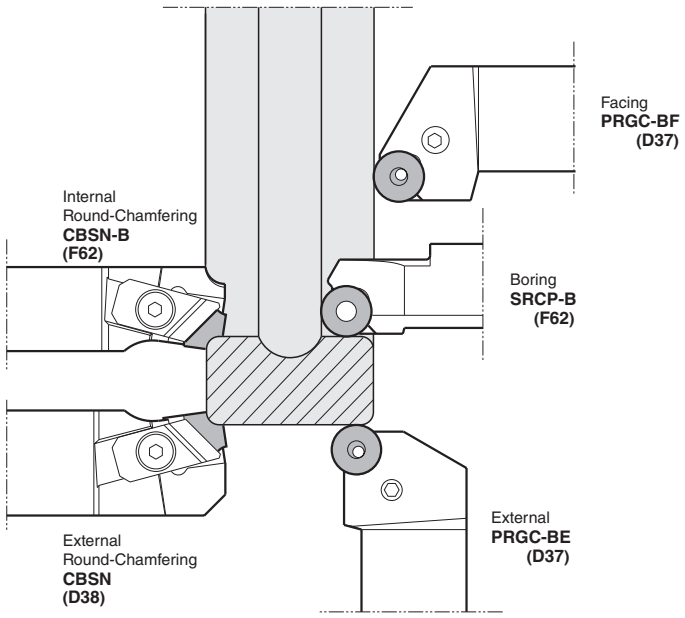
Inserts are sold in 10 piece boxes

● : Std. Item □ : Deleted from the next catalogue

Bearing Machining

Insert		Description		Dimension (mm) A	T	ϕd	rε	Relief Angle α	Cermet TN90	Ref. to Page for Applicable Toolholders
• External/Boring/Facing		**RCMT**	**1204M0-BB**	12.0	4.76	4.2	-	7°	●	**D37**
			1606M0-BB	16.0	6.35	5.5			●	
		RPMT	**1203M0-BB**	12.0	3.18	4.4	-	11°	●	**F62**
			1604M0-BB	16.0	4.76	5.5			●	
• Round Chamfering						B	rε			
		SNMF	**120406-21**	12.70	4.76	1.5	0.6	-	●	**D38**
			120410-21			3.0	1.0		●	
			120416-21			3.1	1.6		●	**F62**
			120421-21			3.2	2.1		●	
			120426-21			3.3	2.6		●	

Tooling for Bearing Machining

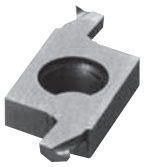
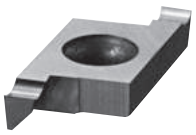
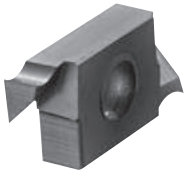


● : Std. Item

Inserts are sold in 10 piece boxes

Micro Boring

● Twin-Bars

Micro Boring	Micro Face Grooving
TWB Twin-Bars ➡F34	TWFG Twin-Bars ➡G72
	
TWBT Twin-Bars ➡F35	TWFGT Twin-Bars ➡G73
	

● EZ Bars / System Tip-Bars / Tip-Bars

Micro Boring		Micro Back Boring
EZB EZ Bars ➡F14	EZVB EZ Bars ➡F20	-
NEW	NEW	-
VNB-S / VNB System Tip-Bars ➡F28	VNBX-S System Tip-Bars ➡F32	VNBT System Tip-Bars ➡F29
HPB 2-Edge Tip-Bars ➡F36	-	HPBT 2-Edge Tip-Bars ➡F36
	-	
PSB-S Tip-Bars ➡F37	-	PSBT-S Tip-Bars ➡F37
	-	

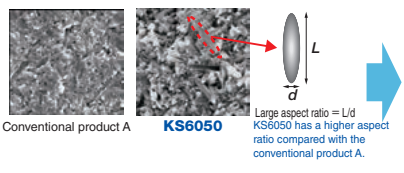
Solid Tip-Bars [Grooving / Threading]

Micro Grooving	Micro Face Grooving	Micro Internal Threading
EZG EZ Bars ➡G43	EZFG EZ Bars ➡G68	EZT EZ Bars ➡J24
NEW	NEW	NEW
VNG System Tip-Bars ➡G45	VNFG System Tip-Bars ➡G70	VNT System Tip-Bars ➡J30
HPG 2-Edge Tip-Bars ➡G46	HPFG 2-Edge Tip-Bars ➡G71	HPT 2-Edge Tip-Bars ➡J28
PSG Tip-Bars ➡G46	PSFG Tip-Bars ➡G71	PST Tip-Bars ➡J30

High Speed Machining for Cast Iron KS6050/CS7050

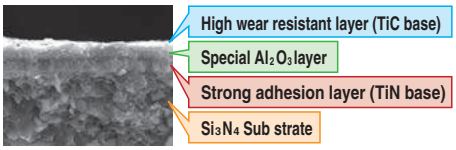
- Improved fracture resistance by high aspect ratio constituents
- Anti-chipping in scale processing and interrupted machining
- High speed machining of cast iron by controlling grain boundary phase (good wear resistance)

KS6050

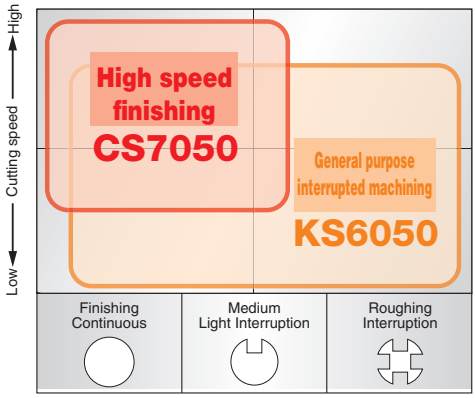


CS7050 (Coated Si_3N_4)

Superior wear resistance attained with strong coating adherence
Applicable to high speed machining

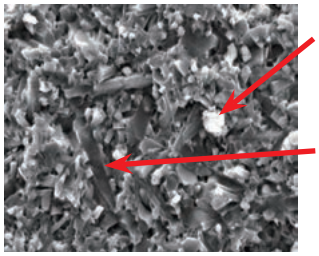


Application Map



Heat-Resistant Alloys Machining SiAlON Ceramic KS6030/KS6040

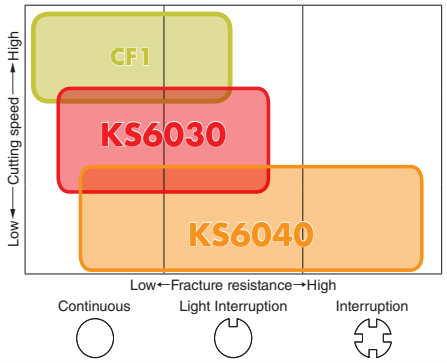
- Improved wear and fracture resistance due to the mixture of the hard and acicular particles



Superior balance in heat resistant alloys machining achieves optimum balance between wear and fracture resistance.

Application Map

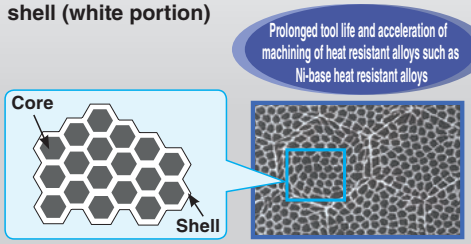
・Heat-Resistant Alloys Machining



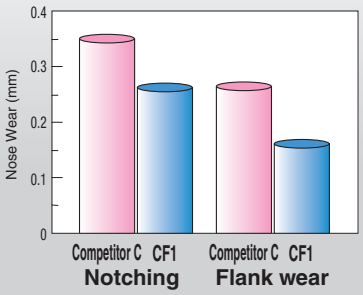
Heat-Resistant Alloys Machining Honeycomb structure Ceramic CF1

What is Honeycomb structure Ceramic?

Honeycomb structure Ceramic is a composite material consisting of a core (gray portion) and shell (white portion)



Comparison of Wear Resistance



<Cutting Conditions>
Workpiece Material: Ni-base heat-resistant alloys
Tool geometry: RNGN120400
Vc=150m/min, ap=1mm
f=0.15mm/rev Wet

Ceramic Inserts Identification System

Identification System

C	N	G	A	12	04	04	S01525

"Turning Indexable Inserts Identification System" Refer to Page B2

Edge Prep. (Ref. to the Table1)

Edge Preparation Identification System

Table1

Edge Prep.	Symbol	Cutting Edge Spec.	Example		Shape
	S	Chamfered and Honed Cutting Edge	S01525	0.15mm X 25° Chamfered and Honed Cutting Edge	
	T	Chamfered Cutting Edge	T02025	0.20mm X 25° Chamfered Cutting Edge	

Ref. to Page B3 for insert color

Turning Indexable Inserts

How to read pages of "Turning Inserts" B13

80° Rhombic / Negative

(mm)

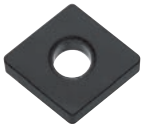
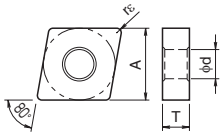
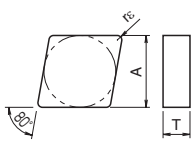
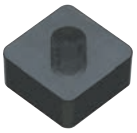
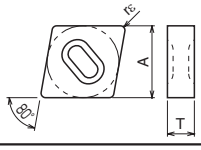
Description	A	T	ϕd
CN_A 1204_	12.70	4.76	5.16
CN_N 1204_	12.70	4.76	-
1207_		7.94	

(mm)

Description	A	T	ϕd
CNGN1607_	15.875	7.94	-
CNGX1207_	12.70	7.94	-

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm X 25° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	✱ ◔
	Gray Cast Iron (Without Scale)	● ◔ ◔ ◔ ◔ ●
	Nodular Cast Iron (With Scale)	◔
	Nodular Cast Iron (Without Scale)	◔
S	Heat-resistant Alloys	✱ ●
H	Hard Materials	○ ● ◔

Insert		Description		Edge Prep.	Dimension (mm) rε	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	Ref. to Page for Applicable Toolholders
		CNGA	120412S01025	S01025	1.2	●										D8 F63 F67 F68
		CNGA	120404S01525 120408S01525 120412S01525	S01525	0.4 0.8 1.2				● ● ●							
		CNGA	120404S02025 120408S02025 120412S02025	S02025	0.4 0.8 1.2					● ● ●						
		CNGA	120404S03030 120408S03030 120412S03030	S03030	0.4 0.8 1.2				● ● ●							
		CNGA	120412T00520	T00520	1.2	●										
		CNGA	120404T02025 120408T02025 120412T02025	T02025	0.4 0.8 1.2		● ●	● ● ●		● ● ●	● ●	● ●				
		CNMA	120408S01525	S01525	0.8				●							
		CNMA	120408S03030 120412S03030	S03030	0.8 1.2				● ●							
		CNGN	120408S01025 120412S01025	S01025	0.8 1.2	● ●										D22
		CNGN	120408T01020 120412T01020	T01020	0.8 1.2									● ●	● ●	
		CNGN	120404T02025 120408T02025 120412T02025 120416T02025	T02025	0.4 0.8 1.2 1.6					● ● ●	● ● ●	● ●		● ●		
		CNGN	120708S01525 120712S01525	S01525	0.8 1.2				● ●							
		CNGN	120708T01020 120712T01020	T01020	0.8 1.2										● ●	
		CNGN	120704T02025 120708T02025 120712T02025 120716T02025	T02025	0.4 0.8 1.2 1.6		● ● ● ●									
		CNGN	160708T02025 160712T02025 160716T02025	T02025	0.8 1.2 1.6		● ● ●									
		CNMN	120708T02025 120712T02025	T02025	0.8 1.2		● ●									
		CNGX	120712T01020 120716T01020	T01020	1.2 1.6									● ●		D28 F80
		CNGX	120708T02025 120712T02025 120716T02025	T02025	0.8 1.2 1.6						● ● ●	● ● ●		● ●		

Inserts are sold in 10 piece boxes

● : Std. Item

55° Rhombic / 75° Rhombic / Negative

(mm)

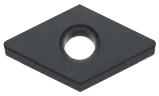
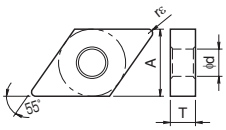
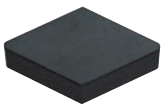
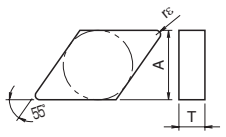
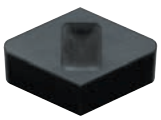
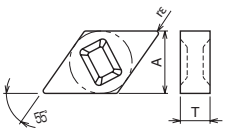
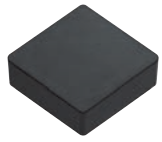
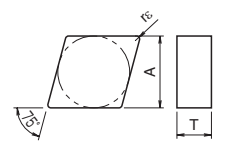
Description	A	T	ϕd
DNGA 1504_	12.70	4.76	5.16
1506_		6.35	
DNGN 1504_	12.70	4.76	-
1507_		7.94	

(mm)

Description	A	T	ϕd
DNGX 1207_	10.00	7.94	-
DNGX 1507_	12.70	7.94	-
ENGN 1307_	12.70	7.94	-

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01225	0.12mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	✱ ◔
	Gray Cast Iron (Without Scale)	● ◔ ◔ ◔ ◔ ◔ ◔
	Nodular Cast Iron (With Scale)	◔
	Nodular Cast Iron (Without Scale)	◔
S	Heat-resistant Alloys	
H	Hard Materials	○ ●

Insert		Description		Edge Prep.	Dimension (mm) rε	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	Ref. to Page for Applicable Toolholders
		DNGA	150408S01025	S01025	0.8	●										
		DNGA	150412S01025		1.2	●										
		DNGA	150404S01525	S01525	0.4				●							D10
		DNGA	150408S01525		0.8				●							D11
		DNGA	150404S02025	S02025	0.4					●						F64
		DNGA	150408S02025		0.8					●						F70
		DNGA	150408S03030	S03030	0.8				●							F71
		DNGA	150404T02025	T02025	0.4		●			●						
		DNGA	150408T02025		0.8		●	●		●						
		DNGA	150412T02025		1.2			●		●						
		DNGA	150604T02025	T02025	0.4			□		●						D10
		DNGA	150608T02025		0.8			●		●						D11
		DNGA	150612T02025		1.2			□		●						F64
		DNGN	150408T02025	T02025	0.8					●						-
		DNGN	150704S01525	S01525	0.4				●							
		DNGN	150708S01525		0.8				●							
		DNGN	150712S01525		1.2				●							
		DNGN	150704S02025	S02025	0.4					●						
		DNGN	150708S02025		0.8					●						D23
		DNGN	150712S02025		1.2					●						
		DNGN	150704T02025	T02025	0.4		●									
		DNGN	150708T02025		0.8		●									
		DNGN	150712T02025		1.2		●									
		DNGN	150716T02025		1.6		●									
		DNGX	120708T02025	T02025	0.8						●					D29
		DNGX	120712T02025		1.2						●					F80
		DNGX	150708T02025	T02025	0.8						●	●				D29
		DNGX	150712T02025		1.2						●	●				
		ENGN	130708S01525	S01525	0.8				●							
		ENGN	130712S01525		1.2				●							
		ENGN	130708S02025	S02025	0.8					●						
		ENGN	130712S02025		1.2					●						
		ENGN	130704T02025	T02025	0.4		●			●						D23
		ENGN	130708T02025		0.8		●			●						F79
		ENGN	130712T02025		1.2		●			●						
		ENGN	130716T02025		1.6		●			●						
		ENGN	130720T02025		2.0		●			●						
		ENGN	130730T02025		3.0		□			●						

● : Std. Item □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

Round / Negative

(mm)

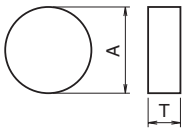
Description	A	T	ϕd
RNGN 0903_	9.525	3.18	-
0904_		4.76	
0907_		7.94	
1204_	12.70	4.76	

(mm)

Description	A	T	ϕd
RNGN 1207_	12.70	7.94	-
1507_	15.875		
1907_	19.05		
2507_	25.40		

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01225	0.12mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	✱ ◔
	Gray Cast Iron (Without Scale)	◔ ◔ ◔ ●
	Nodular Cast Iron (With Scale)	◔
	Nodular Cast Iron (Without Scale)	◔
S	Heat-resistant Alloys	● ✱ ◔
H	Hard Materials	○ ●



Insert	Description		*Edge Prep.	Dimension (mm) rε	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	Ref. to Page for Applicable Toolholders
	RNGN	090300E003	E003	-								●			
		090300E005	E005	-									●		
		090300T01020	T01020	-								●	●		
	RNGN	090400S01525	S01525	-				●							D33
		090400S02025	S02025	-					●						
		090400T01020	T01020	-										●	
		090400T02025	T02025	-		●			●						
	RNGN	090700T01020	T01020	-										●	-
	RNGN	120400E003	E003	-								●			
		120400E005	E005	-									●		
		120400S01525	S01525	-				●							
		120400S02025	S02025	-					●						
		120400T01020	T01020	-								●	●	●	
		120400T02025	T02025	-		●	●		●	●	●				D27
	RNGN	120700E003	E003	-								●			D33
		120700E005	E005	-									●		
		120700K15015	K15015	-				●	●						
		120700S01525	S01525	-				●							
		120700S02025	S02025	-					●						
		120700T01020	T01020	-								●	●	●	
		120700T02025	T02025	-		●	●		●	●	●				
	RNGN	150700S01525	S01525	-				●							
		150700S02025	S02025	-					●						D27
		150700T02025	T02025	-		●									
	RNGN	190700E003	E003	-								●			
		190700E005	E005	-									●		
		190700T01020	T01020	-								●	●		
	RNGN	250700E003	E003	-								MTO			-
		250700E005	E005	-									●		
		250700T01020	T01020	-								MTO	●		

*For cutting edge "E" and "K", please refer to the table below.

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R-honed Cutting Edge	E005	R0.05mm Honed
K	Double Chamfered Cutting Edges	K15015	1.5mm X 15° Chamfered Cutting Edge

· Note: Symbol "K" describe only the largest chamfer width and its angle.

Inserts are sold in 10 piece boxes

● : Std. Item MTO : Made to order

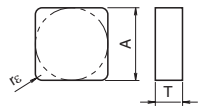
(mm)

90° Square / Negative

Description	A	T	φd
SN_A1204_	12.70	4.76	5.16
SNGN1204_			-
SNGN1207_		7.94	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01225	0.12mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

		Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	SIAION Ceramic		Honeycomb structure Ceramic	
K	Gray Cast Iron (With Scale)						✱	◔				
	Gray Cast Iron (Without Scale)	●		◔		◔	◔	●				
	Nodular Cast Iron (With Scale)							◔				
	Nodular Cast Iron (Without Scale)							◔				
S	Heat-resistant Alloys									✱	●	
H	Hard Materials				○	●						◔

Insert		Description		Edge Prep.	Dimension (mm) rε	KA30	A65	KT66	A66N	PT600M	KS6050	CS7050	KS6030	KS6040	CF1	Ref. to Page for Applicable Toolholders
		SNGA	120408S01525 120412S01525	S01525	0.8 1.2				● ●							D12 D13 F73
		SNGA	120408S02025 120412S02025	S02025	0.8 1.2					● ●						
		SNGA	120408T02025 120412T02025 120416T02025	T02025	0.8 1.2 1.6		● ●	● ●		● ● ●	● ● ●	● ● ●				
		SNMA	120408S03030	S03030	0.8				●							
		SNGN	120408S01025 120412S01025 120416S01025 120420S01025	S01025	0.8 1.2 1.6 2.0	● ● ● ●										D25 D34 D35 F79
		SNGN	120408S01525 120412S01525 120416S01525	S01525	0.8 1.2 1.6				● ● ●							
		SNGN	120408S02025 120412S02025 120416S02025	S02025	0.8 1.2 1.6					● ● ●						
		SNGN	120416S03030	S03030	1.6				●							
		SNGN	120408T00520	T00520	0.8		●	□								
		SNGN	120408T01020 120412T01020 120416T01020 120420T01020	T01020	0.8 1.2 1.6 2.0									● ● ●	● ● ● ●	
		SNGN	120404T02025 120408T02025 120412T02025 120416T02025 120420T02025	T02025	0.4 0.8 1.2 1.6 2.0		● ● ● ● ●	 ● ● ●		● ● ● ● ●	 ● ● ●	 ● ● ●		● ●		
		SNGN	120708S01025 120712S01025 120716S01025	S01025	0.8 1.2 1.6	● ● ●										
		SNGN	120704S01525 120708S01525 120712S01525 120716S01525 120720S01525	S01525	0.4 0.8 1.2 1.6 2.0				● ● ● ● ●							
		SNGN	120708S02025 120712S02025 120716S02025 120720S02025	S02025	0.8 1.2 1.6 2.0					● ● ● ●						
		SNGN	120708T01020 120712T01020 120716T01020 120720T01020	T01020	0.8 1.2 1.6 2.0										● ● ● ●	

● : Std. Item □ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

90° Square / Negative

(mm)

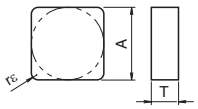
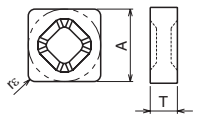
Description	A	T	ϕd
SN_N1207_	12.70	7.94	-
SNGN1507_	15.875	7.94	

(mm)

Description	A	T	ϕd
SNGX1207_	12.70	7.94	-
SNGX1507_	15.875	7.94	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01225	0.12mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	✱ ◔
	Gray Cast Iron (Without Scale)	◔ ◔ ●
	Nodular Cast Iron (With Scale)	◔
	Nodular Cast Iron (Without Scale)	◔
S	Heat-resistant Alloys	✱
H	Hard Materials	●

Insert		Description		Edge Prep.	Dimension (mm) rε	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	Honeycomb structure Ceramic KS6040	CF1	Ref. to Page for Applicable Toolholders
		SNGN	120704T02025	T02025	0.4		●			●						D25 D34 D35 F79
			120708T02025		0.8		●			●						
			120712T02025		1.2		●			●						
			120716T02025		1.6		●			●	●	●				
			120720T02025		2.0		●			●						
		SNMN	120716T02025	T02025	1.6		●									
		SNGN	150712T02025	T02025	1.2		●			●						D25
			150716T02025		1.6		●									
		SNGX	120712T01020	T01020	1.2									●		D30 D31 F80
			120716T01020		1.6									●		
		SNGX	120712T02025	T02025	1.2						●	●		●		
			120716T02025		1.6						●	●		●		
		SNGX	150716T02025	T02025	1.6						●					D30 D31

Inserts are sold in 10 piece boxes

● : Std. Item

60° Triangle / Negative

(mm)

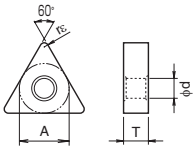
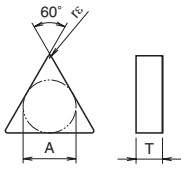
Description	A	T	φd
TNGA 1604_	9.525	4.76	3.81
TNGN 1103_	6.35	3.18	-

(mm)

Description	A	T	φd
TNGN 1604_	9.525	4.76	-
1607_		7.94	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm X 25° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	✱ ◯
	Gray Cast Iron (Without Scale)	● ◯
	Nodular Cast Iron (With Scale)	◯
	Nodular Cast Iron (Without Scale)	◯
S	Heat-resistant Alloys	
H	Hard Materials	○ ●

Insert		Description		Edge Prep.	Dimension (mm) rε	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	Honeycomb structure Ceramic KS6040	CF1	Ref. to Page for Applicable Toolholders
		TNGA	160408S01025	S01025	0.8	●										D14 D15 F64 F74 F75
		TNGA	160404S01525 160408S01525 160412S01525	S01525	0.4 0.8 1.2				● ● ●							
		TNGA	160404S02025 160408S02025 160412S02025	S02025	0.4 0.8 1.2					● ● ●						
		TNGA	160408S03030 160412S03030	S03030	0.8 1.2				● ●							
		TNGA	160408T00520	T00520	0.8	●										
		TNGA	160404T02025 160408T02025 160412T02025	T02025	0.4 0.8 1.2		● ●	● ● ●		● ● ●	● ●	● ●				
		TNGN	110304T00520 110308T00520 110312T00520	T00520	0.4 0.8 1.2		● ● ●			● ● ●						D36 F81
		TNGN	160404S01025 160408S01025 160412S01025 160416S01025 160420S01025	S01025	0.4 0.8 1.2 1.6 2.0	● ● ● ● ●										D26
		TNGN	160404S01525 160408S01525 160412S01525	S01525	0.4 0.8 1.2				● ● ●							
		TNGN	160404S02025 160408S02025 160412S02025	S02025	0.4 0.8 1.2					● ● ●						
		TNGN	160404T00520 160408T00520 160412T00520	T00520	0.4 0.8 1.2	● ●	● ●									
		TNGN	160404T02025 160408T02025 160412T02025	T02025	0.4 0.8 1.2		● ● ●	●		● ● ●	●					
		TNGN	160708S01525	S01525	0.8				●							
		TNGN	160708S02025	S02025	0.8					●						
		TNGN	160704T02025 160708T02025 160712T02025 160716T02025 160720T02025	T02025	0.4 0.8 1.2 1.6 2.0		● ● ● ● ●			● ● ●						

● : Std. Item

Inserts are sold in 10 piece boxes

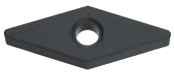
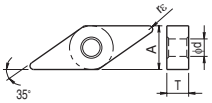
35° Rhombic / Negative

(mm)

Description	A	T	φd
VN_A1604_	9.525	4.76	3.81

Edge Prep.				
Symbol	Cutting Edge Spec.	Example		
S	Chamfered and Honed Cutting Edge	S01525	0.15mm X 25° Chamfered and Honed Cutting Edge	
T	Chamfered Cutting Edge	T01525	0.15mm X 25° Chamfered Cutting Edge	

		Gray Cast Iron (With Scale)	Gray Cast Iron (Without Scale)	Nodular Cast Iron (With Scale)	Nodular Cast Iron (Without Scale)	Heat-resistant Alloys	Hard Materials
K			◔		◕		
S						○	●
H							

Insert	Description	Edge Prep.	Dimension (mm) rε	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	Honeycomb structure Ceramic KS6040	CF1	Ref. to Page for Applicable Toolholders
	VNGA 160404S01525	S01525	0.4				●							D16 D17 D18
	VNGA 160408S01525		0.8				●							
	VNGA 160404S02025	S02025	0.4					●						
	VNGA 160408S02025		0.8					●						
	VNGA 160404T02025	T02025	0.4		●	●		●						
	VNGA 160408T02025		0.8		●	●		●						
	VNGA 160412T02025		1.2					●						
	VNMA 160408S01525	S01525	0.8				●							

Inserts are sold in 10 piece boxes

● : Std. Item

Positive

(mm)

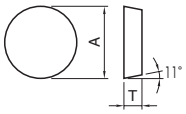
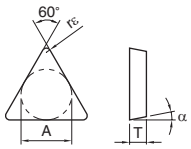
Description	A	T	α
RPGN0903_	9.525	3.18	11°
RPGN1204_	12.70	4.76	
SPGN0903_	9.525	3.18	
SPGN1203_	12.70	3.18	

(mm)

Description	A	T	α
TBGN 0601_	3.97	1.59	5°
TCGN 1604_	9.525	4.76	7°
TPGN 0902_	5.56	2.38	11°
1103_	6.35	3.18	
1603_	9.525		

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm X 25° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	◔
	Gray Cast Iron (Without Scale)	◔
	Nodular Cast Iron (With Scale)	●
	Nodular Cast Iron (Without Scale)	
S	Heat-resistant Alloys	◔ ✖
H	Hard Materials	○ ●

Insert		Description		Edge Prep.	Dimension (mm)	Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	SiAlON Ceramic		Honeycomb structure Ceramic	Ref. to Page for Applicable Toolholders
					rε	KA30	A65	KT66	A66N	PT600M	KS6050	CS7050	KS6030	KS6040	CF1	
		RPGN	090300E003	E003	-								●			-
			090300E005	E005	-									●		
			090300T01020	T01020	-								●	●		
		RPGN	120400E003	E003	-								●			
			120400E005	E005	-									●		
			120400T01020	T01020	-								●	●		
		SPGN	090308T00820	T00820	0.8		●			●						E42 F60
		SPGN	120308S00820	S00820	0.8				●	●						
		SPGN	120308T00820 120312T00820	T00820	0.8 1.2		● ●			● ●						
		TBGN	060104S00820 060108S00820	S00820	0.4 0.8				● ●	● ●						-
		TCGN	160404T00820 160408T00820	T00820	0.4 0.8		● ●									
		TPGN	090204T00820 090208T00820	T00820	0.4 0.8			●		● ●						F61
		TPGN	110304S00820 110308S00820	S00820	0.4 0.8				● ●	● ●						E43 F61
		TPGN	110304T00820 110308T00820	T00820	0.4 0.8		● ●		● ●	● ●						
		TPGN	160304S00820 160308S00820 160312S00820	S00820	0.4 0.8 1.2				● ● ●	● ● ●						
		TPGN	160304T00820 160308T00820 160312T00820	T00820	0.4 0.8 1.2		● ● ●		● ●	● ●						

*For cutting edge "E", please refer to the table below.

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R-honed Cutting Edge	E005	R0.05mm Honed

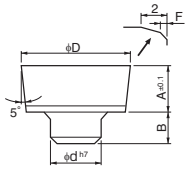
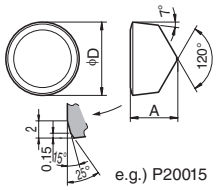
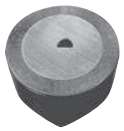
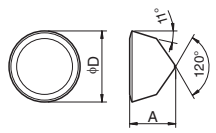
● : Std. Item

Inserts are sold in 10 piece boxes

Inserts for Hardened Roll

Edge Prep. Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm X 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm X 25° Chamfered Cutting Edge

		Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	SIALON Ceramic		honeycomb structure Ceramic	Ref. to Page for Applicable Toolholders
		KA30	A65	KT66	A66N	PT600M	KS6050	CS7050	KS6030	KS6040	CF1	
K	Gray Cast Iron (With Scale)					✱						
K	Gray Cast Iron (Without Scale)											
K	Nodular Cast Iron (With Scale)											
K	Nodular Cast Iron (Without Scale)											
S	Heat-resistant Alloys								●	✱	◔	
H	Hard Materials			◔		●						

Insert	Description		*Edge Prep.	Dimension (mm) ϕD	ϕd	A	B	F	KA30	A65	KT66	A66N	PT600M	KS6050	CS7050	KS6030	KS6040	CF1	Ref. to Page for Applicable Toolholders
		RBG	12K20003	K20003	12	6	6	3	0.2					●					
			16K20003	K20003	16	8	8	5	0.2		●			●					-
			20K20003	K20003	20	10	10	5	0.3		●			●					
	 e.g.) P20015	RCGX	060600E003	E003	6.35	-	6.35	-	-							●			
			060600E005	E005													●		
			060600T01020	T01020												●	●		
			090700E003	E003	9.525	-	8	-	-							●			
			090700E005	E005													●		
			090700P20015	P20015							●		●						
			090700S01020	S01020														●	-
			090700T01020	T01020												●	●		
			120700E003	E003	12.7	-	8	-	-							●			
			120700E005	E005													●		
			120700P20015	P20015									●						
			120700S01020	S01020														●	
			120700T01020	T01020												●	●		
		RPGX	060600E003	E003	6.35	-	6.35	-	-							●			
			060600E005	E005													●		
			060600T01020	T01020												●	●		
			090700E003	E003	9.525	-	8	-	-							●			
			090700E005	E005													●		-
			090700T01020	T01020												●	●		
			120700E003	E003	12.7	-	8	-	-							●			
			120700E005	E005													●		
			120700T01020	T01020												●	●		

*For cutting edge "E", "K" and "P" please refer to the table below.

Edge Prep. Symbol	Cutting Edge Spec.	Example	
E	R-honed Cutting Edge	E005	R0.05mm Honed
K	Double Chamfered Cutting Edges	K20003	2.00mm X 3° Chamfered Cutting Edge
P	Double Chamfered + Honed Cutting Edge	P20015	2.00mm X 15° Chamfered + Honed Cutting Edge

· Note: Symbol "K" and "P" describe only the largest chamfer width and its angle.

RBG Inserts are sold in 1 piece boxes

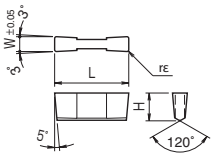
Inserts are sold in 10 piece boxes

● : Std. Item

Grooving Inserts

Edge Prep.				
Symbol	Cutting Edge Spec.	Example		
S	Chamfered and Honed Cutting Edge	S01525	0.15mm X 25° Chamfered and Honed Cutting Edge	
T	Chamfered Cutting Edge	T01525	0.15mm X 25° Chamfered Cutting Edge	

		Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	SIALON Ceramic		Honeycomb structure Ceramic	
		KA30	A65	KT66	A66N	PT600M	KS6050	CS7050	KS6030	KS6040	CF1	
K	Gray Cast Iron (With Scale)											
	Gray Cast Iron (Without Scale)		○			●						
	Nodular Cast Iron (With Scale)											
	Nodular Cast Iron (Without Scale)											
S	Heat-resistant Alloys											
H	Hard Materials				○	●						

Insert		Description		Edge Prep.	Dimension (mm) W	rε	L	H	KA30	A65	KT66	A66N	PT600M	KS6050	CS7050	KS6030	KS6040	CF1	Ref. to Page for Applicable Toolholders
		GH	4020-05	S01020	4.0	0.5	20	7.5				●							
			4020-05	T01020						●			●						
			5020-05	S01020	5.0							●							G38
			5020-05	T01020						●			●						G61
			6020-05	T01020	6.0					●			●						
			7020-05	T01020	7.0					●			●						

● : Std. Item

Inserts are sold in 10 piece boxes

CBN & PCD Tools

C1~C35

C

CBN Tools		C2~C21
Identification System		C2
Edge Preparation Identification System		C2
MEGACOAT CBN		C3
Application Map		C4
Recommended Cutting Conditions		C4
Case Studies		C5
Turning Negative Inserts		C6~C13
Turning Positive Inserts		C14~C18
Turning Negative Inserts (Solid)		C19
Grooving Inserts		C20
Solid Tip-Bars for Micro Boring	EZ Bars / Tip-Bars	C21

PCD Tools		C22~C35
PCD Grades and Features		C22
Identification System		C22
Recommended Cutting Conditions		C22
Turning Negative Inserts		C23
Turning Positive Inserts		C24~C29
Grooving Inserts		C30~C31
For Aluminum Wheel		C31
Turning / Grooving		C32
Solid Tip-Bars for Micro Boring	EZ Bars / System Tip-Bars / Tip-Bars	C33~C34
Milling Inserts		C35

CBN Tools

Extended Tool Life | Improved Stability | High Speed Machining

Kyocera's innovative CBN tools.

CBN Variation and Features Ref. to Page A16

Various lineup applicable from machining Hard materials to Sintered steel

Identification System (Turning Insert)

C	N	G	A	12	04	04	S01225	ME

"Turning Indexable Inserts Identification System" Refer to Page B2

Insert Type	Description	Edge Prep.	Manufacture's Option	Edge Length	No. of Edges	re-grinding
Negative	CNGA120404MEF	F	MEF	Short (Small Edge)	2	Not Recommended
	CNGA120404ME4	S01225	ME4		4 [Multi Edge (Double-sided)]	
	CNGA120404S01225ME		ME		2	
	CNGA120404S00545MEP	S00545	MEP		2	
	CNGA120404S01225SE	S01225	SE		1	
	CNMN120404S02020	S02020	Without Indication (Only KBN900)	Long	Plural edge	Possible
Positive	CCMW09T304MEF	F	MEF	Short (Small Edge)	2	Not Recommended
	CCMW09T304T00815ME	T00815	ME		2	
	CCMW09T304S01225MES	S01225	MES		2	
	CCMW09T304T00815SE	T00815	SE		1	

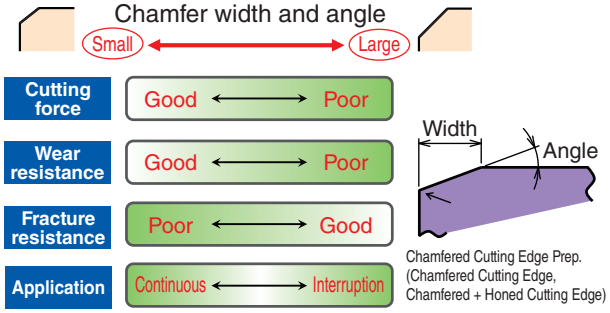
● About re-grinding
1) Regrinding is possible for inserts without any indication in manufacturer's option. Regrinding can not be available depending on the edge condition.
2) Regrinding is not recommended for inserts with manufacturer's symbol like "ME" or "SE"

Note 1) Ref. to Page **B3** for insert color.

● Edge Preparation Identification System

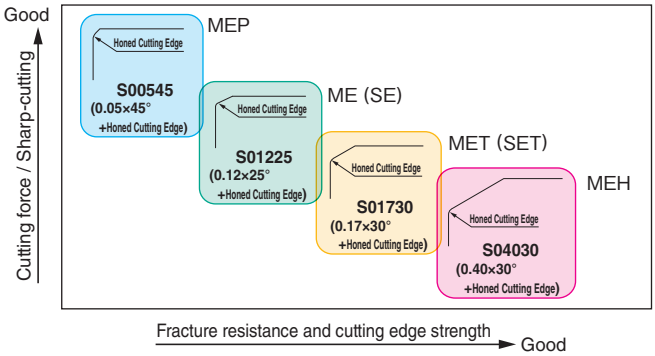
Edge Prep.				
Symbol	Cutting Edge Spec.	Example		Shape
F	Sharp Edge	F	Sharp Edge	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge	Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm×15° Chamfered Cutting Edge	0.12, 15°
S	Chamfered and Honed Cutting Edge	S01225	0.12mm×25° Chamfered and Honed Cutting Edge	0.12, 25°, Honed

● Features of chamfer width and angle

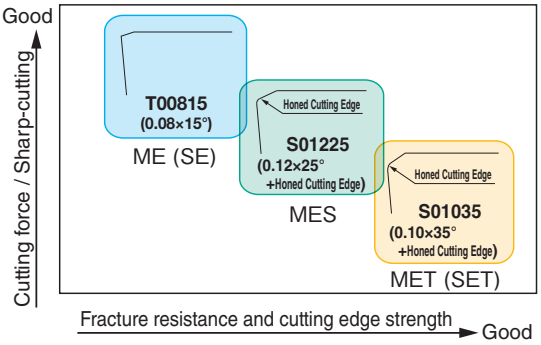


Chamfered Cutting Edge Prep. (Chamfered Cutting Edge, Chamfered + Honed Cutting Edge)

(1) Standard cutting edge prep. of negative inserts (Machining of hard materials)



(2) Standard cutting edge prep. of positive inserts (Machining of hard materials)



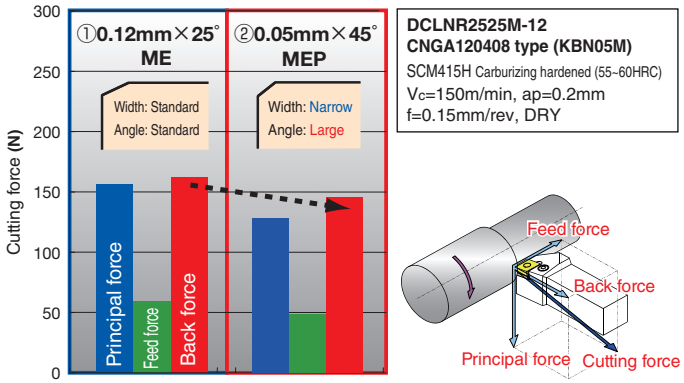
Manufacture's Option	Edge Prep.		Application and Features
MEP	S00545	0.05mm×45°+Honed Cutting Edge	High speed, Continuous Excellent crater wear resistance
ME	S01225	0.12mm×25°+Honed Cutting Edge	General purpose
MET	S01730	0.17mm×30°+Honed Cutting Edge	Superior fracture resistance
MEH	S04030	0.40mm×30°+Honed Cutting Edge	Interrupted high feed machining Prevention of flaking

Manufacture's Option	Edge Prep.		Application and Features
ME	T00815	0.08mm×15°	Chamfered Sharp-cutting oriented, less burring
MES	S01225	0.12mm×25°+Honed Cutting Edge	General purpose
MET	S01035	0.10mm×35°+Honed Cutting Edge	Interrupted machining Stable machining Oriented

■ Negative Inserts, Features of new edge prep. (Machining of hard materials)

(1) MEP（High speed / Continuous）

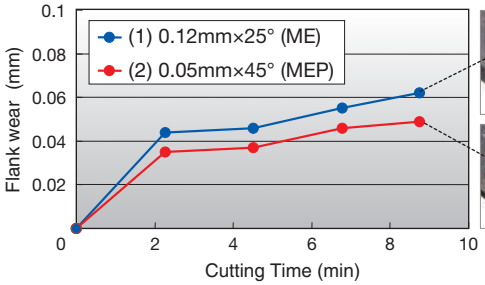
● **Cutting force comparison**



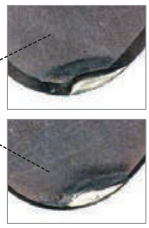
DCLNR2525M-12
CNGA120408 type (KBN05M)
SCM415H Carburizing hardened (55~60HRC)
Vc=150m/min, ap=0.2mm
f=0.15mm/rev, DRY

● **Wear comparison**

SCM415H Carburizing hardened (55~60HRC)
Vc=150m/min, ap=0.2mm
f=0.15mm/rev, DRY



Rake face

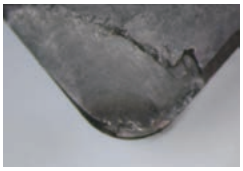


MEP performs lower cutting force than ME
⇒Sharp cutting!

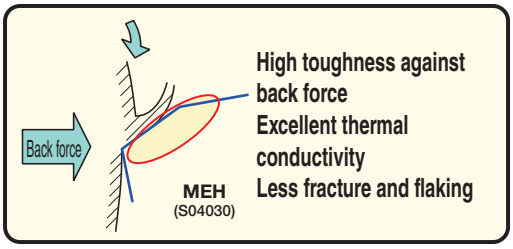
"MEP prevents the Flank wear, compared to ME
⇒Prevents crater wear!

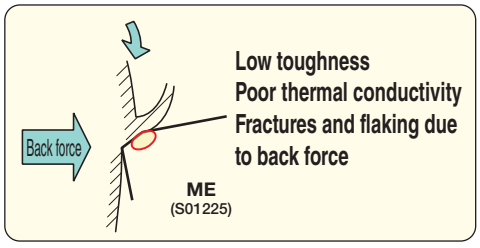
(2) MEH (Interruption / High feed machining)

● **Toughness and Prevention of flaking**

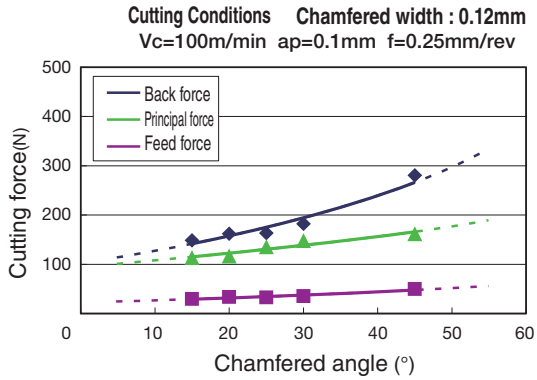


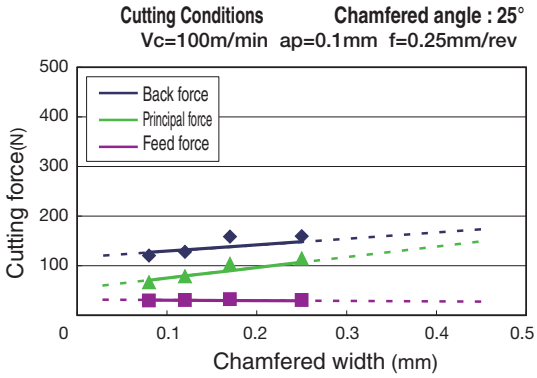
Prevention of flaking





● **Cutting force and chamfered angle / width**

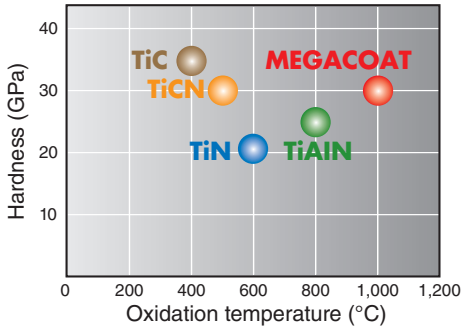




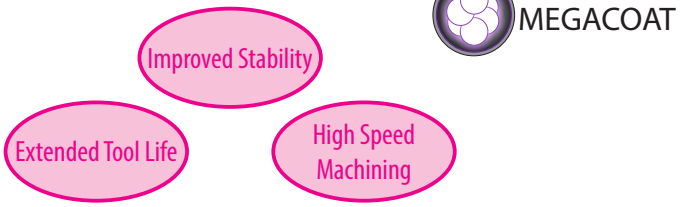
Cutting force is influenced by chamfered angle more than chamfered width.
Though enlarging chamfered angle is more effective for fracture resistance improvement than changing chamfered width, the cutting force increases as well. Please refer to the graph for details.

■ MEGACOAT CBN

● **Properties of PVD Coating**



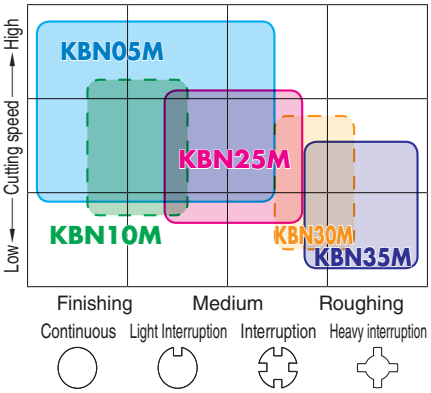
● **Advantages of MEGACOAT**



- Long tool life and stable machining due to superior heat-resistance and hardness
- Stability improvement through prevention of crater wear (oxidation, diffusional wear)
- High thermal stability and surface smoothness provide excellent surface finish

Application Map

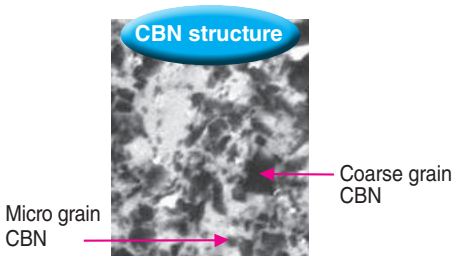
Hard materials



Hybrid Grain Structure (KBN05M)

Mixed structure of micro grain CBN and coarse grain CBN

CBN that possess High hardness, toughness and thermal resistance characteristics

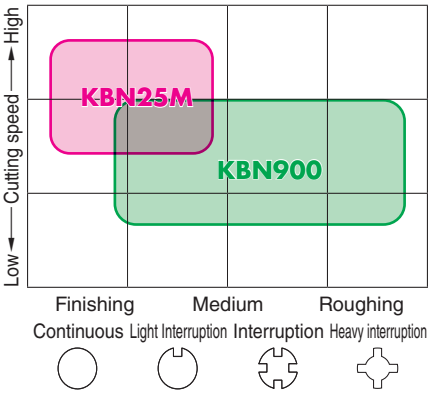


Heat diffusion is promoted by coarse grain CBN
⇒ **High thermal conductivity**

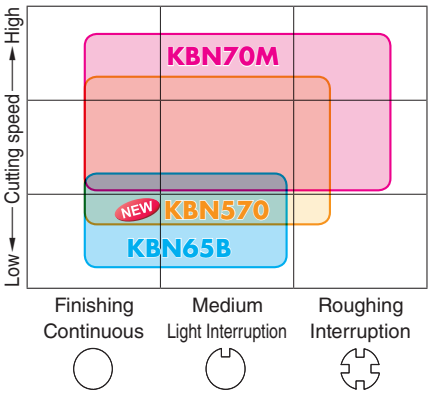
KBN05M is 1st recommended grade for a wide range of application from continuous (high speed finishing) to interrupted machining.

KBN25M : High stability for general machining
KBN30M : High stability in interrupted machining
KBN35M : Honeycomb structure CBN
Superior fracture resistance in heavy interrupted machining

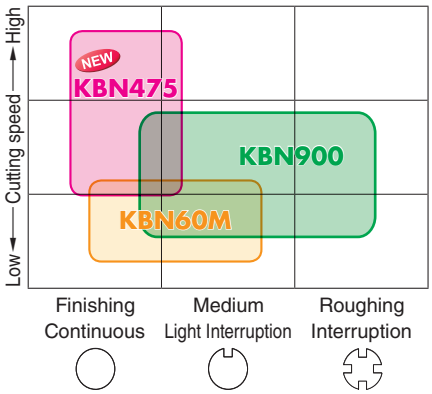
Roll Materials (Chilled Cast Iron)



Sintered Steel



Cast Iron



Recommended Cutting Conditions

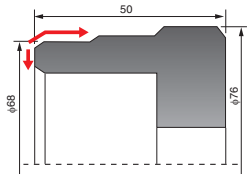
Workpiece Material	Hardness	Applications		Recommended Insert Grade	Cutting Conditions		
					Vc (m/min)	ap (mm)	f (mm/rev)
Heat Treated Steel	Over 55HRC	General Finishing	Continuous~Interruption	KBN05M	100 - **150** - 200	0.05 - **0.3** - 0.5	0.05 - **0.08** - 0.1
		High Efficient Stable Machining	Light Interruption~Interruption	KBN25M	80 - **120** - 160	0.05 - **0.3** - 0.5	0.05 - **0.08** - 0.1
		Interruption (Small ap)	Interruption~Heavy interruption	KBN35M	60 - **100** - 150	0.05 - **0.2** - 0.4	0.05 - **0.08** - 0.1
		Heavy Machining	Continuous~Interruption	KBN900	70 - **90** - 110	0.5 - **1.0** - 2.0	0.05 - **0.1** - 0.2
	Under 55HRC	Finishing	Continuous	*PT600M	60 - **80** - 120	0.2 - **0.5** - 0.7	0.05 - **0.1** - 0.15
Gray Cast Iron	Under 250HB	Finishing	Continuous~Light interruption	KBN475	400 - **800** - 1,200	0.05 - **0.2** - 0.5	0.1 - **0.2** - 0.3
		Finishing	Continuous~Light interruption	KBN60M	300 - **500** - 700	0.05 - **0.2** - 0.5	0.1 - **0.2** - 0.3
		High Efficient Finishing	Continuous~Light interruption	KBN900	500 - **900** - 1,200	0.1 - **0.5** - 1.0	0.05 - **0.1** - 0.2
		Heavy Machining	Continuous~Interruption	KBN900	500 - **700** - 900	0.5 - **1.5** - 3.0	0.1 - **0.3** - 0.5
Roll Materials (Chilled Cast Iron)	Over 55HRC	Finishing	Continuous~Interruption	KBN25M	80 - **120** - 160	0.05 - **0.3** - 0.5	0.05 - **0.08** - 0.1
		Heavy Machining	Continuous~Interruption	KBN900	70 - **90** - 110	0.3 - **0.7** - 1.0	0.05 - **0.1** - 0.15
Sintered Steel	-	Finishing	Continuous~Light interruption	KBN570	50 - **150** - 250	0.05 - **0.15** - 0.25	0.03 - **0.1** - 0.2
	-	Finishing	Continuous~Interruption	KBN70M	100 - **200** - 250	0.05 - **0.2** - 0.3	0.05 - **0.15** - 0.25

*PT600M : MEGACOAT on Al_2O_3+TiC ceramic

Case Studies

SCr420H(58HRC)

- Gear
- External , Facing and Chamfering
- Vc=130m/min
- ap=0.6mm
- f=0.12mm/rev
- Wet
- CNGA120408S01225ME (KBN05M)



KBN05M	300 pcs/edge
Competitor C	200 pcs/edge

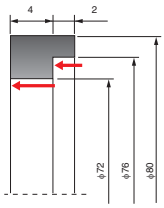
- KBN05M achieved 1.5 times longer tool life than competitor C.

⇒Its longer tool life contributes to cost-cutting.

(Evaluation by the user)

SCM415(55HRC)

- Stator
- Boring
- Vc=170m/min
- ap=0.4mm
- f=0.1mm/rev
- Wet
- CNGA120408S01225ME (KBN05M)



KBN05M	600 pcs/edge
Competitor D	300 pcs/edge

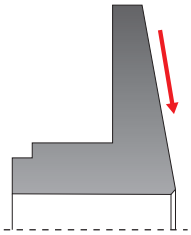
- KBN05M achieved twise longer tool life than competitor D.

⇒Its longer tool life contributes to cost-cutting.

(Evaluation by the user)

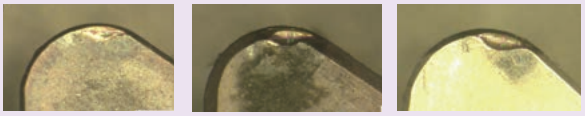
SCr420H(58HRC)

- Pulley
- Facing (Continuous)
- Vc=120m/min
- ap=0.15~0.2mm
- f=0.24mm/rev
- Wet
- DNGA120408S00545MEP (KBN05M)



KBN05M-MEP (Edge Prep.:0.05×45°)	150 pcs/edge
KBN05M-ME (Edge Prep.:0.12×25°)	100 pcs/edge
Competitor E	100 pcs/edge

- Tool life of KBN05M-ME type (Edge prep.: 0.12×25° Chamfered + R honed) is same as competitor E's.
- KBN05M-MEP (Edge prep.: 0.05×45° Chamfered + R honed) type achieved 1.5 times longer tool life, preventing crater wear.

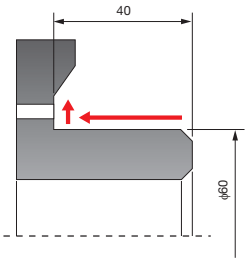


KBN05M-MEP　KBN05M-ME　Competitor E

(Evaluation by the user)

SCr20(61~65HRC)

- Gear
- External and Facing (Interrupted)
- Vc=120m/min
- ap=0.15mm
- f=0.1~0.15mm/rev (External)
- Wet
- CNGA120408S04030MEH (KBN05M)



KBN05M-MEH (Edge Prep.:0.40×30°)	150 pcs/edge
Competitor F	100 pcs/edge

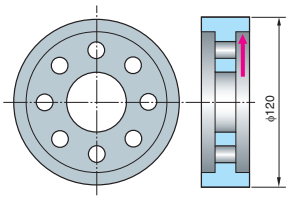
- Compared to competitor F, KBN05M-MEH type (Edge prep.: 0.40×30° Chamfered + R honed) achieved 1.5 times longer tool life.
- No chipping in interrupted machining, and improved productivity (Competitor F's cutting edge got many chipping.)
- Feed rate could be increased from 0.15 to 0.25 mm/rev in facing.

⇒Achieved cycle time and cost reduction.

(Evaluation by the user)

SCM420(60HRC)

- Gear
- Facing (Interrupted)
- Vc=90m/min
- ap=0.5mm
- f=0.12mm/rev
- Wet ⇒ Dry
- CNGA120412S01225ME (KBN25M)



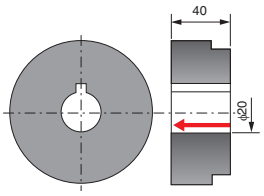
KBN25M	70 pcs/edge
Competitor G	30 pcs/edge (Unstable)

KBN25M improved tool life up to 70 pieces/edge than is two times more than competitor's G (CBN tool). Also, KBN25M has increased its tool life up to 250 pieces/edge by hanging from wet machining to dry machining.

(Evaluation by the user)

SCM420(58HRC)

- Sleeve
- Boring (Heavy interruption)
- Vc=100m/min
- ap=0.5mm
- f=0.1mm/rev
- Wet
- TPGB110308S01035MET (KBN35M)



KBN35M	115 pcs/edge
Competitor H	100 pcs/edge

- KBN35M achieved 15% Longer tool life in heavy interrupted machining compared with competitor H.
- Furthermore it still keeps the insert in a good condition and so provides stable machining result.

⇒Its longer tool life and capability of providing stable result can contribute to cost-cutting and improved efficiency in machining.

(Evaluation by the user)

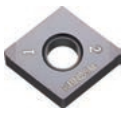
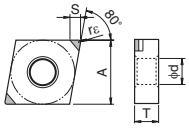
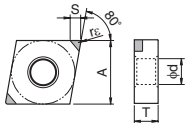
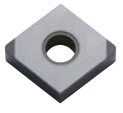
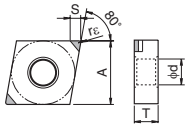
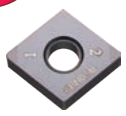
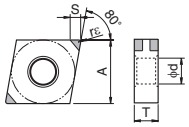
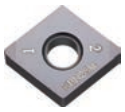
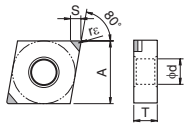
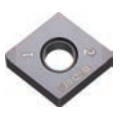
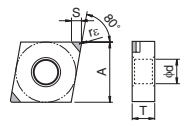
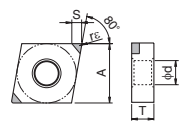
(mm)

Description	A	T	φd
CNGA 1204_ CNGM 1204_	12.70	4.76	5.16

80° Rhombic / Negative

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		MEGACOAT CBN								CBN					
		KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570	
K	Gray Cast Iron (With Scale)														
K	Gray Cast Iron (Without Scale)						●					●			
K	Nodular Cast Iron (With Scale)														
H	Hard Materials (Roughing)				◎	✱									
H	Hard Materials (Finishing)	●	○	◕						○	◔				
H	Hard Materials (Chip Control)		●	◕											
	Sintered Steel							◔	✱					◕	

Insert	Description		Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
 Multi Edge / With Wiper Edge		CNGA 120404S01215MEW		S01215	0.4	2.6	2	●	○	●	□	●				●	●				D8 F63 F67 F68
		CNGA 120408S01215MEW			0.8	2.5		●	○	●	○	●				●	●				
		CNGA 120412S01215MEW			1.2	2.5		●	○	●	□	●				□	●				
NEW Multi Edge / Finishing		CNGA 120404S00545MEP		S00545	0.4	2.6	2	●													
		CNGA 120408S00545MEP			0.8	2.6		●													
		CNGA 120412S00545MEP			1.2	2.5		●													
		CNGA 120416S00545MEP			1.6	3.4		●													
		CNGA 120420S00545MEP			2.0	3.4		●													
		CNGA 120424S00545MEP			2.4	3.3		●													
NEW  Multi Edge / Sharp Edge		CNGA 120404MEF		F	0.4	2.6	2										●		●		
		CNGA 120408MEF			0.8	2.6											●		●		
		CNGA 120412MEF			1.2	2.5											●		●		
NEW  Multi Edge (Double-sided)		CNGA 120404ME4		S01225	0.4	2.6	4	●													
		CNGA 120408ME4			0.8	2.6		●													
		CNGA 120412ME4			1.2	2.5		●													
 Multi Edge		CNGA 120402S01225ME		S01225	0.2	2.6	2	●	○	●		●	●			●	●				
		CNGA 120404S01225ME			0.4	2.6		●	○	●	○	●	●			●	●	●			
		CNGA 120408S01225ME			0.8	2.6		●	○	●	○	●	●			●	●	●			
		CNGA 120412S01225ME			1.2	2.5		●	○	●	○	●	●			□	●	●			
	NEW	CNGA 120416S01225ME			1.6	3.4		●													
	NEW	CNGA 120420S01225ME			2.0	3.4		●													
	NEW	CNGA 120424S01225ME			2.4	3.3		●													
		CNGA 120404T01215ME		T01215	0.4	2.6	2							●	●			●			
		CNGA 120408T01215ME			0.8	2.6								●	●			●			
		CNGA 120412T01215ME			1.2	2.5								●	●			●			
 Multi Edge / Tough		CNGA 120404S01730MET		S01730	0.4	2.6	2	●	○	●	○	●					●				
		CNGA 120408S01730MET			0.8	2.6		●	○	●	○	●					●				
		CNGA 120412S01730MET			1.2	2.5		●	□	●	□	●					●				
	NEW	CNGA 120416S01730MET			1.6	3.4		●													
		CNGA 120420S01730MET			2.0	3.4		●													
		CNGA 120424S01730MET			2.4	3.3		●													
NEW Multi Edge / Interruption		CNGA 120404S04030MEH		S04030	0.4	2.6	2	●													
		CNGA 120408S04030MEH			0.8	2.6		●													
		CNGA 120412S04030MEH			1.2	2.5		●													
		CNGA 120416S04030MEH			1.6	3.4		●													
		CNGA 120420S04030MEH			2.0	3.4		●													
		CNGA 120424S04030MEH			2.4	3.3		●													

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

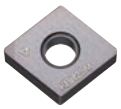
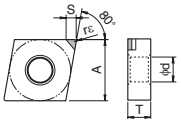
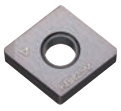
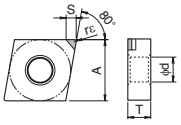
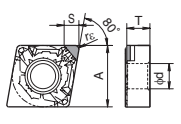
(mm)

Description	A	T	φd
CNGA 1204_	12.70	4.76	5.16
CNGM 1204_			

80° Rhombic / Negative

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Ref. to Page for Applicable Toolholders
K	Gray Cast Iron (With Scale)	
	Gray Cast Iron (Without Scale)	
	Nodular Cast Iron (With Scale)	
H	Hard Materials (Roughing)	
	Hard Materials (Finishing)	
	Hard Materials (Chip Control)	
	Sintered Steel	

Insert		Description		Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
 Small Edge		CNGA	120402S01225SE	S01225	0.2	2.6	1		○	●							●				
			120404S01225SE		0.4	2.6			○	●						●	●				
			120408S01225SE		0.8	2.6			○	●						●	●				
			120412S01225SE		1.2	2.5			□	●											
		CNGA	120404T01215SE	T01215	0.4	2.6	1												○		
			120408T01215SE		0.8	2.6													○		
			120412T01215SE		1.2	2.5													○		
 Small Edge / Tough		CNGA	120404S01730SET	S01730	0.4	2.6	1			●							●				D8 F63 F67 F68
			120408S01730SET		0.8	2.6				●							●				
Chip Control		CNGM	120404S00825BB1	S00825	0.4	1.8	1			●											
			120408S00825BB1		0.8	2.0				●											
			120412S00825BB1		1.2	2.2				●											
		CNGM	120404S01225BB2	S01225	0.4	2.2	1			●											
			120408S01225BB2		0.8	2.4				●											
			120412S01225BB2		1.2	2.6				●											
		CNGM	120404S01625BB3	S01625	0.4	2.6	1		□	●											
			120408S01625BB3		0.8	2.8			□	●											
			120412S01625BB3		1.2	3.0				●											

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

How to read pages of "Turning Inserts" B13

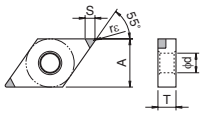
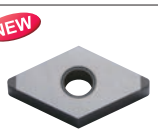
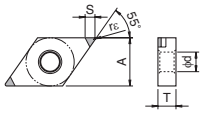
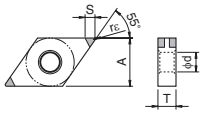
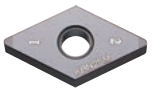
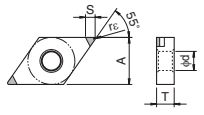
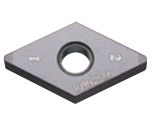
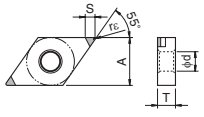
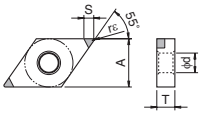
(mm)

55° Rhombic / Negative

Description		A	T	φd
DNGA	1504_	12.70	4.76	5.16
	1506_		6.35	
DNGM	1504_	12.70	4.76	5.16

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Workpiece Material
K	Gray Cast Iron (With Scale)	
	Gray Cast Iron (Without Scale)	●
	Nodular Cast Iron (With Scale)	
H	Hard Materials (Roughing)	✠
	Hard Materials (Finishing)	● ○ ◕
	Hard Materials (Chip Control)	● ◕
	Sintered Steel	◔ ✠ ◕

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW Multi Edge / Finishing		DNGA 150404S00545MEP	S00545	0.4	2.6	2	●												
		DNGA 150408S00545MEP		0.8	2.2		●												
		DNGA 150412S00545MEP		1.2	1.9		●												
		DNGA 150416S00545MEP		1.6	3.8		●												
		DNGA 150420S00545MEP		2.0	3.5		●												
		DNGA 150424S00545MEP		2.4	3.1		●												
NEW  Multi Edge / Sharp Edge		DNGA 150404MEF	F	0.4	2.6	2										●		●	
		DNGA 150408MEF		0.8	2.2											●		●	
		DNGA 150412MEF		1.2	1.9											●			
NEW Multi Edge (Double-sided)		DNGA 150404ME4	S01225	0.4	2.6	4	●												D10
		DNGA 150408ME4		0.8	2.2		●												D11
		DNGA 150412ME4		1.2	1.9		●												F64
																			F70
																			F71
 Multi Edge		DNGA 150401S01225ME	S01225	0.1	2.8	2	●	□	●										
		DNGA 150402S01225ME		0.2	2.7		●	○	●			●			●	●			
		DNGA 150404S01225ME		0.4	2.6		●	○	●	□	●	●			●	●	●		
		DNGA 150408S01225ME		0.8	2.2		●	○	●	○	●	●			●	●	●		
		DNGA 150412S01225ME		1.2	1.9		●	□	●	□	●						●		
		NEW DNGA 150416S01225ME		1.6	3.8		●												
		DNGA 150420S01225ME		2.0	3.5		●												
		DNGA 150424S01225ME		2.4	3.1		●												
		DNGA 150404T01215ME	T01215	0.4	2.6	2						●	●			●			
		DNGA 150408T01215ME		0.8	2.2							□	●			●			
		DNGA 150412T01215ME		1.2	1.9								●			●			
		DNGA 150604S01225ME	S01225	0.4	2.6	2	●	○	●	□	●				●				
		DNGA 150608S01225ME		0.8	2.2		●	○	●	□	●	●			●				D10
		DNGA 150612S01225ME		1.2	1.9		●		□	□	●	●							D11
		DNGA 150604T01215ME	T01215	0.4	2.6	2							●						F64
		DNGA 150608T01215ME		0.8	2.2							●	●						
 Multi Edge / Tough		DNGA 150404S01730MET	S01730	0.4	2.6	2	●	○	●	○	●				●				D10
		DNGA 150408S01730MET		0.8	2.2		●	○	●	○	●				●				D11
		DNGA 150412S01730MET		1.2	1.9		●	□	●	□	●				●				F64
		NEW DNGA 150416S01730MET		1.6	3.8		●												F70
		DNGA 150420S01730MET		2.0	3.5		●												F71
		DNGA 150424S01730MET		2.4	3.1		●												
		DNGA 150604S01730MET	S01730	0.4	2.6	2	●	○	●	□	●				□				D10
		DNGA 150608S01730MET		0.8	1.9		●	○	●	□	●				●				D11
		DNGA 150612S01730MET		1.2	1.9		●	□	□	□	●								F64
NEW Multi Edge / Interruption		DNGA 150404S04030MEH	S04030	0.4	2.6	2	●												D10
		DNGA 150408S04030MEH		0.8	2.2		●												D11
		DNGA 150412S04030MEH		1.2	1.9		●												F64
		DNGA 150416S04030MEH		1.6	3.8		●												F70
		DNGA 150420S04030MEH		2.0	3.5		●												F71
		DNGA 150424S04030MEH		2.4	3.1		●												

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

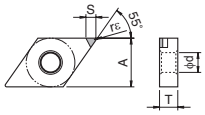
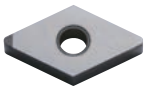
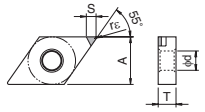
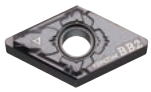
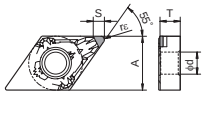
(mm)

55° Rhombic / Negative

Description		A	T	φd
DNGA	1504_	12.70	4.76	5.16
	1506_		6.35	
DNGM	1504_	12.70	4.76	5.16

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Ref. to Page for Applicable Toolholders
K	Gray Cast Iron (With Scale)	
	Gray Cast Iron (Without Scale)	
	Nodular Cast Iron (With Scale)	
H	Hard Materials (Roughing)	
	Hard Materials (Finishing)	
	Hard Materials (Chip Control)	
	Sintered Steel	

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
 Small Edge	DNGA 150401S01225SE		0.1	2.2				●											
	DNGA 150402S01225SE		0.2	2.5				●						●	●				D10
	DNGA 150404S01225SE	S01225	0.4	2.3	1		□	●						●	●				D11
	DNGA 150408S01225SE		0.8	1.9			□	●							●				F64
	DNGA 150412S01225SE		1.2	1.9				□											F70
	DNGA 150404T01215SE	T01215	0.4	2.3	1												○		F71
	DNGA 150408T01215SE		0.8	1.9													○		
	DNGA 150604S01225SE		0.4	2.3			□	●											D10
	DNGA 150608S01225SE	S01225	0.8	1.9	1		□	□						□					D11
	DNGA 150612S01225SE		1.2	1.9				□											F64
  Small Edge / Tough	DNGA 150404S01730SET	S01730	0.4	2.3	1										□				
	DNGA 150408S01730SET		0.8	1.9											□				
  Chip Control	DNGM 150404S00825BB1		0.4	1.6			□	●											D10
	DNGM 150408S00825BB1	S00825	0.8	1.6	1		□	●											D11
	DNGM 150412S00825BB1		1.2	1.8				●											F64
	DNGM 150404S01225BB2		0.4	1.8				●											F70
	DNGM 150408S01225BB2	S01225	0.8	2.0	1		○	●											F71
	DNGM 150412S01225BB2		1.2	2.1				●											
	DNGM 150404S01625BB3		0.4	2.2			○	●											
	DNGM 150408S01625BB3	S01625	0.8	2.5	1		○	●											
	DNGM 150412S01625BB3		1.2	2.5				●											

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

How to read pages of "Turning Inserts" B13

(mm)

Description	A	T	φd
SNGA 1204_	12.70	4.76	5.16
TNGA 1604_	9.525	4.76	3.81

90° Square · 60° Triangle / Negative

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Gray Cast Iron (With Scale)	Gray Cast Iron (Without Scale)	Nodular Cast Iron (With Scale)	Hard Materials (Roughing)	Hard Materials (Finishing)	Hard Materials (Chip Control)	Sintered Steel
K	Gray Cast Iron (With Scale)							
	Gray Cast Iron (Without Scale)		●					
	Nodular Cast Iron (With Scale)							
H	Hard Materials (Roughing)				✠	✠		
	Hard Materials (Finishing)	●	○	◕				○
	Hard Materials (Chip Control)		●	◕				
	Sintered Steel						◔	✠

Insert		Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW	Multi Edge / Finishing	SNGA 120408S00545MEP	S00545	0.8	1.8	2	●													
		SNGA 120412S00545MEP		1.2	2.2		●													
NEW	Multi Edge / Sharp Edge	SNGA 120408MEF	F	0.8	1.8	2											●			
		SNGA 120412MEF		1.2	2.2												●			
	Multi Edge	SNGA 120404S01225ME	S01225	0.4	1.8	2	●	○	●						□	□				D12 D13 F73
		SNGA 120408S01225ME		0.8	1.8		●	○	●	□	●	●			□	●	●			
		SNGA 120412S01225ME		1.2	1.8												●			
		SNGA 120404T01215ME	T01215	0.4	1.8	2								●						
		SNGA 120408T01215ME		0.8	1.8								□	●			●			
		SNGA 120412T01215ME		1.2	1.8									●			●			
	Multi Edge / Tough	SNGA 120404S01730MET	S01730	0.4	1.8	2	●		●											
		SNGA 120408S01730MET		0.8	1.8		●		●	□	●					●				
		SNGA 120412S01730MET		1.2	2.2		●		●	□	●					●				
NEW	Multi Edge / Interruption	SNGA 120408S04030MEH	S04030	0.8	1.8	2	●													
		SNGA 120412S04030MEH		1.2	2.2		●													
NEW	Multi Edge / Finishing	TNGA 160404S00545MEP	S00545	0.4	2.7	3	●													
		TNGA 160408S00545MEP		0.8	2.4		●													
		TNGA 160412S00545MEP		1.2	2.1		●													
NEW	Multi Edge / Sharp Edge	TNGA 160404MEF	F	0.4	2.7	3											●		●	D14 D15 F64 F74 F75
		TNGA 160408MEF		0.8	2.4												●		●	
		TNGA 160412MEF		1.2	2.1												●		●	
NEW	Multi Edge (Double-sided)	TNGA 160404ME6	S01225	0.4	2.7	6	●													
		TNGA 160408ME6		0.8	2.4		●													
		TNGA 160412ME6		1.2	2.1		●													

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

(mm)

60° Triangle / Negative

Description	A	T	φd
TNGA 1604_	9.525	4.76	3.81
TNGM 1604_			

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Ref. to Page for Applicable Toolholders
K	Gray Cast Iron (With Scale)	
	Gray Cast Iron (Without Scale)	
	Nodular Cast Iron (With Scale)	
H	Hard Materials (Roughing)	
	Hard Materials (Finishing)	
	Hard Materials (Chip Control)	
	Sintered Steel	

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
Multi Edge	TNGA 160401S01225ME	S01225	0.1	2.9	3	●	○	●											
	160402S01225ME		0.2	2.8		●	○	●		●	●			●	●				
	160404S01225ME		0.4	2.7		●	○	●	○	●	●			●	●	●			
	160408S01225ME		0.8	2.4		●	○	●	□	●	●			●	●	●			
	160412S01225ME		1.2	2.1		●	□	●	□	●	●			●	●	●			
	TNGA 160404T01215ME	T01215	0.4	2.7	3							●	●			●			
	160408T01215ME		0.8	2.4								●	●			●			
	160412T01215ME		1.2	2.1								●	●			●			
Multi Edge / Tough	TNGA 160404S01730MET	S01730	0.4	2.7	3	●	○	●	○	●					●				
	160408S01730MET		0.8	2.4		●	○	●	○	●					●				
	160412S01730MET		1.2	2.1		●		●	□	●					●				
NEW Multi Edge / Interruption	TNGA 160404S04030MEH	S04030	0.4	2.7	3	●													D14
	160408S04030MEH		0.8	2.4		●													D15
	160412S04030MEH		1.2	2.1		●													F64
Small Edge	TNGA 160401S01225SE	S01225	0.1	2.6	1			●							●				F74
	160402S01225SE		0.2	2.9			○	●						●	●				F75
	160404S01225SE		0.4	2.7			○	●						●	●				
	160408S01225SE		0.8	2.4			○	●						●	●				
	TNGA 160404T01215SE	T01215	0.4	2.7	1												○		
	160408T01215SE		0.8	2.4													○		
	160412T01215SE		1.2	2.2													○		
Small Edge / Tough	TNGA 160404S01730SET	S01730	0.4	2.7	1			●							●				
	160408S01730SET		0.8	2.4				●							●				
Chip Control	TNGM 160404S00825BB1	S00825	0.4	1.5	1		□	●											
	160408S00825BB1		0.8	1.7			□	●											
	160412S00825BB1		1.2	1.9				●											
	TNGM 160404S01225BB2	S01225	0.4	1.9	1			●											
	160408S01225BB2		0.8	2.1				●											
	160412S01225BB2		1.2	2.2				●											
	TNGM 160404S01625BB3	S01625	0.4	2.2	1		□	●											
	160408S01625BB3		0.8	2.4				●											
	160412S01625BB3		1.2	2.6				●											

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

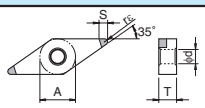
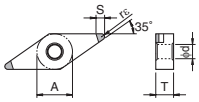
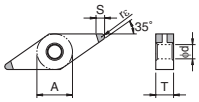
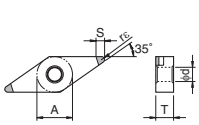
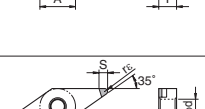
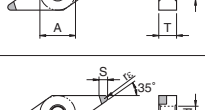
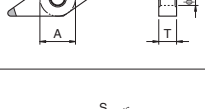
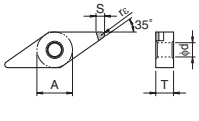
35° Rhombic / Negative

(mm)

Description	A	T	φd
VNGA 1604_	9.525	4.76	3.81

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570
K	Gray Cast Iron (With Scale)													
	Gray Cast Iron (Without Scale)						●					●		
	Nodular Cast Iron (With Scale)													
H	Hard Materials (Roughing)				✠	✠								
	Hard Materials (Finishing)	●	○	●						○	◔			
	Hard Materials (Chip Control)													
	Sintered Steel							◔	✠					●

Insert		Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW Multi Edge / Finishing		VNGA 160404S00545MEP	S00545	0.4	2.0	2	●													D16 D17 D18
		VNGA 160408S00545MEP		0.8	1.8		●													
NEW Multi Edge / Sharp Edge		VNGA 160404MEF	F	0.4	2.0	2											●		●	
		VNGA 160408MEF		0.8	1.8												●		●	
NEW Multi Edge (Double-sided)		VNGA 160404ME4	S01225	0.4	2.0	4	●													
		VNGA 160408ME4		0.8	1.8		●													
Multi Edge		VNGA 160401S01225ME	S01225	0.1	2.6	2		○	●											
		VNGA 160402S01225ME		0.2	2.3		●	○	●		●	●			●	●				
		VNGA 160404S01225ME		0.4	2.0		●	○	●	○	●	●			●	●	●			
		VNGA 160408S01225ME		0.8	1.8		●	○	●	○	●	●					●			
		VNGA 160404T01215ME	T01215	0.4	2.0	2							●	●			●			
		VNGA 160408T01215ME		0.8	1.8								●	●			●			
Multi Edge / Tough		VNGA 160404S01730MET	S01730	0.4	2.0	2	●	□	●	○	●					●				
		VNGA 160408S01730MET		0.8	1.8		●	○	●	□	●					●				
NEW Multi Edge / Interruption		VNGA 160404S04030MEH	S04030	0.4	2.0	2	●													
		VNGA 160408S04030MEH		0.8	1.8		●													
Small Edge		VNGA 160401S01225SE	S01225	0.1	2.6	1			●							●				
		VNGA 160402S01225SE		0.2	2.3			○	●						●	●				
		VNGA 160404S01225SE		0.4	1.9			○	●						●	●				
		VNGA 160408S01225SE		0.8	2.7			○	●						●	●				
		VNGA 160404T01215SE	T01215	0.4	1.9	1												○		
		VNGA 160408T01215SE		0.8	2.7													○		
Small Edge / Tough		VNGA 160404S01730SET	S01730	0.4	1.9	1			●							●				
		VNGA 160408S01730SET		0.8	2.7				●							●				

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

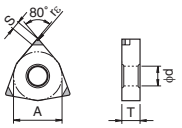
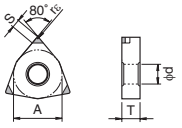
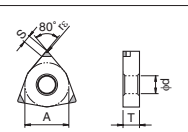
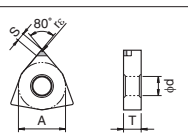
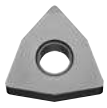
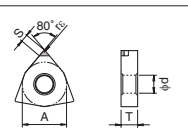
80° Trigon / Negative

(mm)

Description	A	T	φd
WNGA 0804_	12.70	4.76	5.16

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Gray Cast Iron (With Scale)	Gray Cast Iron (Without Scale)	Nodular Cast Iron (With Scale)	Hard Materials (Roughing)	Hard Materials (Finishing)	Hard Materials (Chip Control)	Sintered Steel
K	Gray Cast Iron (With Scale)							
	Gray Cast Iron (Without Scale)		●					
	Nodular Cast Iron (With Scale)							
H	Hard Materials (Roughing)				✠	✠		
	Hard Materials (Finishing)	●	○	●			○	◔
	Hard Materials (Chip Control)							
	Sintered Steel					◔	✠	

Insert		Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
Multi Edge / Sharp Edge		WNGA 080404MEF	F	0.4	2.0	3											●			
		WNGA 080408MEF		0.8	2.6												●			
Multi Edge		WNGA 080404S01225ME	S01225	0.4	2.0	3	●	○	●	□	●	●			●	●	●			
		WNGA 080408S01225ME		0.8	2.6		●	○	●	□	●	●			●	●	●			
		WNGA 080412S01225ME		1.2	2.5		●		●	□	●									
		WNGA 080404T01215ME	T01215	0.4	2.0	3							□	●			●			
		WNGA 080408T01215ME		0.8	2.6								●	●			●			
		WNGA 080412T01215ME		1.2	2.5								●							
Multi Edge / Tough		WNGA 080404S01730MET	S01730	0.4	2.0	3		○	●	□	●									D20 F77 F78
		WNGA 080408S01730MET		0.8	2.6			○	●	□	●									
		WNGA 080412S01730MET		1.2	2.5			□	●	□	●									
Small Edge		WNGA 080404S01225SE	S01225	0.4	2.0	1		○												
		WNGA 080408S01225SE		0.8	1.9			○												
 Small Edge / Tough		WNGA 080404S01730SET	S01730	0.4	2.0	1										●				

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

80° Rhombic / Positive

*Thickness of CC_0301_ and CC_0401_ are different (mm)

Description	A	T	φd	α
CCMW *0301_	3.5	1.4	1.9	7°
*0401_	4.3	1.8	2.3	
0602_	6.35	2.38	2.8	
09T3_	9.525	3.97	4.4	

(mm)

Description	A	T	φd	α
CPGB 0802_	7.94	2.38	3.5	11°
0903_	9.525	3.18	4.5	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Gray Cast Iron (With Scale)	Gray Cast Iron (Without Scale)	Nodular Cast Iron (With Scale)	Hard Materials (Roughing)	Hard Materials (Finishing)	Hard Materials (Chip Control)	Sintered Steel
K	Gray Cast Iron (With Scale)							
	Gray Cast Iron (Without Scale)					●		●
	Nodular Cast Iron (With Scale)							
H	Hard Materials (Roughing)				✠	✠		
	Hard Materials (Finishing)	●	○	◕			○	◔
	Hard Materials (Chip Control)							
	Sintered Steel					◔	✠	◕

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW Multi Edge / Sharp Edge	CCMW 09T304MEF	F	0.4	1.9	2											●		●	Ref. to the table below C15
	CCMW 09T308MEF	F	0.8	1.8	2											●		●	
Multi Edge	CCMW 060202T00815ME	T00815	0.2	2.0		●	○	●		●				●	●				
	CCMW 060204T00815ME	T00815	0.4	1.9	2	●	○	●		●	●			●	●	●			
	CCMW 060208T00815ME	T00815	0.8	1.8		●	○	●		●	●			●		●			
	CCMW 09T302T00815ME	T00815	0.2	2.0		●	○	●		●	●			●	●				
	CCMW 09T304T00815ME	T00815	0.4	1.9	2	●	○	●	□	●	●	●	●	●	●	●			
	CCMW 09T308T00815ME	T00815	0.8	1.8		●	○	●	□	●	●	●	●	●	●	●			
NEW Multi Edge / General Purpose	CCMW 060204S01225MES	S01225	0.4	1.9	2	●													
	CCMW 060208S01225MES	S01225	0.8	1.8		●													
	CCMW 09T304S01225MES	S01225	0.4	1.9	2	●										●			
	CCMW 09T308S01225MES	S01225	0.8	1.8		●										●			
Multi Edge / Tough	CCMW 09T304S01035MET	S01035	0.4	1.9	2	●	○	●		●					●				
	CCMW 09T308S01035MET	S01035	0.8	1.8		●	○	●		●									
Small Edge	*CCMW 030102T00815SE	T00815	0.2	1.4	1		○	●						●	●				F19
	*CCMW 030104T00815SE	T00815	0.4	1.4			○	●						●	●				
	*CCMW 040102T00815SE	T00815	0.2	1.4	1		○	●						●	●				F39
	*CCMW 040104T00815SE	T00815	0.4	1.4			○	●						●	●				
	CCMW 060202T00815SE	T00815	0.2	2.0	1									●	●				Ref. to the table below C15
	CCMW 060204T00815SE	T00815	0.4	1.9				●						●	●				
	CCMW 09T302T00815SE	T00815	0.2	2.0	1		○							●	●				
	CCMW 09T304T00815SE	T00815	0.4	1.9			○							●	●				
Small Edge / Tough	*CCMW 030102S01035SET	S01035	0.2	1.4	1		○	●											F19
	*CCMW 030104S01035SET	S01035	0.4	1.4			○	●							●				
	*CCMW 040102S01035SET	S01035	0.2	1.4	1		○	●											F39
	*CCMW 040104S01035SET	S01035	0.4	1.4			○	●							●				
	CCMW 060204S01035SET	S01035	0.4	1.9	1										●				Ref. to the table below C15
	CCMW 09T304S01035SET	S01035	0.4	1.9	1										●				
Multi Edge	CPGB 080204T00815ME	T00815	0.4	1.9	2	●	○	●		●				●	●	●			
	CPGB 090302T00815ME	T00815	0.2	1.9	2	●	○	●						●	●				
	CPGB 090304T00815ME	T00815	0.4	1.9		●	○	●		●	●			●	●	●			
	CPGB 090308T00815ME	T00815	0.8	2.5												●			
NEW Multi Edge / General Purpose	CPGB 090304S01225MES	S01225	0.4	1.9	2	●													
	CPGB 090308S01225MES	S01225	0.8	2.5		●													
Multi Edge / Tough	CPGB 080204S01035MET	S01035	0.4	1.9	2		○	●		●					●				F41
	CPGB 080208S01035MET	S01035	0.8	2.2				●											
	CPGB 090304S01035MET	S01035	0.4	1.9	2	●	○	●		●					●				
	CPGB 090308S01035MET	S01035	0.8	2.5		●	○	●		●									
Small Edge	CPGB 080202T00815SE	T00815	0.2	1.9	1									●	●				
	CPGB 080204T00815SE	T00815	0.4	1.9										●	●				
	CPGB 090302T00815SE	T00815	0.2	1.9	1									●	●				
	CPGB 090304T00815SE	T00815	0.4	1.9			○							●	●				
Small Edge / Tough	CPGB 080204S01035SET	S01035	0.4	1.9	1			●											
	CPGB 090304S01035SET	S01035	0.4	1.9	1										●				

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

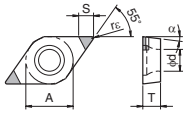
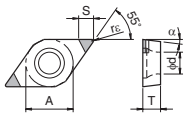
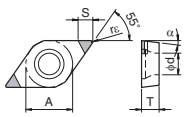
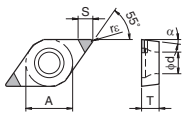
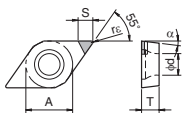
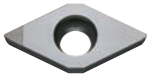
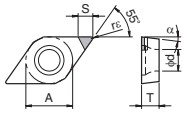
(mm)

55° Rhombic / Positive

Description	A	T	φd	α
DCMW 0702_	6.35	2.38	2.8	7°
11T3_	9.525	3.97	4.4	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Gray Cast Iron (With Scale)	Gray Cast Iron (Without Scale)	Nodular Cast Iron (With Scale)	Hard Materials (Roughing)	Hard Materials (Finishing)	Hard Materials (Chip Control)	Sintered Steel
K			●					○
H					✣	✣		✣
		●		●		○		◔

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW Multi Edge / Sharp Edge		DCMW 11T304MEF	F	0.4	1.7	2			●							●		●	Ref. to the table below
		DCMW 11T308MEF		0.8	1.9				●							●		●	
Multi Edge		DCMW 070202T00815ME	T00815	0.2	1.9	2	●	○	●		●	●			●	●	●		
		DCMW 070204T00815ME		0.4	1.7		●	○	●		●	●			●	●	●		
		DCMW 070208T00815ME		0.8	1.9		●	□	●		●					●			
		DCMW 11T302T00815ME		0.2	1.9		●	○	●		●	●			●	●			
		DCMW 11T304T00815ME		0.4	1.7		●	○	●	□	●	●	●	●	●	●	●		
		DCMW 11T308T00815ME		0.8	1.9		●	○	●	□	●	●	□	●	●	●	●		
		DCMW 11T312T00815ME		1.2	1.9		●		●	□	●				□				
NEW Multi Edge / General Purpose		DCMW 11T302S01225MES	S01225	0.2	1.9	2	●												
		DCMW 11T304S01225MES		0.4	1.7		●									●			
		DCMW 11T308S01225MES		0.8	1.9		●									●			
Multi Edge / Tough		DCMW 070202S01035MET	S01035	0.2	1.9	2		○	●		●								
		DCMW 070204S01035MET		0.4	1.7			○	●		●								
		DCMW 070208S01035MET		0.8	1.9				●		●								
		DCMW 11T302S01035MET		0.2	1.9		●	○	●		●								
		DCMW 11T304S01035MET		0.4	1.7		●	○	●		●								
		DCMW 11T308S01035MET		0.8	1.9			○	●		●								
		DCMW 11T312S01035MET		1.2	1.9			○	□		●								
Small Edge		DCMW 070202T00815SE	T00815	0.2	1.9	1		□	●					●	●				
		DCMW 070204T00815SE		0.4	1.7			○	●					●	●				
		DCMW 11T302T00815SE	T00815	0.2	1.9	1								●	●				
		DCMW 11T304T00815SE		0.4	1.7									●	●				
		DCMW 11T308T00815SE		0.8	1.9				●						●				
 Small Edge / Tough		DCMW 070204S01035SET	S01035	0.4	1.7	1									●				
		DCMW 11T302S01035SET	S01035	0.2	1.9	1									●				
		DCMW 11T304S01035SET		0.4	1.7										●				
		DCMW 11T308S01035SET		0.8	1.9										●				

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	**E24~E27,E35,F43~F45**
DC..11 type	**E20,E24~E27,E35,F43~F45,F65**

● CC type / TP type

Insert Description	Ref. to Page for Applicable Toolholders
CC..0602 type	**E22,E23,E34,F39**
CC..09T3 type	**E22,E23,E34,F39,F65**

Insert Description	Ref. to Page for Applicable Toolholders
TP..0802 type	**E29,F49,F51**
TP..0902 type	**F49,F51**

Insert Description	Ref. to Page for Applicable Toolholders
TP..1103 type	**E29,F49,F50**
TP..1603 type	**F49,F50**

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

How to read pages of "Turning Inserts" B13

60° Triangle / Positive

(mm)

Description	A	T	φd	α
TPGB 0802_	4.76	2.38	2.5	11°
0902_	5.56		3.0	

Description	A	T	φd	α
TPGB 1103_	6.35	3.18	3.5	11°
1603_	9.525		4.5	
TPGW 1604_	9.525	4.76	4.4	11°

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

K	Gray Cast Iron (With Scale)													
	Gray Cast Iron (Without Scale)					●				●				
	Nodular Cast Iron (With Scale)													
H	Hard Materials (Roughing)				✖									
	Hard Materials (Finishing)	●	○	●					○	◔				
	Hard Materials (Chip Control)													
	Sintered Steel													●

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW Multi Edge / Sharp Edge	TPGB 110304MEF	F	0.4	2.1	3											●		●	Ref. to the table below C15
	TPGB 110308MEF		0.8	1.8												●		●	
Multi Edge	TPGB 110302T00815ME	T00815	0.2	2.3	3	●	○	●			●			●	●	●			
	TPGB 110304T00815ME		0.4	2.1		●	○	●		●	●			●	●	●			
	TPGB 110308T00815ME		0.8	1.8		●	○	●		●	●			●	●	●			
	TPGB 160304T00815ME	T00815	0.4	1.8	3	●	○	●		●	●					●			
	TPGB 160308T00815ME		0.8	1.5		●	□	●		●	●					●			
NEW Multi Edge / General Purpose	TPGB 110304S01225MES	S01225	0.4	2.1	3	●										●			
	TPGB 110308S01225MES		0.8	1.8		●										●			
Multi Edge / Tough	TPGB 110302S01035MET	S01035	0.2	2.3	3		○	●		●									
	TPGB 110304S01035MET		0.4	2.1		●	○	●		●									
	TPGB 110308S01035MET		0.8	1.8		●	○	●		●									
	TPGB 160304S01035MET	S01035	0.4	1.8	3		○	●		●					●				
	TPGB 160308S01035MET		0.8	1.5				●							●				
Small Edge	TPGB 080202T00815SE	T00815	0.2	1.8	1		○	●						●	●				
	TPGB 080204T00815SE		0.4	1.6			○	●						●	●				
	TPGB 090202T00815SE	T00815	0.2	1.8	1		○	●						●	●				
	TPGB 090204T00815SE		0.4	1.6			○	●						●	●				
	TPGB 110302T00815SE	T00815	0.2	1.9	1		○							●	●				
	TPGB 110304T00815SE		0.4	1.8			○							●	●				
	TPGB 110308T00815SE		0.8	1.5											●				
	TPGB 160302T00815SE	T00815	0.2	1.9	1		○							●	●				
	TPGB 160304T00815SE		0.4	1.8			○							●	●				
Small Edge / Tough	TPGB 080202S01035SET	S01035	0.2	1.8	1		○	●											
	TPGB 080204S01035SET		0.4	1.6			○	●							●				
	TPGB 090202S01035SET	S01035	0.2	1.8	1		○	●											
	TPGB 090204S01035SET		0.4	1.6			○	●							●				
	TPGB 110304S01035SET	S01035	0.4	1.8	1										●				
	TPGB 110308S01035SET		0.8	1.5											●				
	TPGB 160304S01035SET	S01035	0.4	1.8	1										●				
	TPGB 160308S01035SET		0.8	1.5											●				
Multi Edge	TPGW 160404T00815ME	T00815	0.4	1.8	3		○	●											-
	TPGW 160408T00815ME		0.8	1.5			○	●											
Multi Edge / Tough	TPGW 160404S01035MET	S01035	0.4	1.8	3		□	●							●				
	TPGW 160408S01035MET		0.8	1.5			□	●											
Small Edge	TPGW 160404T00815SE	T00815	0.4	1.8	1										●				
Small Edge / Tough	TPGW 160404S01035SET	S01035	0.4	1.9	1										●				

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

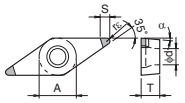
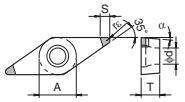
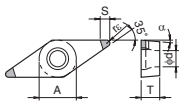
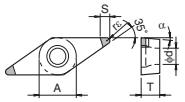
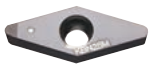
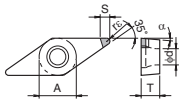
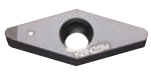
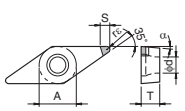
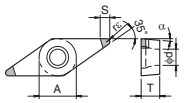
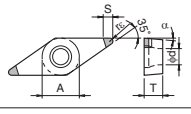
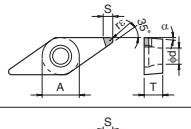
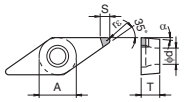
(mm)

35° Rhombic / Positive

Description	A	T	φd	α
VBGW 1103_	6.35	3.18	2.8	5°
1604_	9.525	4.76	4.4	
VCGW 0802_	4.76	2.38	2.3	7°

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

		Gray Cast Iron (With Scale)												
K		Gray Cast Iron (Without Scale)					●				●			
		Nodular Cast Iron (With Scale)												
		Hard Materials (Roughing)				✖								
H		Hard Materials (Finishing)	●	○	●					○	◔			
		Hard Materials (Chip Control)												
		Sintered Steel						◔	✖					●

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	CBN KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW Multi Edge / Sharp Edge		VBGW 110304MEF	F	0.4	2.0	2										●		●	Ref. to the table below
		110308MEF		0.8	1.7											●		●	
		VBGW 160404MEF	F	0.4	2.0	2										●		●	
		160408MEF		0.8	1.7											●		●	
Multi Edge		VBGW 110302T00815ME	T00815	0.2	2.4	2	●	○	●		●	●			●	●	●			
		110304T00815ME		0.4	2.0		●	○	●	□	●	●	●	●	●	●	●			
		110308T00815ME		0.8	1.7		●	□	●	□			●		●	●				
		VBGW 160402T00815ME	T00815	0.2	2.4	2	●	○	●		●				●	●				
		160404T00815ME		0.4	2.0		●	○	●	□	●	●	●	●	●	●	●			
		160408T00815ME		0.8	1.7		●	○	●	□	●	●	●	●	●	●	●			
NEW Multi Edge / General Purpose		VBGW 110304S01225MES	S01225	0.4	2.0	2	●									●				
		110308S01225MES		0.8	1.7											●				
		VBGW 160404S01225MES	S01225	0.4	2.0	2	●									●				
		160408S01225MES		0.8	1.7											●				
Multi Edge / Tough		VBGW 110302S01035MET	S01035	0.2	2.4	2		○	●		●									
		110304S01035MET		0.4	2.0		●	○	●		●				●					
		110308S01035MET		0.8	1.7			○	●		●									
		VBGW 160402S01035MET	S01035	0.2	2.4	2		○	●		●									
		160404S01035MET		0.4	2.0		●	○	●		●				●					
		160408S01035MET		0.8	1.7			○	●		●									
 Small Edge		VBGW 110302T00815SE	T00815	0.2	2.8	1		○	●					●	●					
		110304T00815SE		0.4	2.4			○	●					●	●					
		110308T00815SE		0.8	1.7			○						●						
		VBGW 160402T00815SE	T00815	0.2	2.4	1								●	●					
		160404T00815SE		0.4	2.0			○						●	●					
		160408T00815SE		0.8	1.7									●	●					
 Small Edge / Tough		VBGW 110304S01035SET	S01035	0.4	2.0	1			●						●					
		110308S01035SET		0.8	1.7															
		VBGW 160404S01035SET	S01035	0.4	2.0	1									●					
		160408S01035SET		0.8	1.7										●					
Multi Edge		VCGW 080202T00815ME	T00815	0.2	2.0	2	●	○	●		●			●	●	●			E36 F52 F54 F57	
		080204T00815ME		0.4	2.0		●	○	●		●	●		●	●	●				
		080208T00815ME		0.8	1.7		●					●				●				
Multi Edge / Tough		VCGW 080202S01035MET	S01035	0.2	2.0	2		○	●											
		080204S01035MET		0.4	2.0			○	●											
		080208S01035MET		0.8	1.7				●											
Small Edge		VCGW 080202T00815SE	T00815	0.2	2.4	1		○	●					●	●					
		080204T00815SE		0.4	2.0			○						●	●					
Small Edge / Tough		VCGW 080204S01035SET	S01035	0.4	2.0	1									●					
		080208S01035SET		0.8	1.8										●					

Insert Description	Ref. to Page for Applicable Toolholders
VB..1103 type	E30,E31,E36,F52,F54,F57
VB..1604 type	E30,E31,F52,F54,F57

● : Std. Item (1 pc boxes) ○ : Check Availability □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

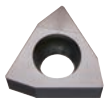
(mm)

80° Trigon / Positive

Description		A	T	φd	α
WBGW	0601_	3.97	1.59	2.3	5°
	0802_	4.76	2.38		

Edge Prep. Symbol	Cutting Edge Spec.	Example		
F	Sharp Edge	F	Sharp Edge	
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge	
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge	
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge	

		MEGACOAT CBN								CBN					
		KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
K	Gray Cast Iron (With Scale)														
K	Gray Cast Iron (Without Scale)														
K	Nodular Cast Iron (With Scale)														
H	Hard Materials (Roughing)														
H	Hard Materials (Finishing)		●	◕						○	◔				
H	Hard Materials (Chip Control)														
	Sintered Steel														

Insert (Left-hand Shown)	*Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
 Small Edge	WBGW 060102T00815L-SE	T00815	0.2	1.9	1		○	●						●	●				F59
	060104T00815L-SE		0.4	1.9			○	●						●	●				
	WBGW 080202T00815L-SE	T00815	0.2	2.3	1		○	●						●	●				
	080204T00815L-SE		0.4	2.3			○	●						●	●				
Small Edge / Tough	WBGW 060102S01035LSET	S01035	0.2	1.9	1		○	●											
	060104S01035LSET		0.4	1.9			○	●							●				
	WBGW 080202S01035LSET	S01035	0.2	2.3	1		○	●											
	080204S01035LSET		0.4	2.3			○	●							●				

*Left-hand (L) Only

(mm)

60° Triangle / Positive without Hole

Description		A	T	φd	α
TBGN	0601_	3.97	1.59	-	5°
TPGN	1103_	6.35	3.18		11°
	1603_	9.525			

Edge Prep. Symbol	Cutting Edge Spec.	Example		
F	Sharp Edge	F	Sharp Edge	
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge	
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge	
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge	

		MEGACOAT CBN								CBN					
		KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
K	Gray Cast Iron (With Scale)														
K	Gray Cast Iron (Without Scale)														
K	Nodular Cast Iron (With Scale)														
H	Hard Materials (Roughing)														
H	Hard Materials (Finishing)		●							○	◔				
H	Hard Materials (Chip Control)														
	Sintered Steel													◕	

Insert	Description	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edges	KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN510	KBN525	KBN475	KBN65B	KBN570	Ref. to Page for Applicable Toolholders
NEW CBN surface type/Sharp Edge	TBGN 060104F	F	0.4	-	3													●	-
CBN surface type	TBGN 060102T00815	T00815	0.2	-	3		□								●				
	060104T00815		0.4	-			○							●	●				
	060108T00815		0.8	-			○							●	□				
Multi Edge	TPGN 110302T00815ME	T00815	0.2	2.6	3										●				
	110304T00815ME		0.4	2.5											●				
	110308T00815ME		0.8	2.4											□				
Small Edge	TPGN 110302T00815SE	T00815	0.2	2.6	1										●				E43 F61
	110304T00815SE		0.4	2.5										●	●				
	110308T00815SE		0.8	2.4											●				
	TPGN 160302T00815SE	T00815	0.2	2.6	1									□	●				
	160304T00815SE		0.4	2.4										●	●				
	160308T00815SE		0.8	2.1											●				
Small Edge / Tough	TPGN 110304S01035SET	S01035	0.4	2.5	1										●				
	110308S01035SET		0.8	2.4											●				
	TPGN 160304S01035SET	S01035	0.4	2.4	1										●				
	160308S01035SET		0.8	2.1											□				

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) ○ : Check Availability
□ : Deleted from the next catalogue

Negative (Solid)

(mm)

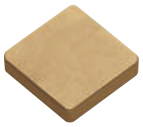
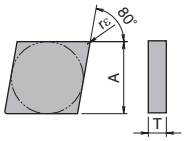
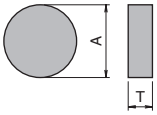
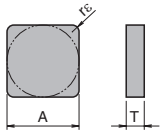
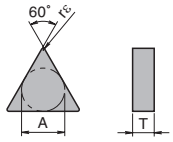
Description		A	T
CNMN	0903_	9.525	3.18
	1204_	12.70	4.76
RNMN	0903_	9.525	3.18
	1203_	12.70	3.18
	1204_		4.76

(mm)

Description		A	T
SNMN	0903_	9.525	3.18
	1203_	12.70	3.18
	1204_		4.76
TNMN	1103_	6.35	3.18
	1604_	9.525	4.76

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

K	Gray Cast Iron (With Scale)	✖
	Gray Cast Iron (Without Scale)	✖
	Nodular Cast Iron (With Scale)	
H	Hard Materials (Roughing)	
	Hard Materials (Finishing)	●
	Hard Materials (Chip Control)	
	Sintered Steel	

Insert		Description		Edge Prep.	Dimension (mm) rε	No. of Edges	PVD Coated CBN KBN900	Ref. to Page for Applicable Toolholders
 Solid		CNMN	090308S02020	S02020	0.8	4	●	D32
			090312S02020		1.2		●	F81
		CNMN	120408S02020	S02020	0.8		●	D22
			120412S02020		1.2		●	
			120416S02020		1.6		●	
Solid		RNMN	090300S02020	S02020	—	Depends on ap	●	D33
		RNMN	120300S02020	S02020			●	
		RNMN	120400S02020	S02020			●	D27 D33
Solid		SNMN	090308S02020	S02020	0.8	8	●	D34 D35
			090312S02020		1.2		●	
		SNMN	120308S02020	S02020	0.8		●	
			120312S02020		1.2		●	
		SNMN	120408S02020	S02020	0.8		●	D25
			120412S02020		1.2		●	D34
			120416S02020		1.6		●	D35
			120420S02020		2.0		●	F79
Solid		TNMN	110308S02020	S02020	0.8	6	●	D36 F81
		TNMN	160408S02020	S02020	0.8		●	D26
			160412S02020		1.2		●	
			160416S02020		1.6		□	

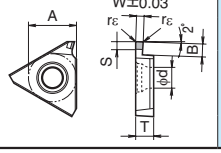
● : Std. Item (1 pc boxes) □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

Grooving Inserts (1-edge)

Edge Prep. Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

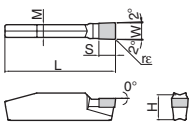
		Gray Cast Iron (With Scale)		
K		Gray Cast Iron (Without Scale)		
		Nodular Cast Iron (Without Scale)		
H		Hard Materials (Roughing)		
		Hard Materials (Finishing)	○	●
		Hard Materials (Chip Control)		
		Sintered Steel		

Insert (Handed Insert shows Right-hand)	Description	Edge Prep.	Dimension (mm) W	B	rε	A	T	φd	S	No. of Edges	CBN KBN510	CBN KBN525	Ref. to Page for Applicable Toolholders
External / Internal Grooving	 GBA43R/L 125-020	E008	1.25	2.0	0.2	12.70	4.76	5.5	1.9	1	●	●	G9
	150-020	E008	1.50	3.5							●	●	G11
	200-020	E008	2.00	3.5							●	●	G56
	250-020	E008	2.50	4.0							●	●	
	300-020	E008	3.00	4.0							●	●	

Deep Grooving Inserts (1-edge)

Edge Prep. Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

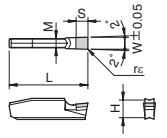
		Gray Cast Iron (With Scale)		
K		Gray Cast Iron (Without Scale)		
		Nodular Cast Iron (Without Scale)		
H		Hard Materials (Roughing)		
		Hard Materials (Finishing)	●	
		Hard Materials (Chip Control)		
		Sintered Steel		●

Insert	Description	Edge Prep.	Dimension (mm) W	W Tolerance	rε	M	L	H	S	No. of Edges	MEGA COAT CBN KBN05M	CBN KBN570	Ref. to Page for Applicable Toolholders
NEW External Grooving	 GDGS 2020N-020NB	E008	2.0	±0.03	0.2	1.8	20	4.3	2.9	1	●		G21 ~ G25
		E002										●	
	3020N-040NB	E008	3.0		0.4	2.3					●		
		E002										●	
	4020N-040NB	E008	4.0			3.3					●		
		E002										●	
	5020N-040NB	E008	5.0			4.2					●		G22 ~ G25
		E002										●	
	6020N-040NB	E008	6.0			5.2					●		
		E002										●	

Deep Grooving Inserts (1-edge)

Edge Prep. Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge

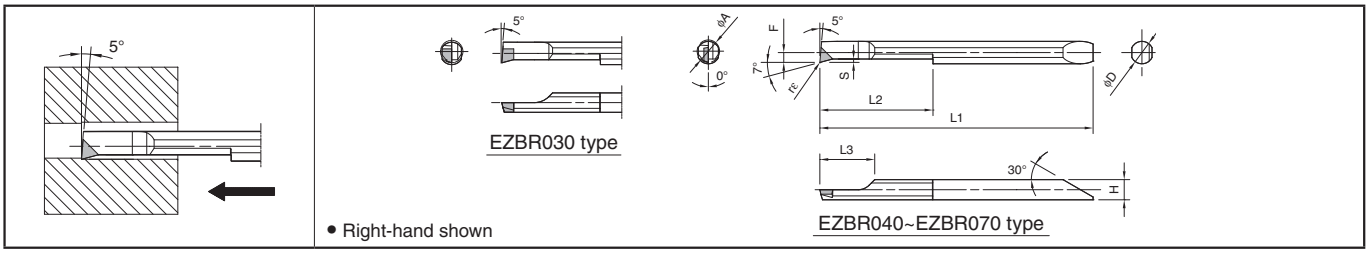
		Gray Cast Iron (With Scale)		
K		Gray Cast Iron (Without Scale)		
		Nodular Cast Iron (Without Scale)		
H		Hard Materials (Roughing)		
		Hard Materials (Finishing)	○	●
		Hard Materials (Chip Control)		
		Sintered Steel		

Insert	Description	Edge Prep.	Dimension (mm) W	rε	L	H	M	S	No. of Edges	CBN KBN510	CBN KBN525	Ref. to Page for Applicable Toolholders
External Grooving	 GMN 2	E008	2.0	0.2	20	4.3	1.8	2.9	1	●	●	G34,G35
	3	E008	3.0	0.4			2.3			●	●	G34
	4	E008	4.0				3.3			●	●	G35
	5	E008	5.0				4.2			●	●	G36
	6	E008	6.0				5.2			●	●	G34,G35

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes)

EZ Bars (EZB-NB:CBN) NEW



EZ Bars Dimensions

Edge Prep. Symbol	Cutting Edge Spec.	Example		Ref. to Page for Applicable Sleeves
F	Sharp Edge	F	Sharp Edge	
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge	
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge	
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge	

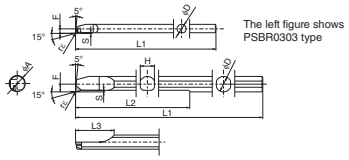
K	Gray Cast Iron (With Scale)			
	Gray Cast Iron (Without Scale)			
	Nodular Cast Iron (Without Scale)			
H	Hard Materials (Roughing)			
	Hard Materials (Finishing)	●		
	Hard Materials (Chip Control)			
	Sintered Steel			

Description		Edge Prep.	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	F	S	rε	No. of Edges	MEGACOAT CBN KBN05M		Ref. to Page for Applicable Sleeves
EZBR	030030-003NB	T00815	3	3	2.6	38.8	13	6.8	1.25	0.3	0.035 ±0.015	1	●		F22 ~ F27
	040040-003NB	T00815	4	4	3.6	48.8	20	9.8	1.75	0.5			●		
	050050-003NB	T00815	5	5	4.6	58.1	25	9.8	2.25	0.5			●		
	060060-003NB	T00815	6	6	5.6	66.1	30	11.8	2.75	0.5			●		
	070070-003NB	T00815	7	7	6.6	74.1	35	11.8	3.25	0.5			●		

Tip-Bars

Edge Prep. Symbol	Cutting Edge Spec.	Example		Ref. to Page for Applicable Sleeves
F	Sharp Edge	F	Sharp Edge	
E	Honed Cutting Edge	E008	R0.08mm Honed Cutting Edge	
T	Chamfered Cutting Edge	T01215	0.12mmx15° Chamfered Cutting Edge	
S	Chamfered + Honed Cutting Edge	S01225	0.12mmx25° Chamfered + Honed Cutting Edge	

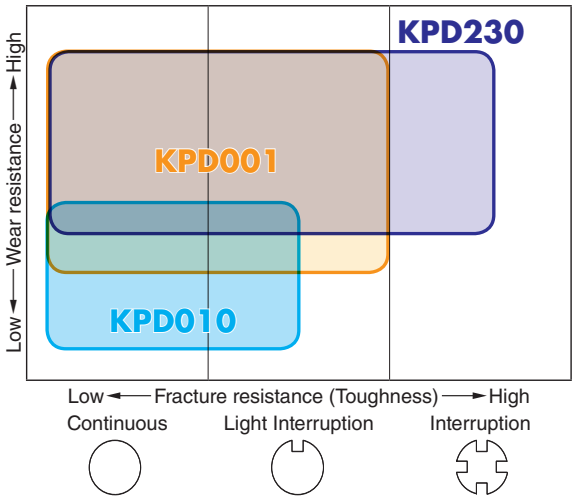
K	Gray Cast Iron (With Scale)			
	Gray Cast Iron (Without Scale)			
	Nodular Cast Iron (Without Scale)			
H	Hard Materials (Roughing)			
	Hard Materials (Finishing)	○	●	
	Hard Materials (Chip Control)			
	Sintered Steel			

Insert (Handed Insert shows Right-hand)	Description		Edge Prep.	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	F	S	rε	No. of Edges	CBN KBN510	KBN525	Ref. to Page for Applicable Sleeves
 The left figure shows PSBR0303 type	PSBR	0303-50NBS	T00815	3	2.8	-	50	25	7	1.4	0.15	0.05	1	○	○	F84
		0404-60NBS	T00815	4	3.8	3.6	60	30	10	1.9	0.3			○	○	
		0505-70NBS	T00815	5	4.8	4.4	70	40	12	2.4	0.5			○	○	
		0606-70NBS	T00815	6	5.8	5.2		45		2.9				○	○	
		0707-80NBS	T00815	7	6.8	6.2	80	50		3.4				○	○	

● : Std. Item (1 pc boxes) ○ : Check Availability

CBN & PCD Inserts are sold in 1 piece boxes.

Application Map



About Insert Grades

Grades	Applications	Features
KPD001 (Ave. Grain Size under 0.5μm)	●High speed machining of non-ferrous metals and brass ●High speed machining of plastics ●Machining of carbide	●The world highest level micro-grain diamond ●High edge strength, and superior to wear resistance, fracture resistance and edge sharpening performance
KPD010 (Ave. Grain Size 10μm)	●High speed machining of non-ferrous metals and brass ●High speed machining of plastics ●Machining of carbide	●Good balance of wear resistance and flexural strength ●General purpose
KPD230 (Mixture of fine grain with the Ave. grain size 2~30 μm and rough grain)	●High speed machining of non-ferrous metals and brass ●High speed machining of plastics	●High density PCD with mixture of coarse and fine grains features excellent abrasive wear resistance and fracture resistance
KPD250 (Ave. Grain Size 25μm) (Made to order)	●High speed machining of high silicon aluminium alloy ●Machining of carbide	●Coarse grain PCD (Ave. Grain Size 25μm) ●Superior to wear resistance

Identification System (Turning Insert)

C	N	M	M	12	04	02	M	–	SE
C	C	G	W	04	01	01			SE

"Turning Indexable Inserts Identification System" Refer to Page B2

Insert Type	Description	Manufacture's Option 1	Manufacture's Option 2	Series Name	Edge Length	No. of Edges	re-grinding
Negative	CNMM120402M-SE	M (Indicates the tool is for negative inserts/ toolholders)	SE	Small Edge	Short (Small Edge)	1	Not Recommended
	CNMM120402M-NE		NE	New Value Edge	Long (85% length compared with no Indication's cutting edge)	1	Possible
	CNMM120402M		Without Indication	-	Long	1	
Positive	CCGW040101SE	-	SE	Small Edge	Short (Small Edge)	1	Not Recommended
	CCGW040101NE		NE	New Value Edge	Long (85% length compared with no Indication's cutting edge)	1	Possible
	CCGW040101		Without Indication	-	Long	1	

Note)1. No edge preparation symbols for PCD inserts. Most of the PCD inserts' edge prep. are sharp edge.
2. "M" in manufacturer's option 1 indicates the inserts are applicable to negative toolholders.
3. Ref. to page **B3** for insert color.

● About re-grinding
1) Regrinding is possible with the inserts with "NE" and no symbol in manufacturer's option 2.
Regrinding can not be available depending on the edge condition.
2) Regrinding is not recommended for inserts with "SE" in manufacturer's option 2.

Recommended Cutting Conditions (Turning)

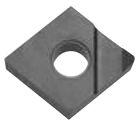
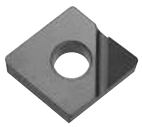
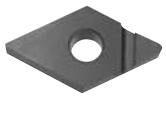
Workpiece Material	Insert Grades		Cutting Conditions				Remarks
	KPD001	KPD010	Vc (m/min)	ap (mm) Small Edge and Positive (Inserts)	ap (mm) Negative (Inserts)	f (mm/rev)	
Aluminum alloys Zinc alloys	★	☆	300~1,500	~1.0	~2.0	0.03~0.5	Both Dry and Coolant
Copper, Brass, Bronze	★	☆	300~1,000	~1.0	~2.0	0.03~0.5	
Magnesium Alloys	★	☆	400~1,200	~1.0	~2.0	0.03~0.5	
Carbide	★	☆	10~30	~0.3	~0.3	0.03~0.1	
Titanium Alloys	★	☆	100~200	~1.0	~2.0	0.05~0.2	Coolant
Glass fiber reinforced plastics Carbon fiber	★	☆	100~600	~1.0	~2.0	0.05~0.5	Dry
Silica Filling Plastic Particle Board	★	☆	400~800	~1.0	~2.0	0.05~0.5	

★:1st Recommendation ☆:2nd Recommendation

Negative

N	Non-ferrous Metals (With interruption)
	Non-ferrous Metals (Without interruption)
S	Titanium Alloys (With interruption)
	Titanium Alloys (Without interruption)

Edge Prep.: PCD all items / Sharp Edge

Insert	Description	Dimension (mm) A	T	φd	rε	S	Angle α	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	Ref. to Page for Applicable Toolholders
 Small Edge	CNMM 120402M-SE	12.70	4.76	5.16	0.2	2.8	-	1	●	●			D8 F63 F67 F68
	CNMM 120404M-SE				0.4	2.8			●	●			
	CNMM 120408M-SE				0.8	2.7			●	●			
	CNMM 120402M-NE	12.70	4.76	5.16	0.2	5.1	-	1	●				
	CNMM 120404M-NE				0.4	5.0			●				
	CNMM 120408M-NE				0.8	4.9			●				
	CNMM 120402M				0.2	5.8			●	●			
	CNMM 120404M				0.4	5.8			●	●			
	CNMM 120408M				0.8	5.7			●	●			
	CNMM 120412M				1.2	5.6				●			
Small Edge	DNMM 150402M-SE	12.70	4.76	5.16	0.2	2.8	-	1	●	●			D10 D11 F64 F70 F71
	DNMM 150404M-SE				0.4	2.6			●	●			
	DNMM 150408M-SE				0.8	2.2			●	●			
	DNMM 150402M-NE	12.70	4.76	5.16	0.2	5.2	-	1	●				
	DNMM 150404M-NE				0.4	5.0			●				
	DNMM 150408M-NE				0.8	4.6			●				
	DNMM 150402M				0.2	5.9			●	●			
	DNMM 150404M				0.4	5.8			●	●			
	DNMM 150408M				0.8	5.4			●	●			
	DNMM 150412M				1.2	5.0				●			
Small Edge	TNMM 160402M-SE	9.525	4.76	3.81	0.2	2.7	-	1	●	●			D14 D15 F64 F74 F75
	TNMM 160404M-SE				0.4	2.6			●	●			
	TNMM 160408M-SE				0.8	2.3			●	●			
	TNMM 160402M-NE	9.525	4.76	3.81	0.2	3.2	-	1	●				
	TNMM 160404M-NE				0.4	3.1			●				
	TNMM 160408M-NE				0.8	2.8			●				
	TNMM 160402M				0.2	3.8			●	●			
	TNMM 160404M				0.4	3.6			●	●			
	TNMM 160408M				0.8	3.3			●	●			
	TNMM 160412M				1.2	3.0				●			
Small Edge	VNMM 160402M-SE	9.525	4.76	3.81	0.2	2.9	-	1	●	●			D16 D17 D18
	VNMM 160404M-SE				0.4	2.5			●	●			
	VNMM 160408M-SE				0.8	1.6			●	●			
	VNMM 160402M-NE	9.525	4.76	3.81	0.2	4.7	-	1	●				
	VNMM 160404M-NE				0.4	4.2			●				
	VNMM 160408M-NE				0.8	3.4			●				
	VNMM 160402M				0.2	5.3			●	●			
	VNMM 160404M				0.4	4.8			●	●			
	VNMM 160408M				0.8	4.0			●	●			
	VNMM 160412M				1.2	3.1				●			
Small Edge	WNMM 080402M-SE	12.70	4.76	5.16	0.2	2.8	-	1	●	●			D20 F77 F78
	WNMM 080404M-SE				0.4	2.8			●	●			
	WNMM 080408M-SE				0.8	2.7				●			
	WNMM 080402M-NE	12.70	4.76	5.16	0.2	5.0	-	1	●				
	WNMM 080404M-NE				0.4	5.0			●				
	WNMM 080402M				0.2	5.8				□			
	WNMM 080404M				0.4	5.8				●			

· **SE:** Small Edge **/ NE:** New Value Edge

● : Std. Item (1 pc boxes) □ : Deleted from the next catalogue

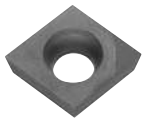
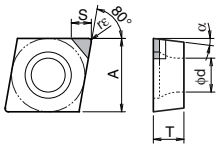
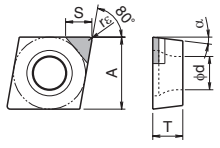
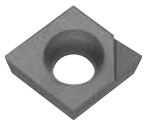
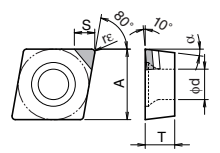
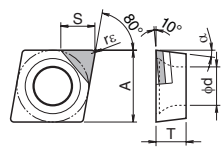
CBN & PCD Inserts are sold in 1 piece boxes.

Positive

*Thickness of CC_0301_ and CC_0401_ are different

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert	Description	Dimension (mm) A	T	φd	rε	S	Angle α	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	Ref. to Page for Applicable Toolholders
 	*CCGW 040101SE NEW 040102SE 040104SE	4.3	1.8	2.3	0.1 0.2 0.4	1.3 1.3 1.3	7°	1	● ● ●				F19 F39
	CCGW 060201SE NEW 060202SE 060204SE	6.35	2.38	2.8	0.1 0.2 0.4	2.3 2.3 2.3	7°	1	● ● ●	 ●			Ref. to the table below
	CCGW 09T302SE NEW 09T304SE 09T308SE	9.525	3.97	4.4	0.2 0.4 0.8	2.7 2.7 2.7	7°	1	● ● ●	 ●			
	*CCGW 040101NE 040102NE 040104NE	4.3	1.8	2.3	0.1 0.2 0.4	1.7 1.6 1.6	7°	1	● ● ●				F19 F39
	CCGW 060201NE 060202NE 060204NE	6.35	2.38	2.8	0.1 0.2 0.4	3.1 3.0 3.0	7°	1	● ● ●				Ref. to the table below
	CCGW 09T301NE 09T302NE 09T304NE 09T308NE	9.525	3.97	4.4	0.1 0.2 0.4 0.8	3.4 3.4 3.4 3.3	7°	1	● ● ● ●				
	*CCGW 040101 040102 040104	4.3	1.8	2.3	0.1 0.2 0.4	1.9 1.9 1.9	7°	1	● ● ●	 ● ●			F19 F39
	CCGW 060201 060202 060204	6.35	2.38	2.8	0.1 0.2 0.4	3.5 3.5 3.5	7°	1		● ● ●			Ref. to the table below
	CCGW 09T301 09T302 09T304 09T308	9.525	3.97	4.4	0.1 0.2 0.4 0.8	3.8 3.8 3.7 3.6	7°	1	● ● ● 	● ● ● ●			
 	CCMT 060202SE NEW 060204SE	6.35	2.38	2.8	0.2 0.4	2.2 2.2	7°	1	● ●				
	CCMT 09T301SE NEW 09T302SE 09T304SE 09T308SE	9.525	3.97	4.4	0.1 0.2 0.4 0.8	2.7 2.7 2.7 2.7	7°	1	● ● ● ●	 ●			
	CCMT 060201NE 060202NE 060204NE	6.35	2.38	2.8	0.1 0.2 0.4	2.8 2.8 2.8	7°	1	● ● ●				Ref. to the table below
	CCMT 09T301NE 09T302NE 09T304NE 09T308NE	9.525	3.97	4.4	0.1 0.2 0.4 0.8	3.4 3.4 3.4 3.3	7°	1	● ● ● ●				
	CCMT 060201 060202 060204	6.35	2.38	2.8	0.1 0.2 0.4	3.3 3.3 3.2	7°	1	● ● ●	● ● ●			
	CCMT 09T301 09T302 09T304 09T308	9.525	3.97	4.4	0.1 0.2 0.4 0.8	3.9 3.9 3.9 3.8	7°	1	● ● ● 	● ● ● ●			

· **SE:** Small Edge **/ NE:** New Value Edge

Insert Description	Ref. to Page for Applicable Toolholders
CC..0602 type	**E22,E23,E34,F39**
CC..09T3 type	**E22,E23,E34,F39,F65**

CBN & PCD Inserts are sold in 1 piece boxes.

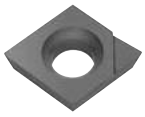
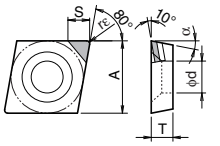
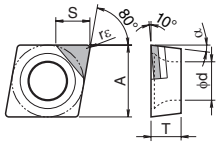
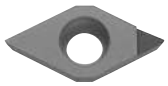
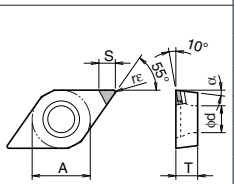
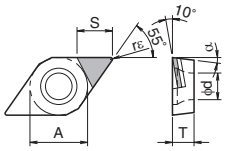
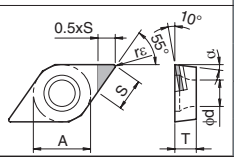
●: Std. Item (1 pc boxes)

Positive

N	Non-ferrous Metals (With interruption)	◕			
	Non-ferrous Metals (Without interruption)	●			
S	Titanium Alloys (With interruption)	◕			
	Titanium Alloys (Without interruption)	●			

Edge Prep.

PCD all items | **Sharp Edge**

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) A	T	φd	rε	S	Angle α	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	Ref. to Page for Applicable Toolholders
 	CPMH 090302SE	9.525	3.18	4.5	0.2	2.7	11°	1	●				F41
	NEW 090304SE				0.4	2.7			●				
	CPMH 080202NE	7.94	2.38	3.5	0.2	3.2	11°	1	●				
	080204NE				0.4	3.2			●				
	CPMH 090301NE	9.525	3.18	4.5	0.1	3.4			●				
	090302NE				0.2	3.4			●				
	090304NE				0.4	3.4			●				
	090308NE				0.8	3.3			●				
	CPMH 080201	7.94	2.38	3.5	0.1	3.7	11°	1	●	●			
	080202				0.2	3.7			●	●			
	080204				0.4	3.7			●	●			
	CPMH 090301	9.525	3.18	4.5	0.1	4.0				●			
	090302				0.2	3.9			●	●			
	090304				0.4	3.9			●	●			
	090308				0.8	3.8				●			
 	DCMT 070201SE	6.35	2.38	2.8	0.1	2.7	7°	1	●				Ref. to the table below
	NEW 070202SE				0.2	2.7			●	●			
	070204SE				0.4	2.7			●	●			
	DCMT 11T301SE	9.525	3.97	4.4	0.1	2.7			●				
	NEW 11T302SE				0.2	2.7			●				
	11T304SE				0.4	2.7			●	●			
	11T308SE				0.8	2.7			●	●			
	DCMT 070201NE	6.35	2.38	2.8	0.1	3.4	7°	1	●				
	070202NE				0.2	3.4			●				
	070204NE				0.4	3.2			●				
	DCMT 11T301NE	9.525	3.97	4.4	0.1	3.4			●				
	11T302NE				0.2	3.3			●				
	11T304NE				0.4	3.2			●				
	11T308NE				0.8	2.8			●				
	DCMT 070201	6.35	2.38	2.8	0.1	4.0	7°	1	●	●			
	070202				0.2	3.9			●	●			
	070204				0.4	3.7			●	●			
	DCMT 11T301	9.525	3.97	4.4	0.1	4.0			●	●			
	11T302				0.2	3.9			●	●			
	11T304				0.4	3.7			●	●			
	11T308				0.8	3.3			●	●			
	DCMT 070202R/L-NE	6.35	2.38	2.8	0.2	3.3	7°	1	●				
	070204R/L-NE				0.4	3.2			●				
	DCMT 11T302R/L-NE	9.525	3.97	4.4	0.2	3.3			●				
	11T304R/L-NE				0.4	3.2			●				

· **SE:** Small Edge **/ NE:** New Value Edge

Insert Description	Ref. to Page for Applicable Toolholders
DC..07 type	**E24~E27,E35,F43~F45**
DC..11 type	**E20,E24~E27,E35,F43~F45,F65**

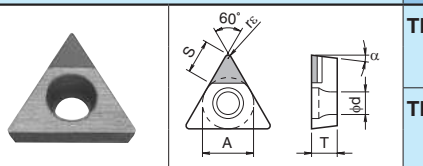
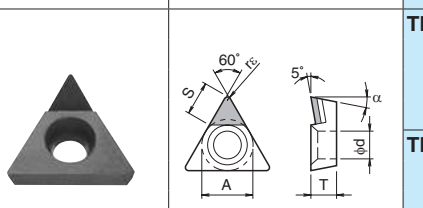
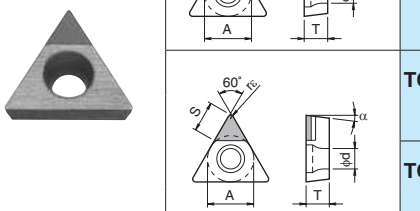
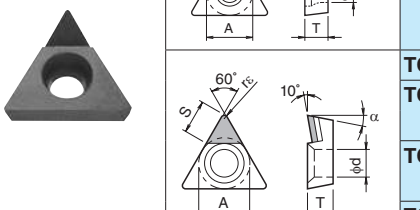
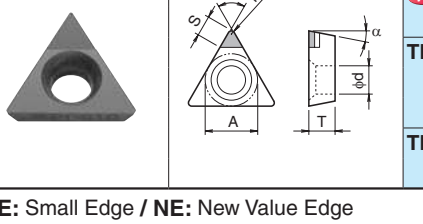
● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes.

Positive

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert	Description		Dimension (mm) A	T	φd	rε	S	Angle α	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	Ref. to Page for Applicable Toolholders
	TBGW	060102NE	3.97	1.59	2.3	0.2	2.1	5°	1	●				F49 F51
		060104NE				0.4	1.9			●				
	TBGW	060102				0.2	2.4			●	●			
		060104				0.4	2.2			●	□			
	TBMT	060101NE	3.97	1.59	2.3	0.1	2.2	5°	1	●				
		060102NE				0.2	2.1			●				
		060104NE				0.4	2.0			●				
		060108NE				0.8	1.7			●				
	TBMT	060101				0.1	2.6				●			
		060102				0.2	2.5			●	●			
		060104				0.4	2.3				●			
		060108				0.8	2.0			●	●			
	TCGW	110302SE	6.35	3.18	2.8	0.2	2.5	7°	1		●			E29
		110304SE				0.4	2.4				●			
	TCGW	110302NE				0.2	3.3	7°	1	●				
		110304NE				0.4	3.2			●				
	TCGW	110302				0.2	3.9	7°	1		●			
		110304				0.4	3.7				●			
	TCMT	110301SE	6.35	3.18	2.8	0.1	2.6	7°	1		●			
		110302SE				0.2	2.5				●			
		110304SE				0.4	2.4				●			
	TCMT	080202NE	4.76	2.38	2.3	0.2	2.1	7°	1	●				
	TCMT	110302NE	6.35	3.18	2.8	0.2	3.4	7°	1	●				
		110304NE				0.4	3.3			●				
	TCMT	080202	4.76	2.38	2.3	0.2	2.4	7°	1		●			
		080204				0.4	2.2				●			
	TCMT	110302	6.35	3.18	2.8	0.2	3.9	7°	1		●			
	TPGB	090202SE NEW	5.56	2.38	3.0	0.2	2.1	11°	1	●				Ref. to the table below
		090204SE				0.4	2.1			●				
		090208SE				0.8	2.1			●				
	TPGB	110301SE	6.35	3.18	3.3	0.1	2.7	11°	1	●	●			
		110302SE				0.2	2.6			●	●			
		110304SE				0.4	2.5			●	●			
	TPGB	160302SE	9.525	3.18	4.5	0.2	2.6	11°	1	●	●			
		160304SE				0.4	2.4			●	●			

· **SE:** Small Edge **/ NE:** New Value Edge

Insert Description	Ref. to Page for Applicable Toolholders
TP..0802 type	**E29,F49,F51**
TP..0902 type	**F49,F51**

Insert Description	Ref. to Page for Applicable Toolholders
TP..1103 type	**E29,F49,F50**
TP..1603 type	**F49,F50**

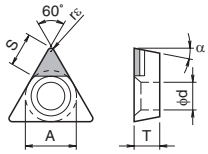
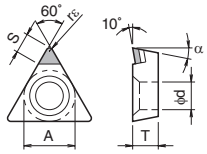
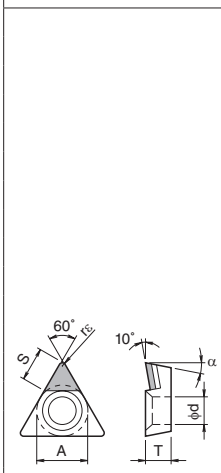
CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes) □ : Deleted from the next catalogue

Positive

N	Non-ferrous Metals (With interruption)	◕
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	◕
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert		Description		Dimension (mm) A	T	φd	rε	S	Angle α	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	Ref. to Page for Applicable Toolholders
		TPGB	080202NE	4.76	2.38	2.5	0.2	2.2	11°	1	●				Ref. to the table below C26
			080204NE				0.4	2.1			●				
			080208NE				0.8	1.8			●				
		TPGB	090202NE	5.56	2.38	3.0	0.2	2.7			●				
			090204NE				0.4	2.6			●				
			090208NE				0.8	2.3			●				
		TPGB	110302NE	6.35	3.18	3.3	0.2	3.4			●				
			110304NE				0.4	3.3			●				
			110308NE				0.8	3.0			●				
		TPGB	160304NE	9.525	3.18	4.5	0.4	3.2			●				
			160308NE				0.8	2.9			●				
		TPGB	080202	4.76	2.38	2.5	0.2	2.6			●	●			
			080204				0.4	2.4			●	●			
		TPGB	090202	5.56	2.38	3.0	0.2	3.2			●	●			
			090204				0.4	3.0			●	●			
		TPGB	110302	6.35	3.18	3.3	0.2	3.9			●	●			
			110304				0.4	3.7			●	●			
			110308				0.8	3.4				●			
		TPMH	080202SE NEW	4.76	2.38	2.5	0.2	2.0	11°	1	●				
			080204SE				0.4	1.8			●				
		TPMH	090202SE NEW	5.56	2.38	3.0	0.2	2.4			●				
			090204SE				0.4	2.2			●				
		TPMH	110301SE	6.35	3.18	3.3	0.1	2.7	11°	1		●			
			110302SE				0.2	2.6			●	●			
			110304SE				0.4	2.5			●	●			
		TPMH	160302SE	9.525	3.18	4.5	0.2	2.6			●	□			
			160304SE				0.4	2.4			●	●			
		TPMH	080201NE	4.76	2.38	2.5	0.1	2.3	11°	1	●				
			080202NE				0.2	2.2			●				
			080204NE				0.4	2.1			●				
		TPMH	090201NE	5.56	2.38	3.0	0.1	2.7			●				
			090202NE				0.2	2.6			●				
			090204NE				0.4	2.5			●				
			090208NE				0.8	2.2			●				
		TPMH	110301NE	6.35	3.18	3.3	0.1	3.4			●				
			110302NE				0.2	3.3			●				
			110304NE				0.4	3.2			●				
			110308NE				0.8	2.9			●				
		TPMH	160304NE	9.525	3.18	4.5	0.4	3.3			●				
			160308NE				0.8	3.0			●				
		TPMH	080201	4.76	2.38	2.5	0.1	2.6	11°	1		□			
			080202				0.2	2.5			●	●			
			080204				0.4	2.3			●	●			
		TPMH	090201	5.56	2.38	3.0	0.1	3.0			●	●			
			090202				0.2	2.9			●	●			
			090204				0.4	2.8			●	●			
			090208				0.8	2.5				●			
		TPMH	110301	6.35	3.18	3.3	0.1	3.9			●	●			
			110302				0.2	3.9			●	●			
			110304				0.4	3.7			●	●			
			110308				0.8	3.4				●			
		TPMH	160302	9.525	3.18	4.5	0.2	4.0			●	●			
			160304				0.4	3.8			●	●			
			160308				0.8	3.6				●			

· **SE:** Small Edge **/ NE:** New Value Edge

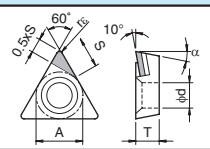
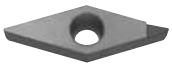
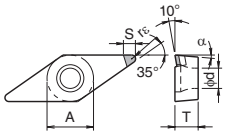
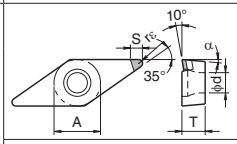
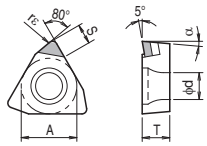
● : Std. Item (1 pc boxes) □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

Positive

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert (Handed Insert shows Left-hand)		Description		Dimension (mm) A	T	φd	rε	S	Angle α	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	Ref. to Page for Applicable Toolholders
		TPMH	110302L-NE	6.35	3.18	3.3	0.2	3.8	11°	1	●				Ref. to the table below C26
			110304L-NE				0.4	3.6			●				
		VBMT	110301SE	6.35	3.18	2.8	0.1	2.5	5°	1	●				Ref. to the table below
		NEW	110302SE				0.2	2.3			●				
			110304SE				0.4	1.9			●				
			110308SE				0.8	1.9			●				
		VBMT	160401SE	9.525	4.76	4.4	0.1	2.7			●				
		NEW	160402SE				0.2	2.5			●				
			160404SE				0.4	2.1			●				
			160408SE				0.8	2.0			●				
		VBMT	110301NE	6.35	3.18	2.8	0.1	2.6	5°	1	●				
			110302NE				0.2	2.4			●				
			110304NE				0.4	2.0			●				
			110308NE				0.8	3.1			●				
		VBMT	160401NE	9.525	4.76	4.4	0.1	2.8			●				
			160402NE				0.2	2.6			●				
			160404NE				0.4	2.2			●				
			160408NE				0.8	3.0			●				
		VBMT	110301	6.35	3.18	2.8	0.1	3.0	5°	1	●	●			
			110302				0.2	2.8			●	●			
			110304				0.4	2.4			●	●			
			110308				0.8	3.5			●	●			
		VBMT	160401	9.525	4.76	4.4	0.1	3.2			●	●			
			160402				0.2	3.0			●	●			
			160404				0.4	2.6			●	●			
			160408				0.8	3.5			●	●			
		VCMT	080202SE	4.76	2.38	2.3	0.2	1.4	7°	1	●				E36 F52 F54 F57
		NEW	080204SE				0.4	1.4			●				
			080208SE				0.8	1.4			●				
		VCMT	080201NE				0.1	1.7			●				
			080202NE				0.2	1.7			●				
			080204NE				0.4	1.8			●				
			080208NE				0.8	1.9			●				
		VCMT	080201				0.1	2.0				●			
			080202				0.2	2.0			●	●			
			080204				0.4	2.1			●	●			
			080208				0.8	2.2			●	●			
		WBMT	060102L-SE	3.97	1.59	2.3	0.2	1.3	5°	1	●				F59
		NEW													
		WBMT	060101L-NE	3.97	1.59	2.3	0.1	1.7	5°	1	●				
			060102L-NE				0.2	1.6			●				
			060104L-NE				0.4	1.6			●				
		WBMT	060101L	3.97	1.59	2.3	0.1	1.9	5°	1	●	□			
			060102L				0.2	1.9			●	●			
			060104L				0.4	1.9			●	●			

· **SE:** Small Edge **/ NE:** New Value Edge

Insert Description	Ref. to Page for Applicable Toolholders
VB..1103 type	E30,E31,E36,F52,F54,F57
VB..1604 type	E30,E31,F52,F54,F57

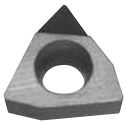
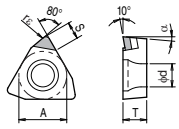
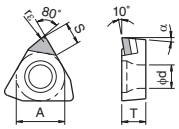
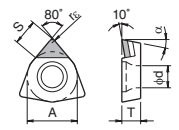
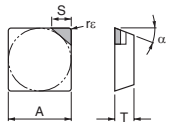
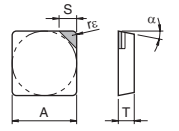
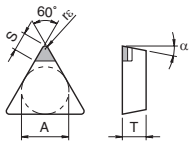
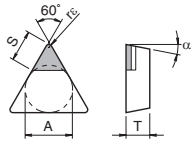
● : Std. Item (1 pc boxes) □ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

Positive

N	Non-ferrous Metals (With interruption)	◕			
	Non-ferrous Metals (Without interruption)	●			
S	Titanium Alloys (With interruption)	◕			
	Titanium Alloys (Without interruption)	●			

Edge Prep.	
PCD all items	Sharp Edge

Insert (Handed Insert shows Left-hand)	Description		Dimension (mm) A	T	φd	rε	S	Angle α	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	Ref. to Page for Applicable Toolholders
		WBMT 080202L-SE NEW	4.76	2.38	2.3	0.2	1.6	5°	1	●				F59
		WBMT 080202L-NE	4.76	2.38	2.3	0.2	2.1	5°	1	●				
		WBMT 080204L-NE				0.4	2.1			●				
		WBMT 080202L	4.76	2.38	2.3	0.2	2.4	5°	1	●	●			
		WBMT 080204L				0.4	2.3			●	●			
		WPMT 110202SE	6.35	2.38	2.8	0.2	2.1	11°	1	●				
		WPMT 110202NE				0.2	2.7			●				
		WPMT 110202				0.2	3.1				●			
		SEGN 120304NE	12.70	3.18	-	0.4	3.6	20°	1	□				-
		SPGN 120304NE	12.70	3.18	-	0.4	3.6	11°	1	●				E42 F60
		SPGN 120304					4.2				●			
		TPGN 110301SE	6.35	3.18	-	0.1	2.6	11°	1	●				
		TPGN 110302SE				0.2	2.5			●	●			
		TPGN 110304SE				0.4	2.4			●	●			
		TPGN 160301SE	9.525	3.18		0.1	2.6				●			
		TPGN 160302SE				0.2	2.6			●	●			
		TPGN 160304SE				0.4	2.4			●	●			
		TPGN 160304NE	9.525	3.18	-	0.4	3.2	11°	1	●				E43 F61
		TPGN 160308NE				0.8	2.9			●				
		TPGN 110302	6.35	3.18		0.2	3.9			●	●			
		TPGN 110304				0.4	3.7			●	●			
		TPGN 110308				0.8	3.4				●			
		TPGN 160302	9.525	3.18		0.2	3.9			●	●			
		TPGN 160304				0.4	3.7			●	●			
		TPGN 160308				0.8	3.4				●			

· **SE:** Small Edge **/ NE:** New Value Edge

● : Std. Item (1 pc boxes) □ : Deleted from the next catalogue

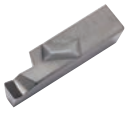
CBN & PCD Inserts are sold in 1 piece boxes.

Grooving Inserts (1-edge)

N	Non-ferrous Metals (With interruption)	◕
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	◕
	Titanium Alloys (Without interruption)	●

Edge Prep.: PCD all items / Sharp Edge

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) W	B	rε	A	T	φd	S	No. of Edges	PCD KPD001 R	KPD001 L	KPD010 R	KPD010 L	Ref. to Page for Applicable Toolholders
External / Internal Grooving	GBA32R 125-010	1.25	2.0	0.1	9.525	3.18	4.4	1.7	1			●		G9
	150-010	1.50								●		●		G11
	GBA43R/L 125-010	1.25	2.0									●	●	G56
	150-010	1.50	3.5							●	●	●	●	
	200-010	2.00		0.1	12.70	4.76	5.5	1.9		●	●	●	●	
	250-010	2.50	4.0							●	●	●	●	
	300-010	3.00								●	●	●	●	
External Grooving	GB43R/L 125	1.25	2.0									○		G11
	150	1.50	3.5									○		
	200	2.00		0.1	12.70	4.76	-	1.9	1			○		
	250	2.50	4.0									○		
	300	3.00										○	○	
External Grooving	TGF32R 125-010	1.25	2.0					1.7		●				G14 G15
	150-010	1.50		0.1	9.525	3.18	4.5		1	●				
	200-010	2.00	2.5					1.9		●				

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) W	B	rε	A	L	H	No. of Edges	PCD KPD001 R	KPD001 L	KPD010 R	KPD010 L	Ref. to Page for Applicable Toolholders
Internal Grooving	GVR/L 145-020A	1.45	2.3	0.2	4.0	12	5.0	1			●	MTO	G55
	200-020A	2.00									●	MTO	
	300-020A	3.00									MTO	MTO	
	GVR/L 200-020B	2.00	3.2	0.2	4.5	15	5.5				●	MTO	
	250-020B	2.50									●	MTO	
	300-020B	3.00	4.2								MTO	MTO	
	GVR/L 300-020C	3.00	4.5	0.2	5.8	21	6.5				MTO	MTO	
	400-020C	4.00	5.5								MTO	MTO	
 Face Grooving	GVFR/L 250-020B	2.50	4.8	0.2	5.8	20	5.0	1			●	●	G90 ~ G93 G100
	300-020B	3.00	4.8								●	●	
	400-020B	4.00	5.3								MTO	MTO	
	GVFR/L 350-020C	3.50	6.8	0.2	7.0	27	7.0				MTO	MTO	
	400-020C	4.00	6.8								MTO	MTO	
	GVFR/L 350-040C	3.50	6.8	0.4	7.0	27	7.0				MTO	MTO	
	400-040C	4.00	6.8								MTO	MTO	

Insert	Description	Dimension (mm) W	rε	L	H	M	S	No. of Edges	PCD KPD001	KPD010	Ref. to Page for Applicable Toolholders
External Deep Grooving	GMN 2	2.0	0.2	20	4.3	1.8	2.9	1	●	●	G34,G35
	3	3.0				2.3			●	●	G34
	4	4.0				3.3			●	●	G35
	5	5.0				4.2			●	●	G36
	6	6.0				5.2				●	G34,G35

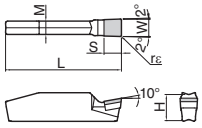
● : Std. Item (1 pc boxes)
○ : Check Availability
MTO : Made to order

CBN & PCD Inserts are sold in 1 piece boxes.

Deep Grooving Inserts (1-edge)

N	Non-ferrous Metals (With interruption)	●	
	Non-ferrous Metals (Without interruption)	●	
S	Titanium Alloys (With interruption)	●	
	Titanium Alloys (Without interruption)	●	

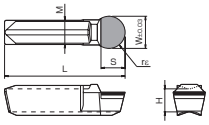
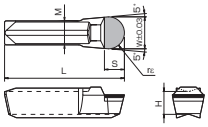
Edge Prep.	
PCD all items	Sharp Edge

Insert	Description		Dimension (mm) W	Tolerance	rε	M	L	H	S	No. of Edges	PCD KPD001		Ref. to Page for Applicable Toolholders
NEW External Deep Grooving		GDGS 2020N-020NB	2.0	±0.03	0.2	1.8	20	4.3	2.9	1	●		G21 ~ G25
		3020N-020NB	3.0			2.3					●		
		4020N-020NB	4.0			3.3					●		
		5020N-020NB	5.0			4.2					●		G22 ~ G25
		6020N-020NB	6.0			5.2					●		

For Aluminum Wheel (1-edge)

N	Non-ferrous Metals (With interruption)	●	
	Non-ferrous Metals (Without interruption)	●	
S	Titanium Alloys (With interruption)	●	
	Titanium Alloys (Without interruption)	●	

Edge Prep.	
GMGW	Honed Cutting Edge

Insert	Description		W	rε	L	H	M	S	No. of Edges	PCD KPD001	KPD010	Ref. to Page for Applicable Toolholders
		GMGW 6030-30R	6	3	30	5.5	5	4.5	1	●		G40
		8030-40R	8	4			6	6		●		
		GMGW 8030-40R-HR	8	4	30	5.5	6	5		●		

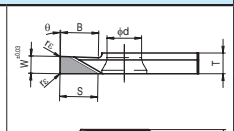
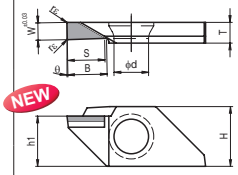
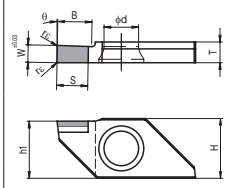
● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes.

Turning / Grooving (1-edge)

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) W	B	rε	T	H	h1	φd	S	Angle θ	No. of Edges	PCD KPD001 R	L	Ref. to Page for Applicable Toolholders
Turning / Grooving	 NEW  ● Insert hand: Left-hand / PCD edge hand: Right-hand	TKF12R/L	200-AS	2.0	5	+0 −0.05 0.1	3	8.7	7.3	5	5.3	0°	1	●	●	E12
			250-AS	2.5	5									●	●	
		TKF16R/L	250-AS	2.5	8		4	9.5	8.0		6.3			●	●	
		TKF12L	200-ASR	2.0	5	+0 −0.05 0.1	3	8.7	7.3	5	5.3	0°	1		●	
			250-ASR	2.5	5										●	
		TKF16L	250-ASR	2.5	8		4	9.5	8.0		6.3				●	
External Grooving (Turning is possible)		TKF12R/L	150-NB	1.5	3.5	+0 −0.05 0.1	3	8.7	8.3	5	2.0	0°	1	●	●	
			200-NB	2.0	4						3.0			●	●	
			250-NB	2.5	4									●		
			250-NB4.5	2.5	5						4.5			●		

* Lead angle (Front cutting edge angle: θ) shows the angle when installed in toolholder.
* PCD Inserts of TKF type only for Turning and Grooving.
* Cut-off is not recommended.
* Dimension B: shows available grooving depth.

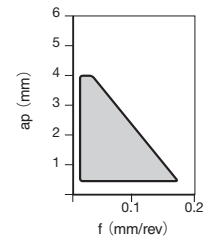
Inserts Identification System

TKF	12	R	200	-	AS	
TKF	12	L	200	-	AS	R

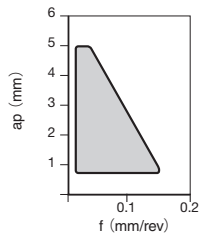
- TKF / TKF — Insert Type
- 12 / 12 — Insert Size
- R / L — Insert Hand: R: Right-hand; L: Left-hand
- 200 / 200 — Width (Edge Width)
- AS / AS — Name of Chipbreaker: AS : AS Chipbreaker; NB: Without Chipbreaker
- R — PCD insert hand: Without Indication: The edge hand is same as the insert hand; R: Right-hand

Applicable Range

TKF12-AS/-ASR



TKF16-AS/-ASR



* PCD Inserts of TKF type only for Turning and Grooving.
* Cut-off is not recommended.

Note 1) The cutting edge of the TKF-AS/-ASR will be 1mm lower than the center line when attached to the KTKF toolholder (Ref. to Fig.1).
Adjust the height by making NC lathe parameter settings or inserting a plate.
2) If the 1mm adjustment is not possible on your automatic lathe, use the TKF-NB. (Ref. to Fig.2.)

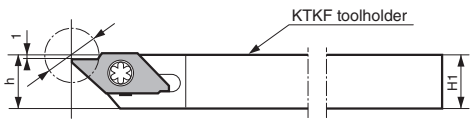


Fig.1 When a TKF-AS/-ASR insert is attached
(The cutting edge is 1mm lower than the center line.)

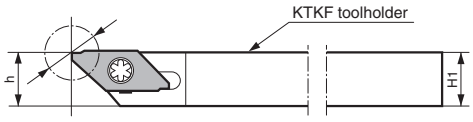
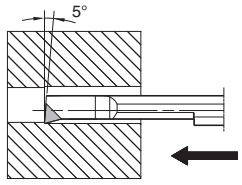


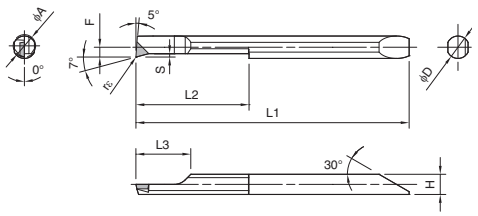
Fig.2 When a TKF-NB insert is attached

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes)

EZ Bars (EZB-NB type: PCD) NEW





● Right-hand shown

● EZ Bars Dimensions

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Description		Min. Bore Dia.	Dimension (mm)									No. of Edges	PCD		Ref. to Page for Applicable Sleeves
		φA	φD	H	L1	L2	L3	F	S	rε			KPD001		
EZBR	040040-003NB	4	4	3.6	48.8	20	9.8	1.75	0.5	0.035 $^{\pm 0.015}$		1	●		F22 ~ F27
	050050-003NB	5	5	4.6	58.1	25		2.25					●		
	060060-003NB	6	6	5.6	66.1	30	11.8	2.75					●		
	070070-003NB	7	7	6.6	74.1	35		3.25					●		

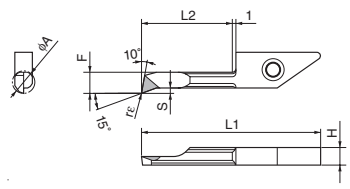
● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes.

System Tip-Bars

Edge Prep.	
PCD all items	Sharp Edge

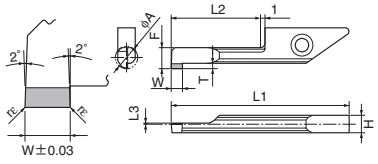
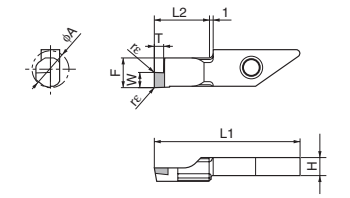
N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Insert (Handed Insert shows Right-hand)	Description		Min. Bore Dia.	Dimension (mm)							No. of Edges	PCD		Ref. to Page for Applicable Toolholders
			φA	H	L1	L2	F	S	rε			KPD001	KPD010	
 Micro Boring	VNBR	0411-02NB	4	3.9	30.8	11	3.5	0.5	0.2		1	●	●	F30 F31
		0420-02NB			39.8	20						●	●	
	VNBR	0511-02NB	5	3.9	30.8	11	4.5	0.7	0.2			●	●	
		0520-02NB			39.8	20						●	●	
	VNBR	0620-02NB	6	3.9	39.8	20	5.3	1.0	0.2			●	●	
		0630-02NB			49.8	30						●	●	
	VNBR	0720-02NB	7	3.9	39.8	20	6.2	1.0	0.2			●	●	
		0730-02NB			49.8	30						●	●	

System Tip-Bars

Edge Prep.	
PCD all items	Sharp Edge

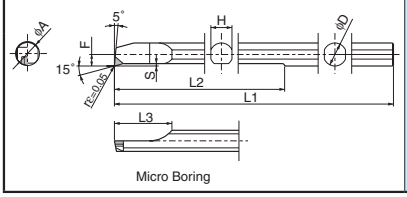
N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Insert (Handed Insert shows Right-hand)	Description		Min. Bore Dia.	Dimension (mm)									No. of Edges	PCD		Ref. to Page for Applicable Toolholders
			φA	W	rε	H	L1	L2	L3	F	T			KPD001	KPD010	
 Micro Grooving	VNGR	0410-11NB	4	1.0	0.05	3.9	30.8	11	0.1	3.5	0.8		1	MTO	MTO	F30 F31
		0420-11NB		2.0	0.10									MTO	MTO	
	VNGR	0510-11NB	5	1.0	0.05	3.9	30.8	11	0.1	4.4	1.0			MTO	MTO	
		0520-11NB		2.0	0.10									MTO	MTO	
	VNGR	0610-20NB	6	1.0	0.05	3.9	39.8	20	0.3	5.2	1.8			MTO	MTO	
		0620-20NB		2.0	0.10									MTO	MTO	
	VNGR	0710-20NB	7	1.0	0.05	3.9	39.8	20	0.3	6.2	2.0			MTO	MTO	
		0720-20NB		2.0	0.10									MTO	MTO	
 Micro Face Grooving	VNFGR	0820-10NB	8	2.0	0.05	3.9	39.8	10	-	7.3	2.0		1	MTO	MTO	
		0830-10NB	8	3.0							3.0			MTO	MTO	

Tip-Bars

Edge Prep.	
PCD all items	Sharp Edge

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

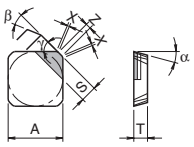
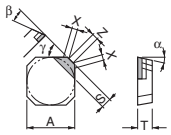
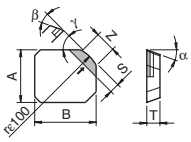
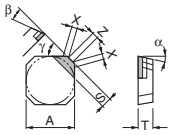
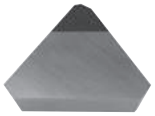
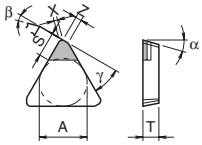
Insert (Handed Insert shows Right-hand)	Description		Min. Bore Dia.	Dimension (mm)							No. of Edges	PCD				Ref. to Page for Applicable Sleeves
			φA	φD	H	L1	L2	L3	F	S		KPD001		KPD010		
												R	L	R	L	
 Micro Boring	PSB$^{R}_{L}$	0404-60NBS	4	3.8	3.6	60	30	10	1.9	0.3	1	○		○		F84
		0505-70NBS	5	4.8	4.4	70	40	12	2.4	0.5		○		○	○	
		0606-70NBS	6	5.8	5.2		45		2.9			○		○		
		0707-80NBS	7	6.8	6.2	80	50		3.4			○		○		

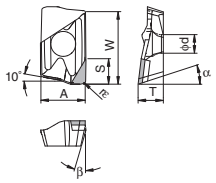
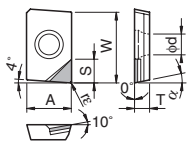
CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item (1 pc boxes)
○ : Check Availability
MTO : Made to order

Milling Inserts

Edge Prep.		N	Non-ferrous Metals (With interruption)	◔		●
PCD all items	Sharp Edge	S	Titanium Alloys (With interruption)	◔		●

Insert		Description		Dimension (mm)						Angle			No. of Edges	PCD			Ref. to Page for Applicable Toolholders
				A	T	X	Z	S		α	β	γ		KPD001	KPD010	KPD230	
		SDKN	1203AUFN-NE	12.70	3.18	0.5	1.2	3.1		15°	23°	45°	1	●			M43
			1203AUFN					3.6						●	●		
		SEEN	1203AFFN-NE	12.70	3.18	0.5	1.4	3.0		20°	25°	45°	1	●			M38 M39 M40
			1203AFFN					3.5						●	●		
With Wiper Edge		SEEN	1203AFFR-W	12.50	3.18	-	3.5	1.7	B= 14.56	20°	25°	45°	1	●			M40
		SOKN	13T3AXFN-NE	13.494	3.97	0.4	1.1	3.0		27°	32°	45°	1			○	M44
		TEEN	1603PTFR-NE	9.525	3.18	0.6	1.4	4.1		20°	22°	30°	1	●		●	M113
			1603PTFR					4.7						●	●		
		TEKN	2204PTFR-NE	12.70	4.76	0.7	1.8	4.2		20°	22°	30°	1	●		●	M94
			2204PTFR					4.8						●	●		M95

Insert		Description		Dimension (mm)						Angle			No. of Edges	PCD			Ref. to Page for Applicable Toolholders
				A	T	φd	W	rε	S	α	β			KPD001	KPD010	KPD230	
		BDMT	11T302FR	6.7	3.8	2.8	11.0	0.2	3.6	18°	13°		1	●		●	M62
			11T304FR					0.4						●		●	M63
		BDMT	170402FR	9.6	4.9	4.4	17.0	0.2	4.4	18°	13°		1	●		●	M64 M65
			170404FR					0.4						●		●	
		NDCW	150302FRX-NE	9.525	3.18	4.4	15.0	0.2	5.1	15°	-		1	●		●	M111
			150302FRX						5.7					●	●		

● : Std. Item (1 pc boxes) ○ : Check Availability

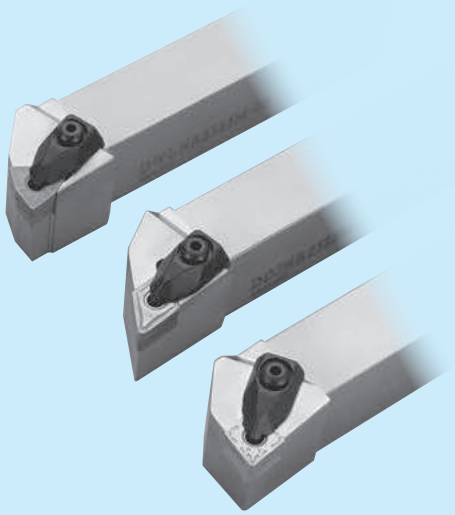
CBN & PCD Inserts are sold in 1 piece boxes.

External

D

D1~D40

External Turning Toolholders Identification System		**D3**
Product Lineup		**D4~D5**
Clamping System		**D6~D7**
External Turning Toolholders		**D8~D21**
CN□□ Insert	DCLN / PCLN	D8
DN□□ Insert	DDJN / DDHN	D10
	PDJN / PDHN	D11
SN□□ Insert	DSBN / PSBN / PSKN	D12
	PSSN / PSDN	D13
TN□□ Insert	DTGN / PTGN / PTFN	D14
	WTJN-N / WTKN-N / WTEN-N	D15
VN□□ Insert	DVLN / DVPN / DVVN	D16
	MVLN / MVVN	D17
	PVLN / PVPN / PVVN	D18
RC□□ Insert	PRGC / PRXC	D19
RN□□ Insert	PRGN	D19
WN□□ Insert	DWLN / PWLN / WWLN	D20
Toolholders for Ceramic Tools		**D22~D31**
CN□□ Insert	CCLN	D22
DN□□ Insert	CDJN	D23
EN□□ Insert	CELN	D23
SN□□ Insert	CSRN / CS-N / CSKN / CSYN	D25
	CSSN / CSDN	D25
TN□□ Insert	CTJN / CTUN	D26
RN□□ Insert	CRSN / CRDN	D27
CNGX Insert	CCLN-GX	D28
DNGX Insert	CDHN-GX / CDJN-GX	D29
SNGX Insert	CSRN-GX / CSDN-GX / CSSN-GX	D30
	CS-N-GX / CSKN-GX / CSYN-GX	D31
Toolholders for Solid CBN Tools		**D32~D36**
CNMN Insert	CCRN-A / CCLN-A	D32
RNMN Insert	CRSN-A / CRDN-A	D33
SNMN Insert	CSRN-A / CSKN-A / CSYN-A	D34
	CSSN-A / CSDN-A	D35
TNMN Insert	CTJN-A / CTUN-A	D36
Toolholders for Bearing Machining		**D37~D38**
RCMT Insert	PRGC-BE / PRGC-BF	D37
SNMF Insert	CBSN	D38
Technical Information		**D39~D40**
Recommended Cutting Conditions		D39
Parts Compatibility of Lever Lock Toolholders		**R44**



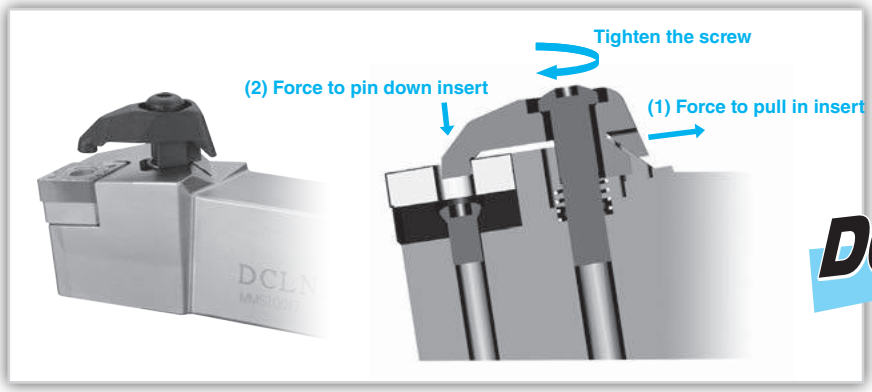
High rigidity toolholder

Double Clamp Series

Securely clamps the insert with a single action

Improved Clamping Rigidity

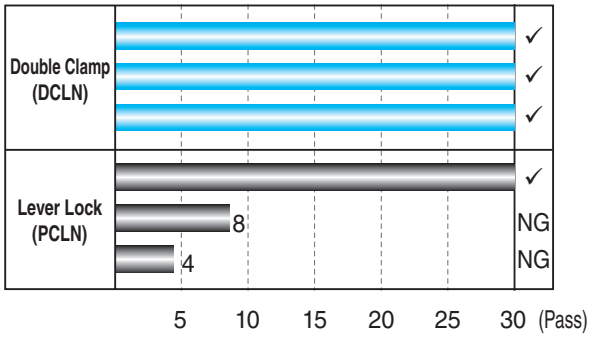
Firmly clamp the insert in two directions with one action



DOUBLE POWER

Achieving long Tool Life

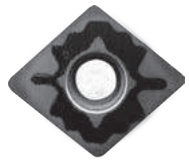
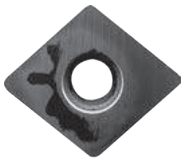
By strongly clamping the insert in two directions, good contact between the shim and insert can be maintained, even with high feed rates.
Along with improving the accuracy of the insert position, long tool life can be achieved.



<Cutting Conditions>
SCM435, Vc=150m/min, ap=1mm, f=0.4mm/rev
CNMG120408PS, 30 Pass Interrupted Machining

Comparison of shim and insert contact

Coating material is applied to the shim side of the insert, which is installed on the toolholder. Compare the shim contact surface after tightening.

PS Chipbreaker	Shim contact surface of double clamp	Shim contact surface of lever lock
	 Cutting edge side	 Cutting edge side
	The shape of insert chipbreaker is transferred. There is a high level of contact.	Only a part of the shape of insert chipbreaker is transferred.There is a low level of contact.

Convenient marking design

Screw	Tightening Torque (N•m)
CS-2D	1.7
CS-3D	3.9
CS-5D	3.0

Use the part-description for convenient ordering. The screw tightening torque is also indicated.

External Turning Toolholders Identification System (Square Shank)

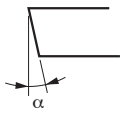
Clamping System	Insert Shape	Hand of Tool	Shank Height	Shank Width	Others
A: Back Clamp **C**: Top Clamp **D**: Double Clamp **M**: Multi Lock **P**: Pin Lock or Lever Lock **S**: Screw Clamp **W**: Wedge Lock	**C**: 80° Rhombic **D**: 55° Rhombic **R**: Round **S**: 90° Square **T**: 60° Triangle **V**: 35° Rhombic **W**: 80° Trigon	**R**: Right-hand **L**: Left-hand **N**: Neutral	Shank Height (mm)	Shank Width (mm)	Manufacture's Option Optional Mark or Number

D	C	L	N	R	20	20	K	—	12	

Cutting Edge Angle

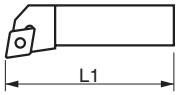
A	B	C	D
90°	75°	90°	45°
E	**F**	**G**	**H**
60°	90°	90°	107.5°
J	**K**	**L**	**N**
93°	75°	95° 95°	63°
P	**R**	**S**	**T**
117.5°	75°	45°	60°
U	**V**	**W**	**Y**
93°	72.5°	60°	85°

Insert Relief Angle



B: 5° Positive
C: 7° Positive
D: 15° Positive
E: 20° Positive
N: 0° Negative
P: 11°Positive

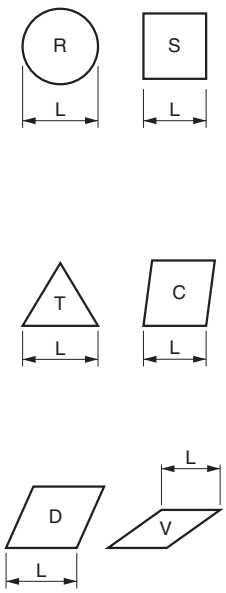
Toolholder Length



(mm)

A: 32	**J**: 110	**R**: 200
B: 40	**JX**: 120	**S**: 250
C: 50	**K**: 125	**T**: 300
D: 60	**L**: 140	**U**: 350
E: 70	**M**: 150	**V**: 400
F: 80	**N**: 160	**W**: 450
G: 90	**P**: 170	**Y**: 500
H: 100	**Q**: 180	**X**: Special

Insert Size



- Specification may change without any prior notice.
- Due to the installation size contrains on the machine, the toolholder length of some products may not match with the symbol.

External Turning Toolholders

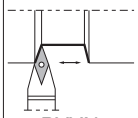
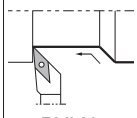
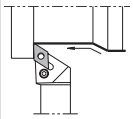
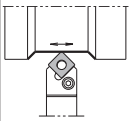
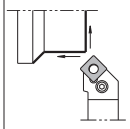
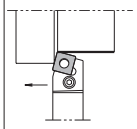
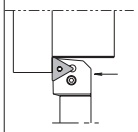
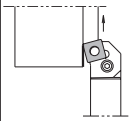
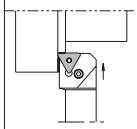
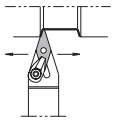
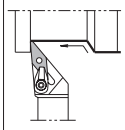
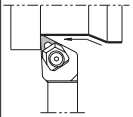
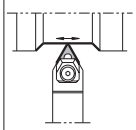
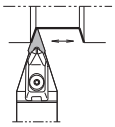
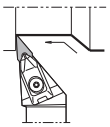
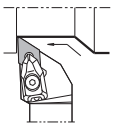
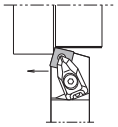
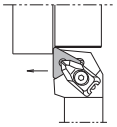
Applicable Insert Shape	CN..	WN..	TN..	DN..	RC..		RN..	VN..
Applications	External / Facing		External / Facing / Copying					External / Facing / Copying / Undercutting
Cutting Edge Angle	95°		105°	107.5°	Special			117.5°
Lever Lock (Pin Lock)	PCLN	PWLN		PDHN	PRGC	PRXC	PRGN	PVPN (Pin Lock)
Ref. to Page	**D8**	**D20**		**D11**	**D19**	**D19**	**D19**	**D18**
Wedge Lock Multi Lock		WWLN	WTKN-N					
Ref. to Page		**D20**	**D15**					
Double Clamp	DCLN	DWLN		DDHN				DVPN
Ref. to Page	**D8**	**D20**		**D10**				**D16**

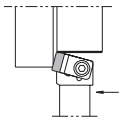
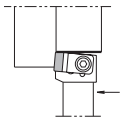
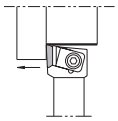
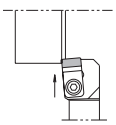
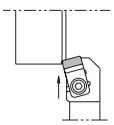
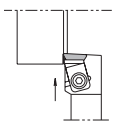
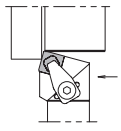
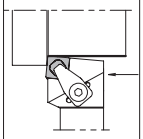
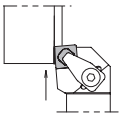
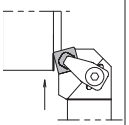
Toolholders for Ceramic Tools

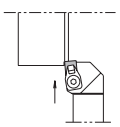
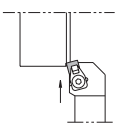
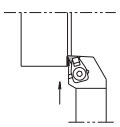
Applications	External / Facing			External / Copying			External / Chamfering	External / Facing / Chamfering
Cutting Edge Angle	95°	97.5°	Special	93°	107.5°	Special	45°	45°
Top Clamp	CCLN	CELN	CRSN	CDJN		CRDN	CSDN	CSSN
Ref. to Page	**D22**	**D23**	**D27**	**D23**		**D27**	**D25**	**D25**
Dimpled-clamp	CCLN-GX			CDJN-GX	CDHN-GX		CSDN-GX	CSSN-GX
Ref. to Page	**D28**			**D29**	**D29**		**D30**	**D30**

Toolholders for Solid CBN Tools

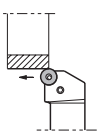
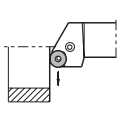
Applications	External / Facing		External / Copying	External / Chamfering	External / Facing / Chamfering	External		
Cutting Edge Angle	95°	Special	Special	45°	45°	75°		93°
Top Clamp	CCLN-A	CRSN-A	CRDN-A	CSDN-A	CSSN-A	CCRN-A	CSRN-A	CTJN-A
Ref. to Page	**D32**	**D33**	**D33**	**D35**	**D35**	**D32**	**D34**	**D36**

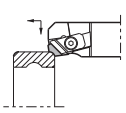
	VN..		DN.. TN..	SN..	TN..	SN..	SN..	TN..	SN..	TN..
	External / Copying			External / Chamfering		External / Facing / Chamfering	External		Facing	
	72.5°	95°	93°	45°	60°	45°	75°	91°	15°	-1°
	 PVVN (Pin Lock)	 PVLN (Pin Lock)	 PDJN	 PSDN		 PSSN	 PSBN	 PTGN	 PSKN	 PTFN
	D18	**D18**	**D11**	**D13**		**D13**	**D12**	**D14**	**D12**	**D14**
	 MVVN	 MVLN	 WTJN-N		 WTEN-N					
	D17	**D17**	**D15**		**D15**					
	 DVVN	 DVLN	 DDJN				 DSBN	 DTGN		
	D16	**D16**	**D10**				**D12**	**D14**		

	External			Facing		
	75°	85°	93°	5°	15°	-3°
	 CSRN	 CS-N	 CTJN	 CSYN	 CSKN	 CTUN
	D25	**D25**	**D26**	**D25**	**D25**	**D26**
	 CSRN-GX	 CS-N-GX		 CSYN-GX	 CSKN-GX	
	D30	**D31**		**D31**	**D31**	

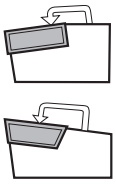
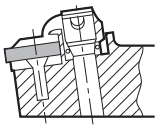
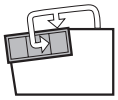
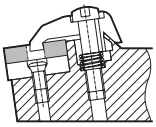
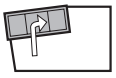
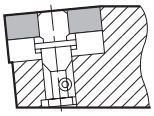
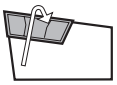
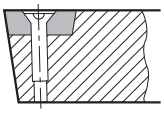
	Facing		
	5°	15°	-3°
	 CSYN-A	 CSKN-A	 CTUN-A
	D34	**D34**	**D36**

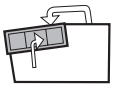
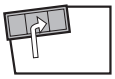
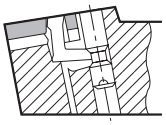
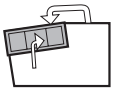
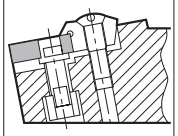
Toolholders for Bearing Machining

Applications	External	Facing
Cutting Edge Angle	Special	Special
Lever Lock	 PRGC-BE	 PRGC-BF
Ref. to Page	**D37**	**D37**

Applications	Round Chamfering
Cutting Edge Angle	Special
Top Clamp	 CBSN
Ref. to Page	**D38**

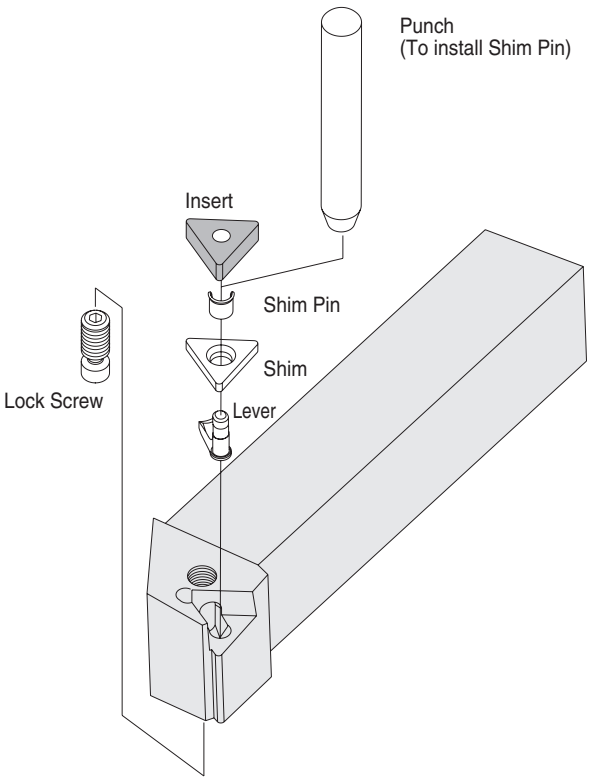
Clamping System

Series	Design		Features
Top Clamp (C)			· Rigid Clamping · Negative Insert : Medium to Heavy Machining (Mainly for Ceramic Insert) · Positive Insert : Low Cutting Force
Double Clamp (D)			· Firmly clamp the insert in two directions with one action.
Pin Lock (P)			· Easy Insert Replacement
Screw Clamp (S)			· Simple Mechanism · Fewer Parts · Finishing to Medium Machining

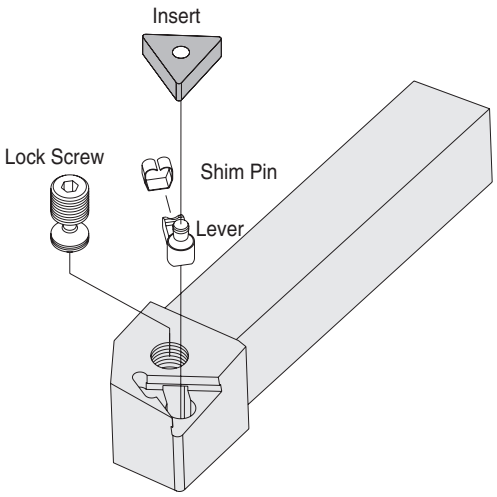
Series	Design		Features
Multi Lock (M)			· Combination of Top Clamp and Pin Lock · Rigid Clamping · Heavy Machining
Lever Lock (P)			· Easy Insert Replacement · General Use
Wedge Lock (W)			· Rigid Clamping · Heavy Machining

● Lever Lock

PCLN
PWLN
PTGN / PTFN / PTLN
PDJN / PDHN
PSBN / PSKN / PSSN / PSDN
PRGN
PRGC / PRXC



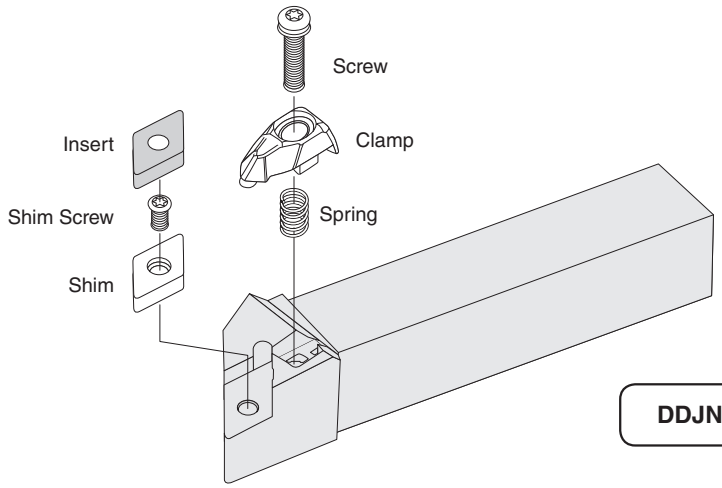
With Shim



Without Shim

PTGN-11 / PTFN-11

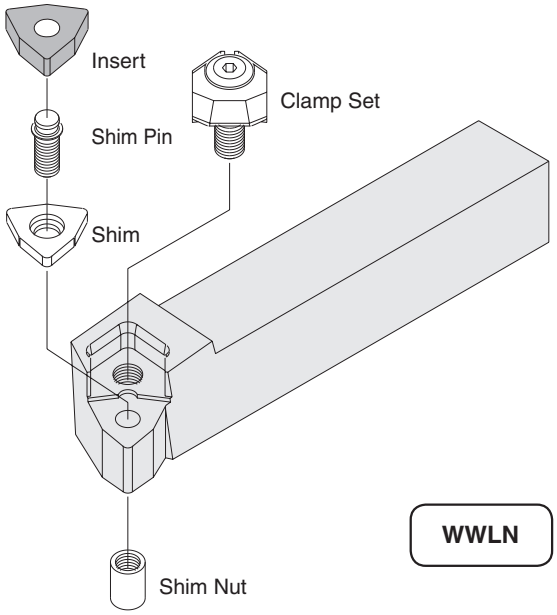
Double Clamp



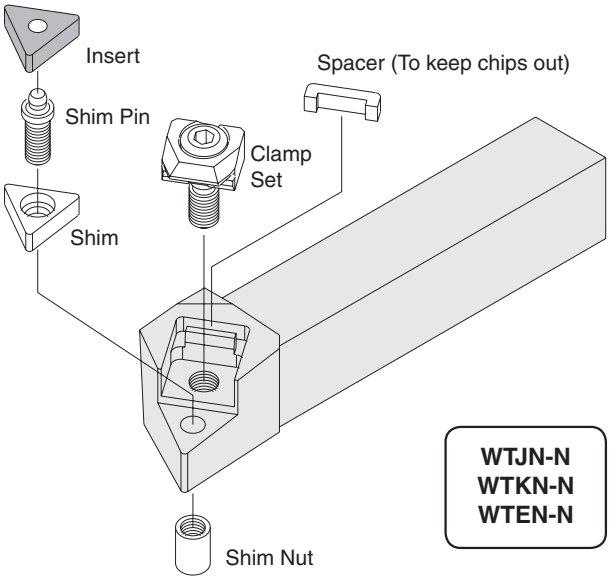
DDJN

DCLN
DDJN / DDHN
DSBN
DTGN
DVLN / DVPN / DVVN
DWLN

Wedge Lock

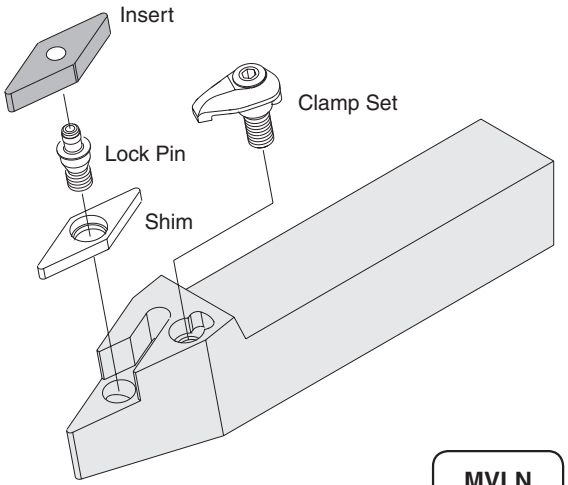


WWLN



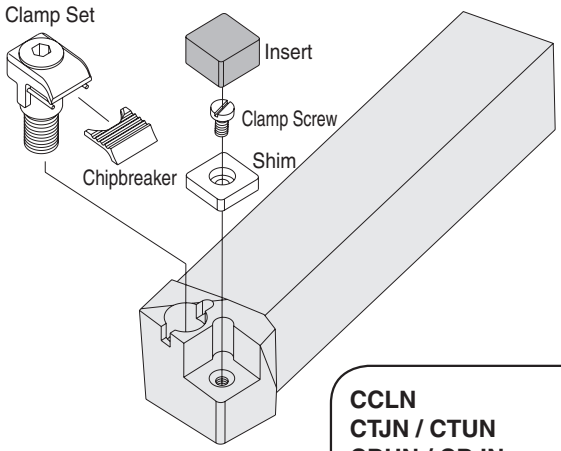
WTJN-N
WTKN-N
WTEN-N

Multi Lock



MVLN
MVVN

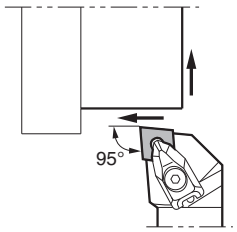
Top Clamp

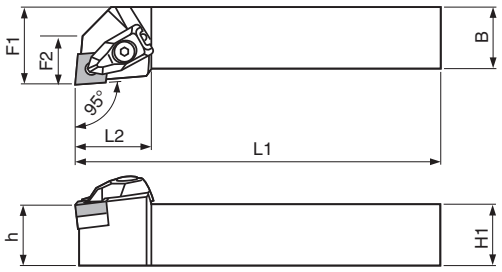


CCLN
CTJN / CTUN
CDHN / CDJN
CELN
CSRN / CS-N / CSKN
CSYN / CSSN / CSDN
*** CRSN / * CRDN**

* A chipbreaker is not included with CRSN / CRDN.

DCLN (External / Facing)





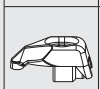
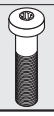
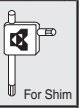
●Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

● **Applicable Inserts**

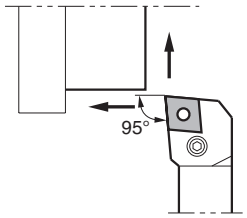
Toolholder Description	Insert Description	
DCLN$^{R}_{L}$...-12	CN□A CN□G CN□M	1204..

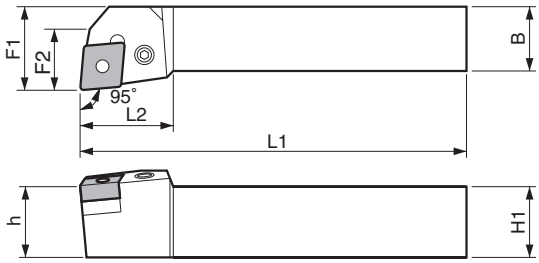
● **Toolholder Dimensions**

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
																	
DCLN$^{R}_{L}$	2020K-12	●	●	20	20	125	33	25	20	0.8	CP-3D	CS-3D	SP-3D	*DC-44	SB-4085TR	LW-3	FT-15
	2525M-12	●	●	25	25	150	32	32									

*When using inserts whose corner-R(rε) is greater than 1.6mm, it will be necessary additional modifications of the shim in order to prevent workpiece and shim from interfering each other.

PCLN (External / Facing)





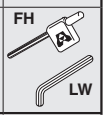
●Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

● **Applicable Inserts**

Toolholder Description	Insert Description	
PCLN$^{R}_{L}$...-09	CN□G	0904..
PCLN$^{R}_{L}$...-12	CN□A CN□G CN□M	1204..
PCLN$^{R}_{L}$...-16		1606..

● **Toolholder Dimensions**

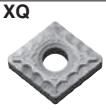
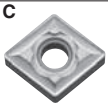
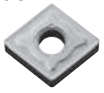
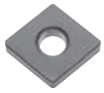
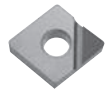
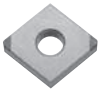
Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
																
PCLN$^{R}_{L}$	1616H-09	●	●	16	16	100	22	20	14	0.8	LL-1N	LS-1N	LC-32N	LSP-1	PC-1	FH-2.5
	2020K-09	●	●	20	20	125		25	15							
	2525M-09	●	●	25	25	150		32	18							
	2020H-12*	●		20	20	100	27	25	20	0.8	LL-2N	LS-2N	LC-42N *LC-42N-20	LSP-2	PC-2	LW-3
	2020K-12	●	●			125										
	2525M-12	●	●	25	25	150		32								
	3225P-12	●	●	32		170										
	2525M-16	●	●	25	25	150	32	32	25	0.8	LL-5N	LS-4N	LC-53N	LSP-3	-	LW-3
	3232P-16	●	●	32	32	170		40	27							

* mark indicates short shank type

· When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

● : Std. Item

● Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing
Insert	**WP(Wiper)**	**WQ(Wiper)**	**PP**	**PQ**	**CQ**	**CJ**	**GS**	**PG**
Size	12	12	12	12	12,16	12,16	09,12	12
Page	**B14**	**B14**	**B14**	**B14**	**B14**	**B14**	**B15**	**B15**
Applications	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing	Roughing	Single Sided / Roughing / High Feed Rate	Finishing	Medium
Insert	**PS**	**HS**	**PT**	**Standard**	**PH**	**PX**	**R/L-S**	**R/L**
Size	12,16	12,16	12,16	12,16	12,16	12,16	09	09,12
Page	**B15**	**B15**	**B15**	**B16**	**B16**	**B16**	**B20**	**B20**
Applications	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron
Insert	**XF**	**XP**	**XQ** 	**XS**	**MQ**	**MS**	**MU**	**C** 
Size	12	12	12	12	12	12	12,16	12,16
Page	**B17**	**B17**	**B17**	**B17**	**B18**	**B18**	**B18**	**B19**
Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	**ZS**	**GC** 	**Without Chipbreaker**	**Ceramic** 	**AH**	**A3**	**PCD** 	**CBN** 
Size	12	12	12	12	12	12	12	12
Page	**B19**	**B19**	**B19**	**B98**	**B19**	**B19**	**C23**	**C6,C7**

Recommended Cutting Conditions ➡ **D39~D40**

■ Short Shank Toolholders for small lathes and turning mill

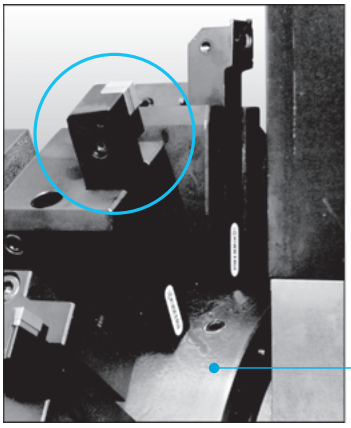
Overall length : 100mm (20mm square shank)

- Optimal toolholder length for small lathe, conventionally for which shank was cut off
- Available also as toolholder for quick change system of turning mill

Short Shank PCLNR2020H-12

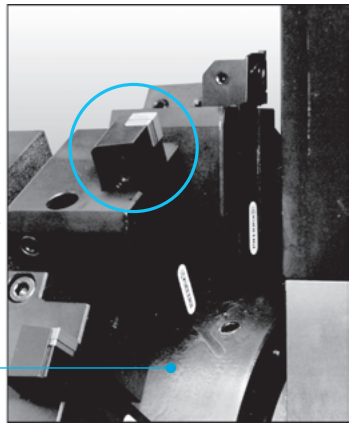
Conventional Toolholder PCLNR2020K-12

Conventional Toolholder



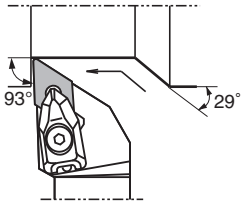
Large overhang length due to contact of shank with toolpost drum.

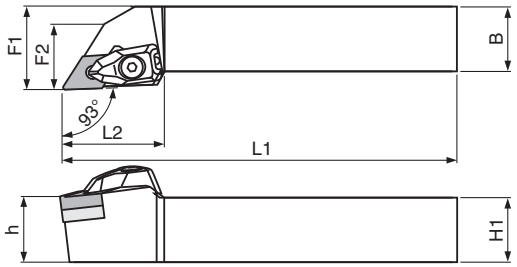
Short Shank



May be set to optional overhang length since there is no interference with tool-post drum.

DDJN (External / Copying)





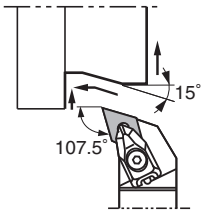
●Right-hand shown

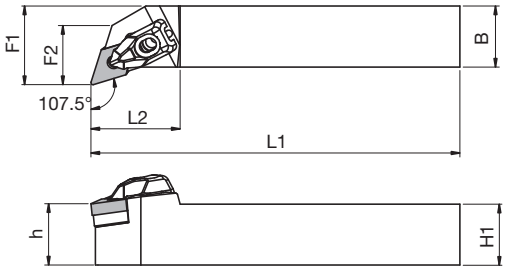
Side Rake Angle: -6°
Angle of Inclination: -7°

● Applicable Inserts

Toolholder Description	Insert Description	
DDJNR/L...-1504	DN□A DN□G DN□M	1504.. (1506..)
DDJNR/L...-1506		1506.. (1504..)

DDHN (External / Facing / Copying)





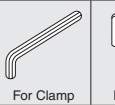
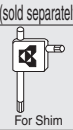
●Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

● Applicable Inserts

Toolholder Description	Insert Description	
DDHNR/L...-1504	DN□A DN□G DN□M	1504.. (1506..)
DDHNR/L...-1506		1506.. (1504..)

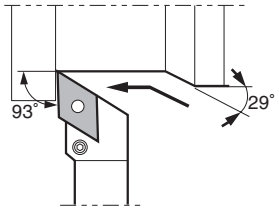
● Toolholder Dimensions

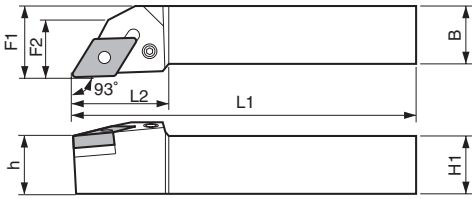
Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
																 For Clamp	 For Shim
DDJNR/L	2020K-1504	●	●	20	20	125	39	25	-	0.8	CP-3D	CS-3D	SP-3D	*DD-44 (DD-43)	SB-4085TR	LW-3	FT-15
	2525M-1504	●	●	25	25	150		32	25								
DDJNR/L	2020K-1506	●	●	20	20	125		25	-					DD-43 (*DD-44)			
	2525M-1506	●	●	25	25	150		32	25								
DDHNR/L	2020K-1504	●	●	20	20	125	37	25	22					*DD-44 (DD-43)			
	2525M-1504	●	●	25	25	150		32									
DDHNR/L	2020K-1506	●	●	20	20	125		25						DD-43 (*DD-44)			
	2525M-1506	●	●	25	25	150		32									

Shims indicated within brackets ( ) are not included with the toolholder. To change insert thickness, please purchase it separately.
*When using inserts whose corner-R(rε) is greater than 1.6mm, it will be necessary additional modifications of the shim in order to prevent workpiece and shim from interfering each other.

● : Std. Item

PDJN (External / Copying)





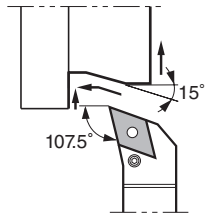
●Right-hand shown

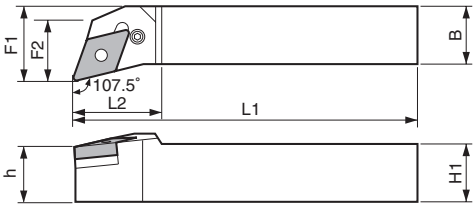
Side Rake Angle: -6°
Angle of Inclination: -7°

● Applicable Inserts

Toolholder Description	Insert Description	
PDJN$^{R}_{L}$...-11	DN□A DN□G	1104..
PDJN$^{R}_{L}$...-15	DN□A DN□G	1504..
PDJN$^{R}_{L}$...-15U	DN□M	1506.. (1504..)

PDHN (External / Facing / Copying)





●Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

● Applicable Inserts

Toolholder Description	Insert Description	
PDHN$^{R}_{L}$...15	DN□A DN□G DN□M	1504.. (1506..)

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PDJN$^{R}_{L}$	1616H -11	●	●	16	16	100	28	20	-	0.4	LL-1DN	LS-1N	LD-32N	LSP-1	PC-1	FH-2.5
	2020K -11	●	●	20	20	125		25								
	2525M -11	●	●	25	25	150		32	27							
	2020H -15*	●		20	20	100	36	25	-	0.8	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2	LW-3
	2020K -15	●	●			125										
	2525M -15	●	●	25	25	150		32	25							
	3225P -15	●	●	32		170										
	2525M -15U	●	●	25	25	150	34	32	24	0.8	LL-4	LS-3	LD-42 *LD-42-20 (LD-43) (*LD-43-20)	LSP-2	PC-2	LW-3
	3232P -15U	●	●	32	32	170	36	40	28							
PDHN$^{R}_{L}$	2020K -15	●	●	20	20	125	35	25	22	0.8	LL-4	LS-3	LD-43 *LD-43-20 (LD-42) (*LD-42-20)	LSP-2	PC-2	LW-3
	2525M -15	●	●	25	25	150	34	32	24							

*mark indicates short shank type

· Shim: PDJN$^{R}_{L}$-15U …LD-42 is attached to PDJN$^{R}_{L}$-15U. When using DN□□1504 type insert, please purchase LD-43 separately.
PDHN …LD-43 is attached to PDHN. When using DN□□1506 type Insert, please purchase LD-42 separately.
· When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

● Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing	Roughing
Insert	PP	PQ	CQ	CJ	GS	PG	PS	PT	Standard	PH
Size	1504,1506	1504,1506	1504,1506	1504,1506	1104,1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506
Page	B21	B21	B22	B22	B22	B22	B23	B23	B23	B24

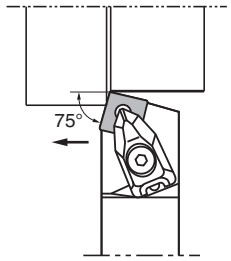
Applications	Single Sided / Roughing / High Feed Rate	Finishing	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing
Insert	PX	$^{R}_{L}$-S	$^{R}_{L}$	XP	XQ	XS	MQ	MS	MU
Size	1504,1506	1104	1104,1504	1504,1506	1504,1506	1504	1504,1506	1504,1506	1504,1506
Page	B24	B27	B27	B24	B24	B24	B25	B25	B25

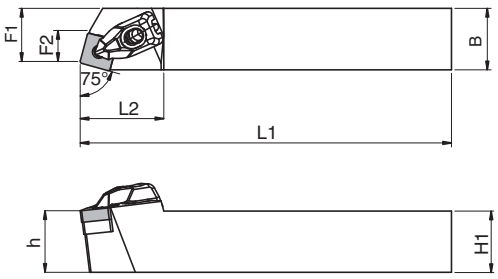
Applications	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	TK	C	ZS	GC	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
Size	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504	1504	1504,1506
Page	B25	B26	B26	B26	B99	B27	B27	C23	C8, C9

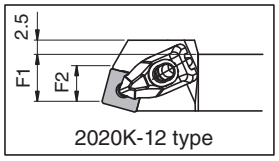
Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

DSBN (External)







Side Rake Angle: -6°
Angle of Inclination: -6°

●Right-hand shown

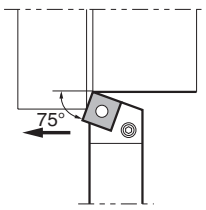
● Applicable Inserts

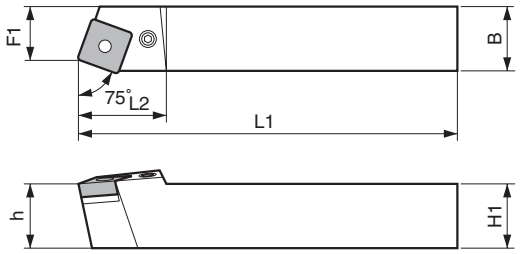
Toolholder Description	Insert Description	
DSBN$^{R}_{L}$...-12	SN□A SN□G SN□M	1204..

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DSBN$^{R}_{L}$	2020K -12	●	●	20	20	125	34	17	13	0.8	CP-3D	CS-3D	SP-3D	DS-44	SB-4085TR	LW-3	FT-15
	2525M -12	●	●	25	25	150		22									

PSBN (External)

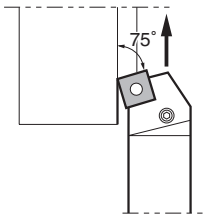


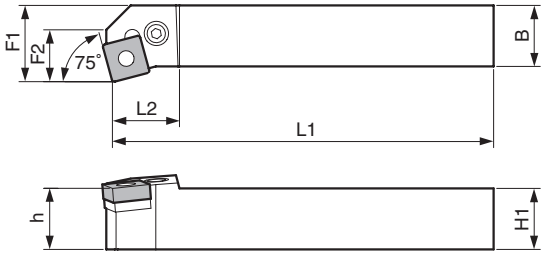


Side Rake Angle: -6°
Angle of Inclination: -6°

●Right-hand shown

PSKN (Facing)





Side Rake Angle: -6°
Angle of Inclination: -6°

●Right-hand shown

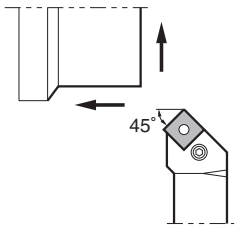
● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PSBN$^{R}_{L}$	1616H -09	●	●	16	16	100	21	13	-	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K -12	●	●	20	20	125	27	17	-	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M -12	●	●	25	25	150	24	22								
PSKN$^{R}_{L}$	1616H -09	●	●	16	16	100	19	20	12.7	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K -12	●	●	20	20	125	22.5	25	17	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M -12	●	●	25	25	150		32	19							

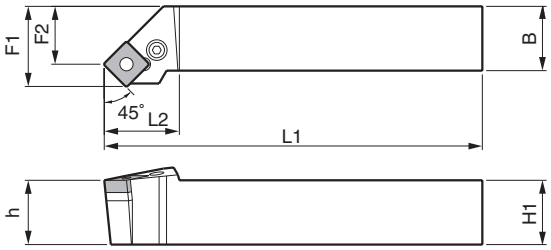
· PSKN$^{R}_{L}$...Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

● : Std. Item

PSSN (External / Facing / Chamfering)

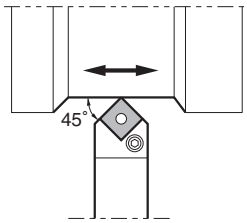


Side Rake Angle: -8°
Angle of Inclination: 0°

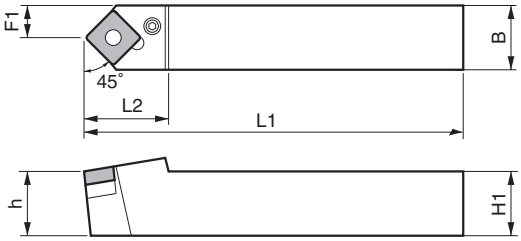


●Right-hand shown

PSDN (External / Chamfering)



Back Rake Angle: -8.5°



● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(r_ε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PSSN$^{R}_{L}$	1616H-09	●		●	16	16	100	22	20	13.6	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K-12	●		●	20	20	125	29	25	16.4	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M-12	●		●	25	25	150		32	23.4							
PSDNN	1616H-09		●		16	16	100	21	8	-	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K-12		●		20	20	125	30	10	-	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M-12		●		25	25	150		12.5								

● Applicable Inserts

Toolholder Description	Insert Description	
PSBN$^{R}_{L}$...-09	SN□G	0903..
PSKN$^{R}_{L}$...-09		
PSSN$^{R}_{L}$...-09		
PSDNN...-09		
PSBN$^{R}_{L}$...-12	SN□A SN□G SN□M	1204..
PSKN$^{R}_{L}$...-12		
PSSN$^{R}_{L}$...-12		
PSDNN...-12		

Applications	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing	Roughing	Single Sided / Roughing / High Feed Rate
Insert	PQ	PG	PS	HS	PT	Standard	PH	PX
Size	12	12	12	12	12	09,12	12	12
Page	B29	B29	B29	B29	B29	B29	B30	B30

Applications	Finishing-Roughing	Medium-Roughing / Low Cutting Force	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Cast Iron
Insert	$^{R}_{L}$-□	$^{R}_{L}$-25R	XP	XQ	XS	MQ	MS	C
Size	09,12	12	12	12	12	12	12	12
Page	B32	B32	B30	B30	B30	B31	B31	B31

Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Hard Materials			
Insert	ZS	GC	Without Chipbreaker	Ceramic	CBN			
Size	12	12	12	12	12			
Page	B31	B31	B31	B101	C10			

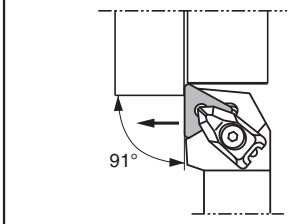
· PSSN$^{R}_{L}$: For External Turning, Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder
For Facing, Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder

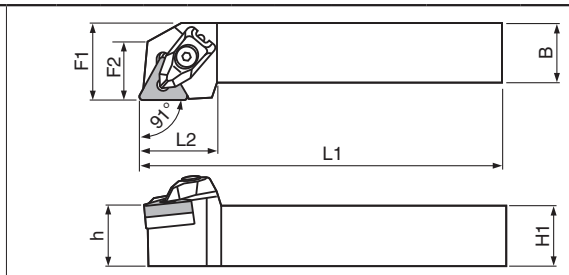
Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

External Turning Toolholders [TN□□ Insert]

DTGN (External)



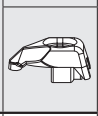
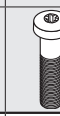
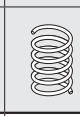
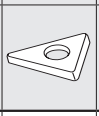
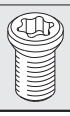
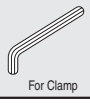
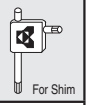


●Right-hand shown

Side Rake Angle: -6°
Angle of Inclination:-6°

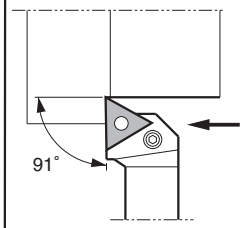
● Applicable Inserts

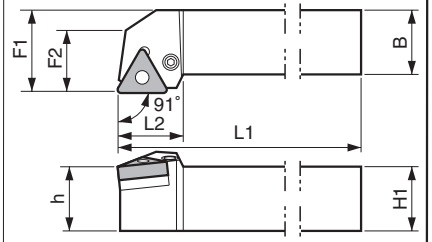
Toolholder Description	Insert Description	
DTGN$^{R}_{L}$...-16	TN□A TN□G TN□M	1604..

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
																 For Clamp	 For Shim
DTGN$^{R}_{L}$	2020K -16	●	●	20	20	125	25	25	20	0.8	CP-2D	CS-2D	SP-2D	*DT-32	SB-3080TR	LW-2.5	FT-10
	2525M -16	●	●	25	25	150		32									

*When using inserts whose corner-R(rε) is greater than 1.6mm, it will be necessary additional modifications of the shim in order to prevent workpiece and shim from interfering each other.

PTGN (External)

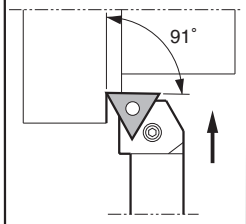


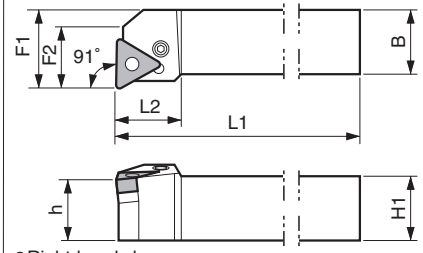


●Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

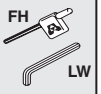
PTFN (Facing)





●Right-hand shown

Side Rake Angle: -6°
Angle of Inclination:-6°

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
														P LSP		 FH LW
PTGN$^{R}_{L}$	1212F -11	●	●	12	12	80	18	16	12	0.8	LL-03N	LS-03N	-	P-03	-	FH-2
	1616H -11	●	●	16	16	100	22	20	14	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
	2020K -11	●	●	20	20	125		25	20							
	2525M -11	●	●	25	25	150		32	22							
	1616H -16	●	●	16	16	100	24	20	17	0.8	LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
	2020H -16*	●		20	20			25	20							
	2020K -16	●	●			125										
	2525M -16	●	●	25	25	150		32								
	2525M -22	●	●	25	25	150	29	32	24	0.8	LL-2N	LS-2N	LT-42N *LT-42N-20	LSP-2	PC-2	LW-3
PTFN$^{R}_{L}$	1212F -11	●	●	12	12	80	15	16	12.5	0.8	LL-03N	LS-03N	-	P-03	-	FH-2
	1616H -11	●	●	16	16	100	22.5	20	15	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
	2020K -11	●	●	20	20	125		25	19							
	2525M -11	●	●	25	25	150		32	25							
	2020K -16	●	●	20	20	125	22	25	21	0.8	LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
	2525M -16	●	●	25	25	150	23	32	22							
	2525M -22	●	●	25	25	150	28	32	25	0.8	LL-2N	LS-2N	LT-42N *LT-42N-20	LSP-2	PC-2	LW-3

*mark indicates short shank type

·When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

● Applicable Inserts

Toolholder Description	Insert Description	
PT□N$^{R}_{L}$12...-11	TN□□	1103..
PT□N$^{R}_{L}$...-11		1104..
PT□N$^{R}_{L}$...-16	TN□A TN□G TN□M	1604..
PT□N$^{R}_{L}$...-22		2204..

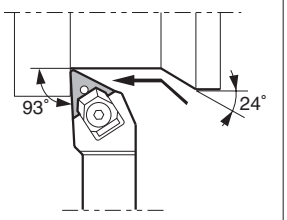
PTGN$^{R}_{L}$1212F-11
PTFN$^{R}_{L}$1212F-11
} Insert applicable for above

TN□□1103-type Insert is applicable.

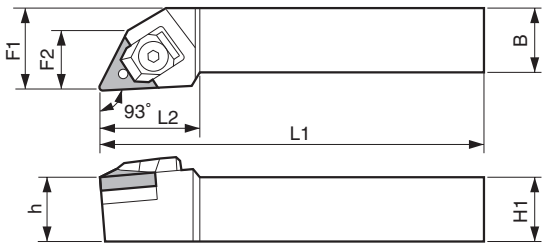
· PTFN$^{R}_{L}$: Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

● : Std. Item

WTJN-N (External / Copying)

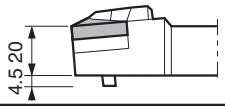


●Right-hand shown

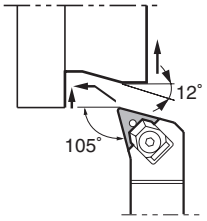


Side Rake Angle: -6°
Angle of Inclination: -6°

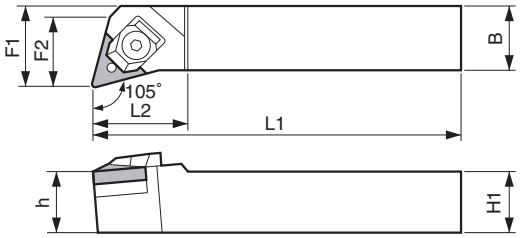
WTJN$^{R}_{L}$2020K types, Shim Nut sticks out as shown below.



WTKN-N (External / Facing / Copying)

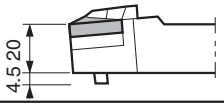


●Right-hand shown

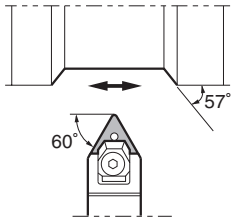


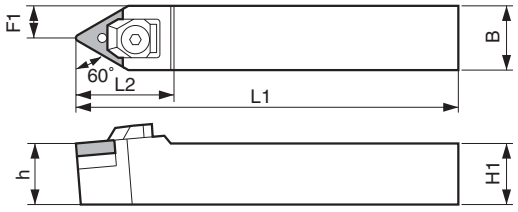
Side Rake Angle: -6°
Angle of Inclination: -6°

WTKN$^{R}_{L}$2020K types, Shim Nut sticks out as shown below.



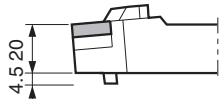
WTEN-N (External / Chamfering)





Back Rake Angle: -8.5°

WTENN2020K types, Shim Nut sticks out as shown below.



● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Spacer
WTJN$^{R}_{L}$	2020K-16N	●		●	20	20	125	32	25	24	0.8	WCS-1N	WTN-33 *WTN -33-20	WP-1S	WN-1	LW-3	WSP-1
	2525M-16N	●		●	25	25	150		32								
WTKN$^{R}_{L}$	2020K-16N	●		●	20	20	125	32	25	-							
	2525M-16N	●		●	25	25	150		32	30							
WTENN	2020K-16N		●		20	20	125	32	10	-							
	2525M-16N		●		25	25	150		12.5								

·When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim (WTN-33-20) with * mark and use it in order to prevent workpiece and shim from interfering with each other.

● Applicable Inserts

Toolholder Description	Insert Description	
WTJN$^{R}_{L}$...-16N	TN□A TN□G TN□M	1604..
WTKN$^{R}_{L}$...-16N		
WTENN...-16N		

Applications	Finishing	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Medium-Roughing / High Feed Rate	Roughing
Insert	PP	PQ	CQ	GS	PG	PS	PT	GT	PH
Size	16	16	16,22	1104,16	16	16,22	16	16	16,22
Page	B33	B33	B33	B33	B33	B33	B34	B34	B34

Applications	Single Sided / Roughing / High Feed	Roughing	Finishing	Finishing-Roughing	Medium-Roughing / Low Cutting Force	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing
Insert	PX	Standard	$^{R}_{L}$-S	$^{R}_{L}$-□	$^{R}_{L}$-25R	XF	XP	XQ	XS
Size	16,22	16,22	1104,16	1103,1104,16,22	16	16	16	16	16
Page	B34	B34	B38	B38,B39	B39	B35	B35	B35	B35

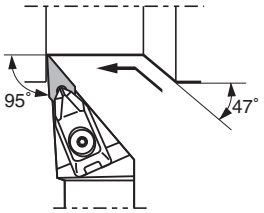
Applications	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	MQ	MS	MU	C	ZS	GC	Without Chipbreaker	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
Size	16	16	16	16	16	16	1103,16	16	16	16	16	16
Page	B36	B36	B36	B37	B37	B37	B37	B103	B37	B37	C23	C11

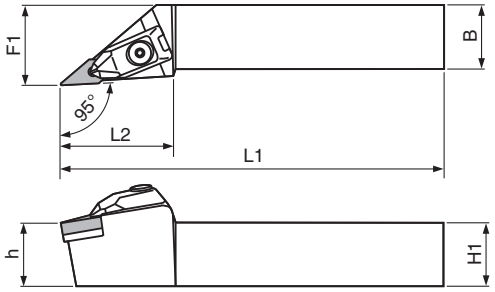
·In wedge lock, use of ceramic insert other than silicon nitride insert is not recommended due to strong restrain force.

Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

DVLN (External / Copying)





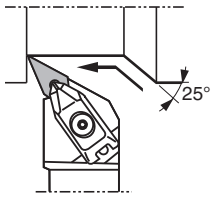
●Right-hand shown

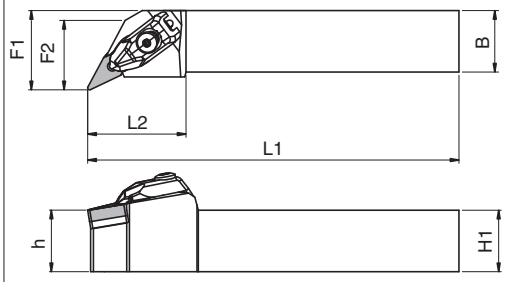
Side Rake Angle: -6°
Angle of Inclination: -9°

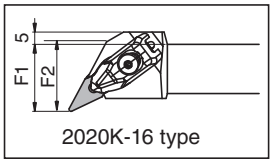
● **Applicable Inserts**

Toolholder Description	Insert Description	
DVLN$^{R}_{L}$...-16	**VN□A VN□G VN□M**	**1604..**

DVPN (External / Facing / Copying / Undercutting)







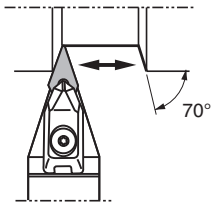
●Right-hand shown

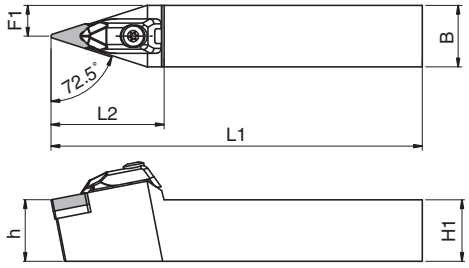
Side Rake Angle: -13°
Angle of Inclination: -10°

● **Applicable Inserts**

Toolholder Description	Insert Description	
DVPN$^{R}_{L}$...-16	**VN□A VN□G VN□M**	**1604..**

DVVN (External / Copying)





Back Rake Angle: -11°

● **Applicable Inserts**

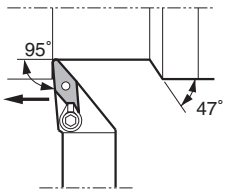
Toolholder Description	Insert Description	
DVVNN...-16	**VN□A VN□G VN□M**	**1604..**

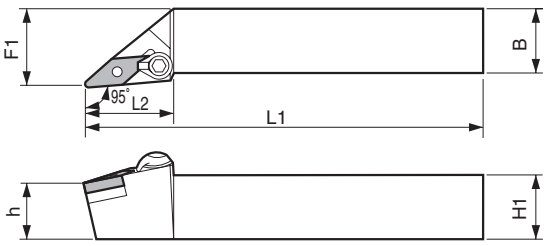
● **Toolholder Dimensions**

Description		Std.			Dimension (mm)						Standard Corner-R(rε)	Spare Parts						
												Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
		R	N	L	H1=h	B	L1	L2	F1	F2							For Clamp	For Shim
DVLN$^{R}_{L}$	**2020K-16**	●		●	20	20	125	45	25	-	0.8	CP-5D	CS-5D	SP-5D	DV-33	SB-4085TR	LW-3	FT-15
	2525M-16	●		●	25	25	150		32									
DVPN$^{R}_{L}$	**2020K-16**	●		●	20	20	125	40	27	28								
	2525M-16	●		●	25	25	150		32									
DVVNN	**2020K-16**		●		20	20	125	46	10	-								
	2525M-16		●		25	25	150		12.5									

● : Std. Item

MVLN (External / Copying)

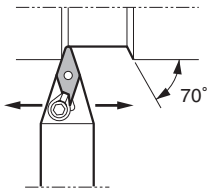


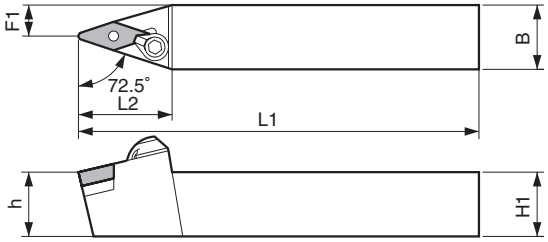


Side Rake Angle: -6°
Angle of Inclination: -9°

●Right-hand shown

MVVN (External / Copying)





Back Rake Angle: -11°

● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Lock Pin	Wrench
MVLN R/L	2020K-16	●		●	20	20	125	38	25	0.8	CPS-5 R/L	FH-2.5	MVN-32	TS-3S	FH-2
	2525M-16	●		●	25	25	150		32						
MVVNN	2020K-16		●		20	20	125	39	10	0.8	CPS-5R	FH-2.5	MVN-32	TS-3S	FH-2
	2525M-16		●		25	25	150		12.5						

· Clamp Set: CPS-5R for Right-hand Toolholder, CPS-5L for Left-hand Toolholder.

● Applicable Inserts

Toolholder Description	Insert Description	
MVLN R/L...-16 MVVNN...-16	VN□A VN□G VN□M	1604..

Applications	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium	Roughing	Finishing-Medium	Stainless Steel / Finishing
Insert	PP	R/L -VC	VF	PQ	TN-V	Standard	R/L	MQ
Size	16	16	16	16	16	16	16	16
Page	B40	B40	B40	B40	B40	B40	B41	B41
Applications	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials		
Insert	MS	MU	Without Chipbreaker	Ceramic	PCD	CBN		
Size	16	16	16	16	16	16		
Page	B41	B41	B41	B104	C23	C12		

Recommended Cutting Conditions ➡ D39~D40

◆ Regarding rotation directions of the clamp set

MVVNN type
(Neutral)

MVLNR type
(Right-hand Toolholder)

Clamp set: (CPS-5R) has Right-hand thread.
When clamping the insert, turn the screw in the arrow direction (clockwise).
When removing the insert, turn the screw away from the arrow (counterclockwise).

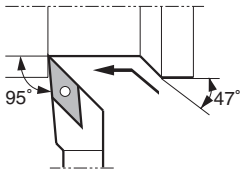
MVLNL type
(Left-hand Toolholder)

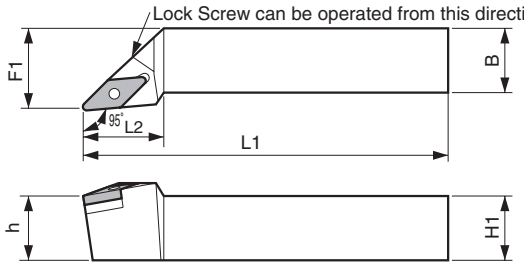
Clamp set: (CPS-5L) has Left-hand thread.
When clamping the insert, turn the screw in the arrow direction (counterclockwise).
When removing the insert, turn the screw away from the arrow (clockwise).

● : Std. Item

External Turning Toolholders [VN□□ Insert]

PVLN (External / Copying)

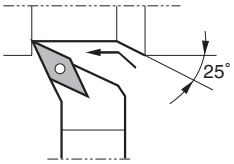


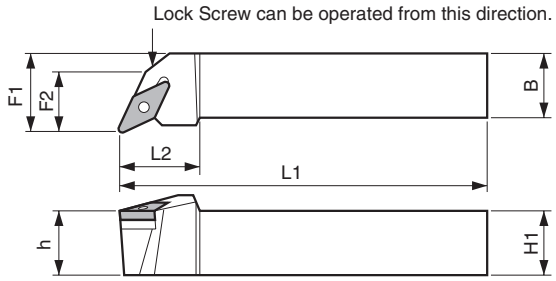


Side Rake Angle: -6°
Angle of Inclination: -9°

●Right-hand shown

PVPN (External / Facing / Copying / Undercutting)

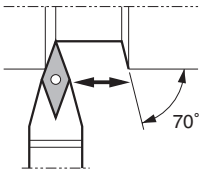


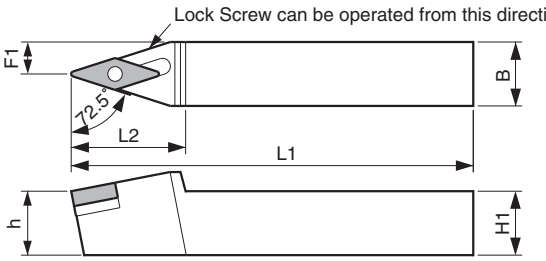


Side Rake Angle: -13°
Angle of Inclination: -10°

●Right-hand shown

PVVN (External / Copying)





Back Rake Angle: -11°

● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Lock Pin	Lock Screw	Shim	Wrench		
PVLN R/L	2525M-16Q	●		●	25	25	150	37	32	-	0.8	LP-6S	LS-15	KVN-32	LW-3		
PVPN R/L	2020K-16Q	●		●	20	20	125	30	25	22	0.8	LP-2S	LS-11	KVN-32	LW-3		
	2525M-16Q	●		●	25	25	150		32	28		LP-6S					
PVVNN	2020K-16Q		●		20	20	125	35	10	-	0.8	LP-2S	LS-15	KVN-32	LW-3		
	2525M-16Q		●		25	25	150	40	12.5			LP-6S					

● Applicable Inserts

Toolholder Description	Insert Description	
PVLN R/L...-16Q	VN□A	1604..
PVPN R/L...-16Q	VN□G	
PVVNN...-16Q	VN□M	

Applications	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium	Roughing	Finishing-Medium	Stainless Steel / Finishing
Insert	PP	R/L -VC	VF	PQ	TN-V	Standard	R/L	MQ
Size	16	16	16	16	16	16	16	16
Page	B40	B40	B40	B40	B40	B40	B41	B41

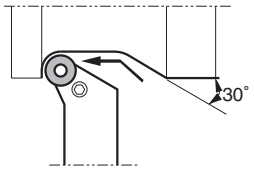
Applications	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials		
Insert	MS	MU	Without Chipbreaker	Ceramic	PCD	CBN		
Size	16	16	16	16	16	16		
Page	B41	B41	B41	B104	C23	C12		

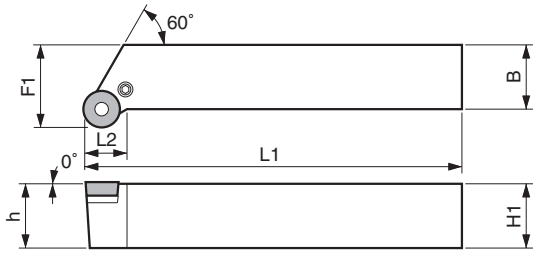
Recommended Cutting Conditions ➔ D39~D40

● : Std. Item

PRGC / PRXC / PRGN (External / Facing / Copying)

PRGC

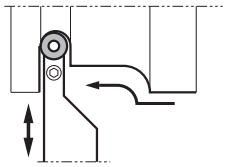


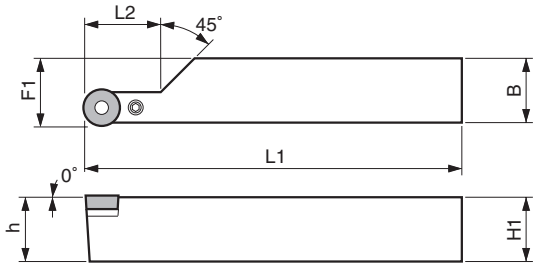


Side Rake Angle: 0°
Angle of Inclination: 0°

●Right-hand shown

PRXC

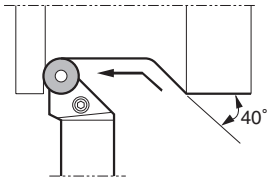


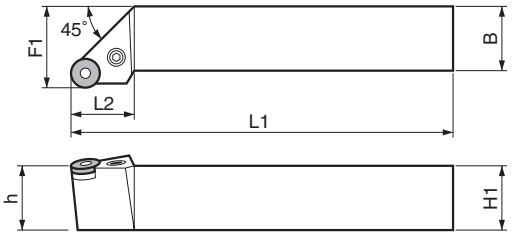


Side Rake Angle: 0°
Angle of Inclination: 0°

●Right-hand shown

PRGN





Side Rake Angle: -6°
Angle of Inclination: -6°

●Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	Standard Corner-R(r_ε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PRGC$^{R}_{L}$	2020K-10	●	●	20	20	125	15	25	-	LL-05C	LS-05	LR-10C	LSP-1	PC-1	FH-2
	2525M-10	●	●	25	25	150		32							
	2020K-12	●	●	20	20	125	14	25	-	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
	2525M-12	●	●	25	25	150	17	32							
PRXC$^{R}_{L}$	2020K-10	●	●	20	20	125	25	20.5	-	LL-05C	LS-05	LR-10C	LSP-1	PC-1	FH-2
	2525M-10	●	●	25	25	150	30	25.5							
	2525Q-10	●	●			180									
	2525M-12	●	●	25	25	150	30	25.7	-	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
PRGN$^{R}_{L}$	2020K-09	●	●	20	20	125	19	25	-	LL-1N	LS-1N	LR-80	LSP-1	PC-1	FH-2.5
	2525M-12	●	●	25	25	150	26	32	-	LL-2N	LS-2N	LR-81	LSP-2	PC-2	LW-3

Applicable Inserts

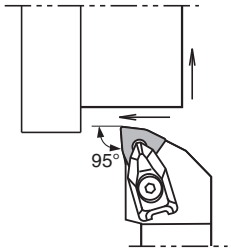
Toolholder Description	Insert Description	
PRGC$^{R}_{L}$...-10	RCGX RCMX	1003M0
PRGC$^{R}_{L}$...-12		1204M0
PRXC$^{R}_{L}$...-10		1003M0
PRXC$^{R}_{L}$...-12		1204M0
PRGN$^{R}_{L}$...-09	RNMG	090300
PRGN$^{R}_{L}$...-12		120400

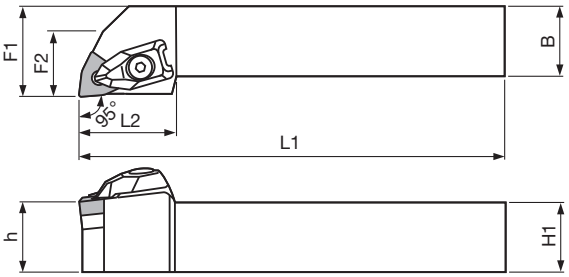
Applications	Medium	Non-ferrous Metals
Insert	Standard	AQ
Size	10,12	10
Page	B68	B68
Applications	Medium-Roughing	
Insert	Standard	
Size	09,12	
Page	B28	

Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

DWLN (External / Facing)





●Right-hand shown

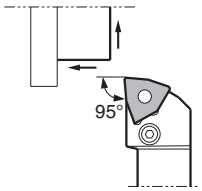
Side Rake Angle: -6°
Angle of Inclination: -6°

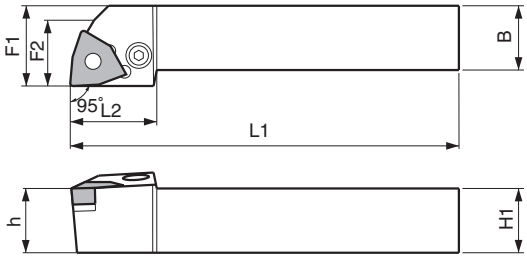
● **Applicable Inserts**

Toolholder Description	Insert Description	
DWLN$^{R}_{L}$...-08	WN□A WN□G WN□M	0804...

Description		Std.		Dimension (mm)						Standard Corner-R(rε)	Spare Parts						
		R	L	H1=h	B	L1	L2	F1	F2		Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DWLN$^{R}_{L}$	2020K -08	●	●	20	20	125	34	25	20	0.8	CP-3D	CS-3D	SP-3D	DW-44	SB-4085TR	LW-3	FT-15
	2525M -08	●	●	25	25	150		32									

PWLN (External / Facing)





●Right-hand shown

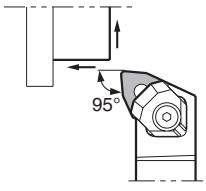
Side Rake Angle: -6°
Angle of Inclination: -6°

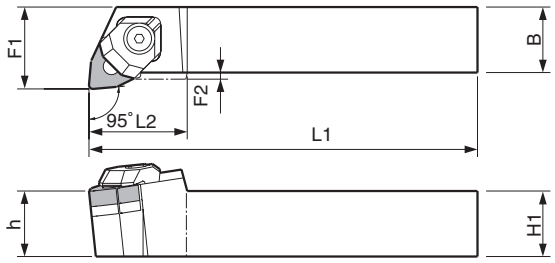
● **Applicable Inserts**

Toolholder Description	Insert Description	
PWLN$^{R}_{L}$...-06	WN□A WN□G WN□M	0604..
PWLN$^{R}_{L}$...-08		0804..

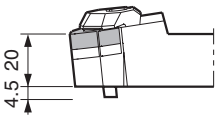
Description		Std.		Dimension (mm)						Standard Corner-R(rε)	Spare Parts					
		R	L	H1=h	B	L1	L2	F1	F2		Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PWLN$^{R}_{L}$	1616H -06	●	●	16	16	100	22	20	-	0.8	LL-1N	LS-1N	LW-32N	LSP-1	PC-1	FH-2.5
	2020K -06	●	●	20	20	125		25								
	2525M -06	●	●	25	25	150		32								
	2020K -08	●	●	20	20	125	26	25	-	0.8	LL-2N	LS-2N	LW-42N	LSP-2	PC-2	LW-3
	2525M -08	●	●	25	25	150		32	23							

WWLN (External / Facing)





●Right-hand shown



WWLN$^{R}_{L}$2020K types,
Shim Nut sticks out as
shown below.

Side Rake Angle: -6°
Angle of Inclination: -6°

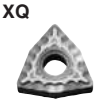
● **Applicable Inserts**

Toolholder Description	Insert Description	
WWLN$^{R}_{L}$...-08	WN□A WN□G WN□M	0804..

Description		Std.		Dimension (mm)						Standard Corner-R(rε)	Spare Parts				
		R	L	H1=h	B	L1	L2	F1	F2		Clamp Set	Shim	Shim Pin	Shim Nut	Wrench
WWLN$^{R}_{L}$	2020K -08	●	●	20	20	125	30	25	-	1.2	WCS-8	WWN-42	WP5X15	WN-1	LW-3
	2525M -08	●	●	25	25	150		32	2.5						

● : Std. Item

● Applicable Inserts

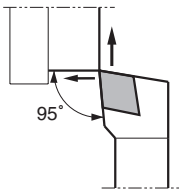
Applications	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing
Insert	**WP(Wiper)**	**WQ(Wiper)**	**PP**	**PQ**	**CQ**	**CJ**	**GS**	**PG**	**PS**
Size	08	08	08	08	08	08	06,08	08	08
Page	**B42**	**B42**	**B42**	**B42**	**B42**	**B42**	**B43**	**B43**	**B43**
Applications	Medium-Roughing / High Feed Rate	Roughing	Finishing	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	
Insert	**PT**	**Standard**	**R/L-S**	**R/L**	**XP**	**XQ** 	**XS**	**MQ**	
Size	08	08	06	06	08	08	08	08	
Page	**B43**	**B43**	**B45**	**B45**	**B44**	**B44**	**B44**	**B44**	
Applications	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Hard Materials	
Insert	**MS**	**MU**	**C**	**ZS**	**GC**	**AH**	**PCD**	**CBN**	
Size	08	08	08	08	08	08	08	08	
Page	**B44**	**B44**	**B45**	**B45**	**B45**	**B45**	**C23**	**C13**	

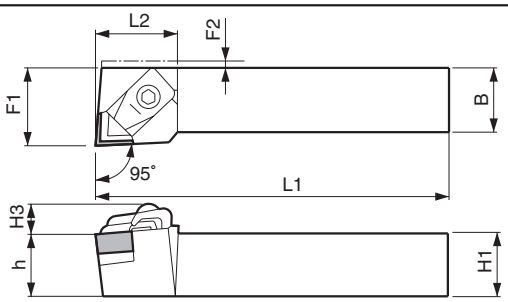
·In wedge lock, use of ceramic insert other than silicon nitride insert is not recommended due to strong restrain force.

Recommended Cutting Conditions ⇒ **D39~D40**

Toolholders for Ceramic Tools [CN□□ Insert]

CCLN (External / Facing)





Side Rake Angle: -6°
Angle of Inclination: -6°

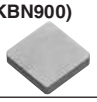
●Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CCLN R/L	2020K -12	●	●	20	14	20	125	32	27	5	0.8	CB-16	CE-010	LW-4	SP-441 (SP-443)	M3X8 (M3X12)
	2525M -12	●	●	25		25	150		32	-						
	3225P -16	●	●	32	14	25	170	35	32	-	0.8	CB-17	CE-220	LW-4	SP-454	M4X10

· Shim & Shim Screw: When using CN□□1204 Insert, please purchase spare parts in ( ) separately.

● Applicable Inserts

Applications	Cast Iron / Hard Materials	Hard Materials / Cast Iron
Ref. to Page	B98	C19
Insert / Toolholder Description	Ceramic	CBN (KBN900) 
CCLN R/L...-12	CNGN1207..(CNGN1204..) CNMN1207	(CNMN1204)
CCLN R/L...-16	CNGN1607..	-

Recommended Cutting Conditions ➡ D39~D40

◆Selection of Ceramic Insert

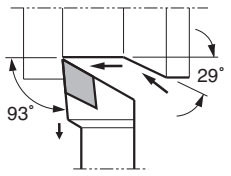
Select the suitable Ceramic Insert and specifications (Corner-R(rε), Feed Rate, Chamfer, etc.) from the table below.

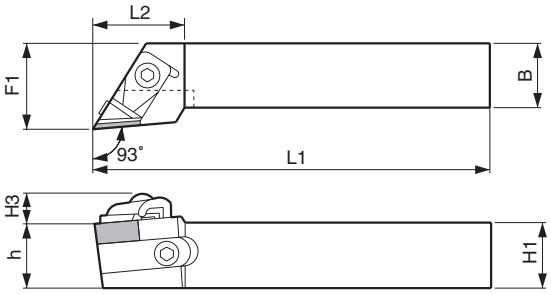
(FC250, Cutting Edge Angle: 0°~15°)

Insert Shape		Corner-R (rε)	f (mm/rev) 0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	ap (mm)
●	RN	–	→	→	→	→	→	→	→	→	→	→	0.3~4
■	SN	2.0	→	→	→	→	→	→	→	→	→	→	0.3~4
		1.6	→	→	→	→	→	→	→	→			
◆	EN	1.2	→	→	→	→	→	→					
	CN	0.8	→	→	→	→							
		0.4	→	→									
▲	TN	1.6	→	→	→	→	→						0.3~2
		1.2	→	→	→	→							
◆	DN	0.8	→	→	→								
Chamfer			0.05mm×20°		(0.1~0.2)mm×(20°~25°)				0.3mm×30°				–
Insert Thickness			7.94mm										

● : Std. Item

CDJN (External / Copying / Back Turning)





Side Rake Angle: -5°
Angle of Inclination: -8°

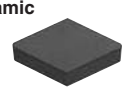
●Right-hand shown

● Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CDJN R/L 2525M-15	●	●	25	16	25	150	32	32		0.8	CB-14/15	CE-010	LW-4	556C R/L	HH5X16
CDJN R/L 3225P -15	●	●	32			170									

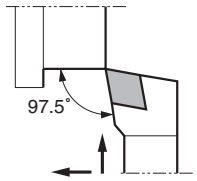
· Chipbreaker: CB-14 for Right-hand Toolholder, and CB-15 for Left-hand Toolholder.
· Shim: 556CR for Right-hand Toolholder, and 556CL for Left-hand Toolholder.

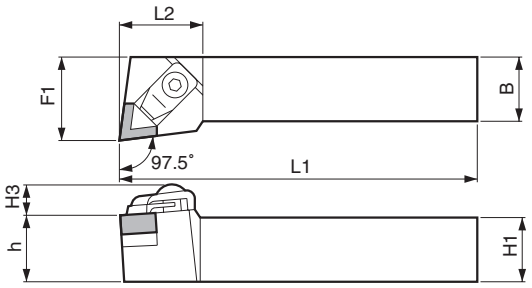
● Applicable Inserts

Applications	Cast Iron / Hard Materials
Ref. to Page	B99
Insert / Toolholder Description	Ceramic 
CDJN R/L...-15	DNGN1507..

Recommended Cutting Conditions ➡ D39~D40

CELN (External / Facing)





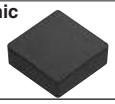
Side Rake Angle: -6°
Angle of Inclination: -6°

●Right-hand shown

● Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CELN R/L 2525M-13	●	●	25	15	25	150	32	32		0.8	CB-16	CE-010	LW-4	SP-342	M3X8

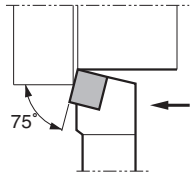
● Applicable Inserts

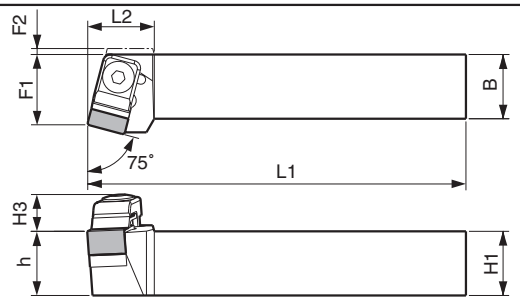
Applications	Cast Iron / Hard Materials
Ref. to Page	B99
Insert / Toolholder Description	Ceramic 
CELN R/L...-13	ENGN1307..

Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

CSRN (External)

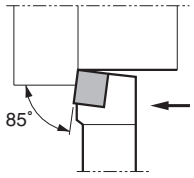


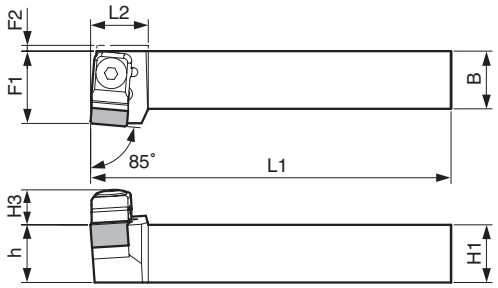


Side Rake Angle: -6°
Angle of Inclination: -4°

●Right-hand shown

CS-N (External)

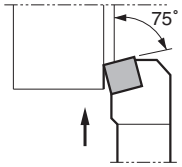


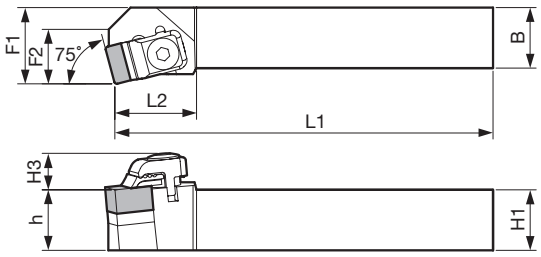


Side Rake Angle: -6°
Angle of Inclination: -4°

●Right-hand shown

CSKN (Facing)

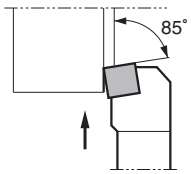


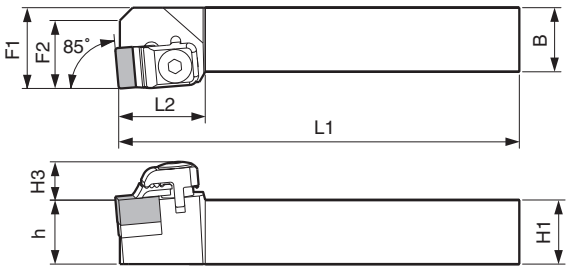


Side Rake Angle: -6°
Angle of Inclination: -4°

●Right-hand shown

CSYN (Facing)

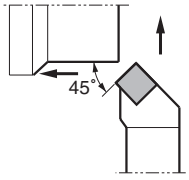


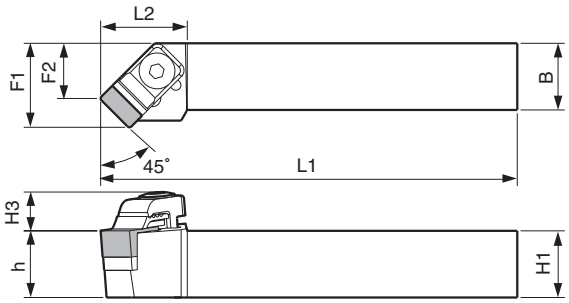


Side Rake Angle: -6°
Angle of Inclination: -4°

●Right-hand shown

CSSN (External / Facing / Chamfering)

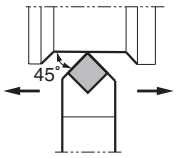


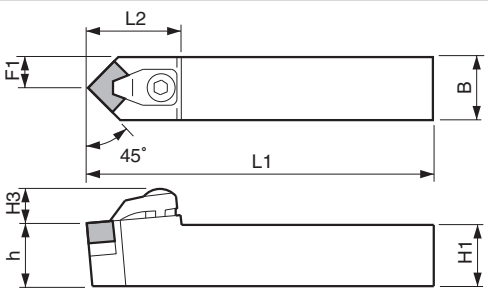


Side Rake Angle: -6°
Angle of Inclination: 0°

●Right-hand shown

CSDN (External / Chamfering)





Back Rake Angle: -8.5°

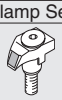
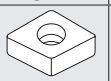
Toolholder Dimensions

Description		Std.			Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
													Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
		R	N	L	H1=h	H3	B	L1	L2	F1	F2			020 220 040			
CSRNR/L	2020K-12	●		●	20	12	20	125	22	22	2	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12	●		●	25		25	150		27	-						
	3225P-12	●		●	32			170									
	3225P-15	●			32	15	25	170	30	32.4	-	0.8	CB-51	CE-220	LW-4	SP-162	M4X10
	4040R-15	●		●	40		40	200		43							
CS-NR/L	2525M-12	●		●	25	12	25	150	20	32	-	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
CSKNR/L	2020K-12	●		●	20	12	20	125	27	25	18	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12	●		●	25		25	150		32							
	3225P-15	●			32	15	25	170	37	32	20	0.8	CB-51	CE-220	LW-4	SP-162	M4X10
CSYNR/L	2020K-12	●		●	20	12	20	125	27	25	21	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12	●		●	25		25	150		32							
CSSNR/L	2020K-12	●		●	20	12	20	125	26	25	16	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12	●		●	25		25	150		32	23						
CSDNN	2020K-12		●		20	13	20	125	32	10	-	0.8	-	CE-040	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12		●		25		25	150		12.5							
	3225P-12		●		32			170									

· Shim & Shim Screw : When using SN□□1204 Insert, please purchase spare parts in ( ) separately.

Applicable Inserts

Applications	Cast Iron / Hard Materials	Cast Iron
Ref. to Page	B101,B102	B31
Insert / Toolholder Description	Ceramic	Coated Carbide
CSRNR/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSRNR/L ...-15	SNGN1507..	-
CS-NR/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSKNR/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSKNR/L ...-15	SNGN1507..	-
CSYNR/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSSNR/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSDNN ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)

Hard Materials / Cast Iron	When using as toolholder for CBN tools (KBN900), please purchase spare parts below separately.		
C19	Clamp Set	Shim	Shim Screw
CBN (KBN900)			
(SNMN1204..)	CE-030A	SP-143	M3X12
-	-		
(SNMN1204..)	CE-030A	SP-143	M3X12
(SNMN1204..)	CE-030A	SP-143	M3X12
-	-		
(SNMN1204..)	CE-030A	SP-143	M3X12
(SNMN1204..)	CE-030A	SP-143	M3X12
(SNMN1204..)	*-	SP-143	M3X12

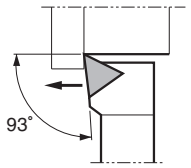
*CSDNN...-12: Clamp Set CE-040 is used continuously.

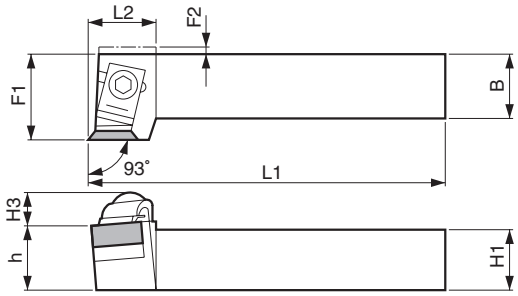
Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

Toolholders for Ceramic Tools [TN□□ Insert]

CTJN (External)

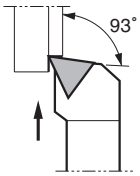


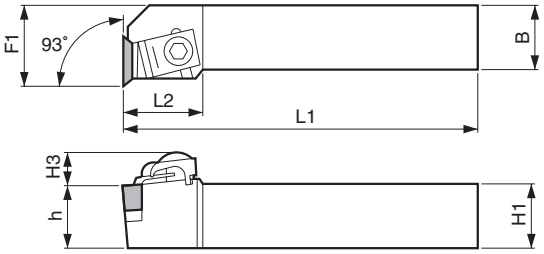


Side Rake Angle: -6°
Angle of Inclination: -4°

●Right-hand shown

CTUN (Facing)





Side Rake Angle: -6°
Angle of Inclination: -4°

●Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(r_ε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CTJN R/L	2020K-16	●	●	20	11	20	125	21	25	2	0.8	CB-12/13	CE-020	LW-4	SP-221 (SP-223)	M3X8 (M3X12)
	2525M-16	●	●	25		25	150		32	-						
CTUN R/L	2020K-16	●	●	20	11	20	125	27	25	-	0.8	CB-13/12	CE-020	LW-4	SP-221 (SP-223)	M3X8 (M3X12)
	2525M-16	●	●	25		25	150		32							

· CTJN (Chipbreaker): CB-12 for Right-hand Toolholder, CB-13 for Left-hand Toolholder.
CTUN (Chipbreaker): CB-13 for Right-hand Toolholder, CB-12 for Left-hand Toolholder.
· Shim & Shim Screw: When using TN□□1604 Insert, please purchase spare parts in ( ) separately.

● Applicable Inserts

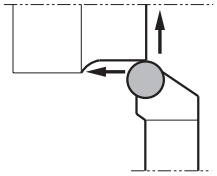
Applications	Cast Iron / Hard Materials	Hard Materials / Cast Iron
Ref. to Page	B103	C19
Insert / Toolholder Description	Ceramic	CBN (KBN900)
CTJN R/L...-16	TNGN1607.. (TNGN1604..) (TNMN1604..)	(TNMN1604..)
CTUN R/L...-16		

Recommended Cutting Conditions ➡ D39~D40

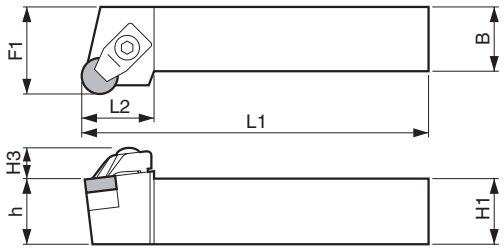
● : Std. Item

Toolholders for Ceramic Tools [RN□□ Insert]

CRSN (External / Facing)

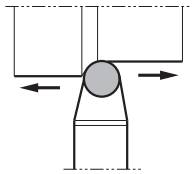


Side Rake Angle: -6°
Angle of Inclination: -6°

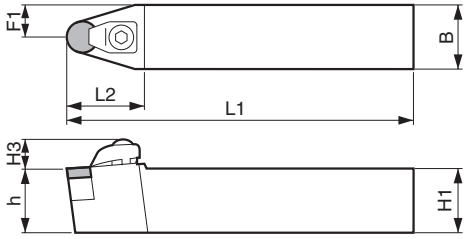


●Right-hand shown

CRDN (External / Copying)



Back Rake Angle: -8.5°



● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
CRSN R/L	2020K-12	●		●	20	11	20	125	26	25	-	CE-030	LW-4	SP-841 (SP-843)	M3X8 (M3X12)
	2525M-12	●		●	25		25	150		32					
	3225P-12	●		●	32			170							
CRDNN	2020K-12		●		20	11	20	125	28	10	-	CE-030	LW-4	SP-841 (SP-843)	M3X8 (M3X12)
	2525M-12		●		25		25	150		12.5					
	3225P-12		●		32			170							
	3232P-15		●		32	13	32	170	35	16	-	CE-040	LW-4	SP-861	M4X10
	4040R-15		●		40		40	200		20					

·Shim & Shim Screw: When using RN□□1204 Insert, please purchase spare parts in ( ) separately.

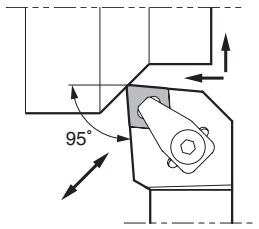
● Applicable Inserts

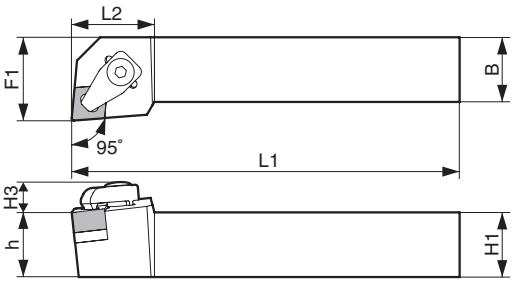
Applications / Ref. to Page / Insert \ Toolholder Description	Cast Iron / Hard Materials B100 Ceramic	Hard Materials / Cast Iron C19 CBN (KBN900)	When using as toolholder for CBN tools (KBN900), please purchase spare parts below separately. Clamp Set	Shim	Shim Screw
CRSN R/L ...-12	RNGN120700(RNGN120400)	(RNMN120400)	CE-030A	SP-843	M3X12
CRDNN ...-12	RNGN120700(RNGN120400)	(RNMN120400)	CE-030A	SP-843	M3X12
CRDNN ...-15	RNGN150700	-	-		

Recommended Cutting Conditions D39~D40

● : Std. Item

CCLN-GX (External / Facing / Back Turning)





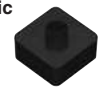
Side Rake Angle: –6°
Angle of Inclination: –6°

●Right-hand shown

● Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts Clamp Set	Wrench	Shim	Shim Screw	
CCLN$^{R}_{L}$ 2525M-12GX	●	●	**25**	**13**	**25**	**150**	**30**	**32**		**1.2**	**CE-410**	**LW-4**	**SP-441**	**M3X8**	

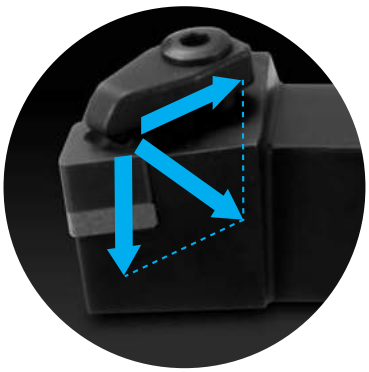
● Applicable Inserts

Applications	Cast Iron
Ref. to Page	**B98**
Insert / Toolholder Description	**Ceramic** 
CCLN$^{R}_{L}$...12GX	CNGX1207..

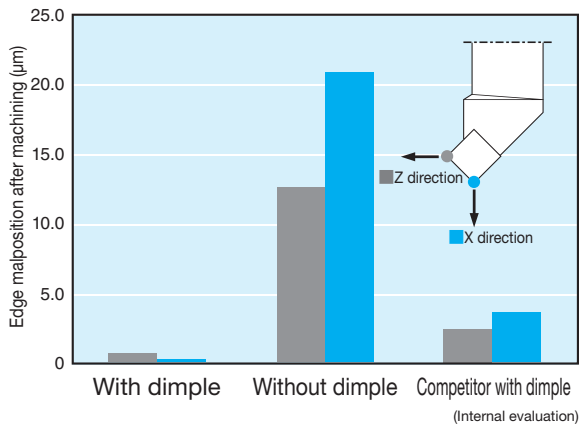
Recommended Cutting Conditions **D39~D40**

Features

- **Improved clamping stability due to the dimple design**
- **Improve machine stability and machinability**

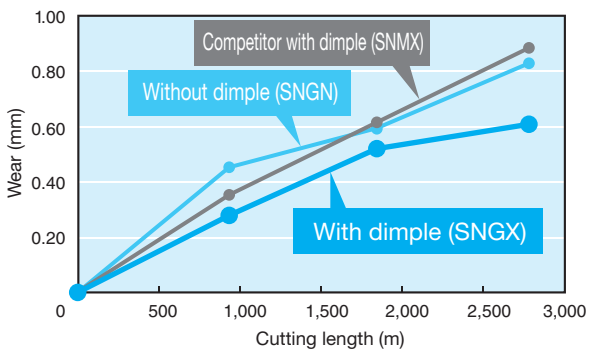


● Edge malposition



(Internal evaluation)

● Cutting capability

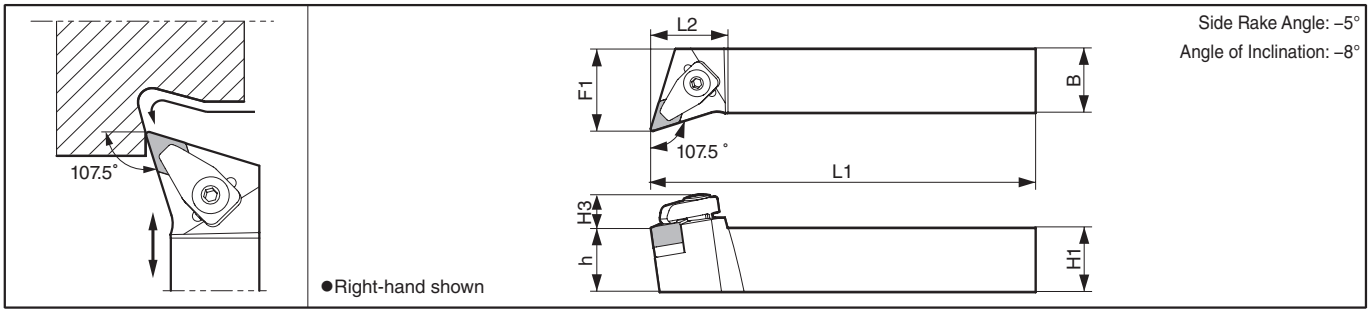


Vc=800m/min, ap=1.5~2.0mm, f=0.6mm/rev
FC250 with scale, Dry

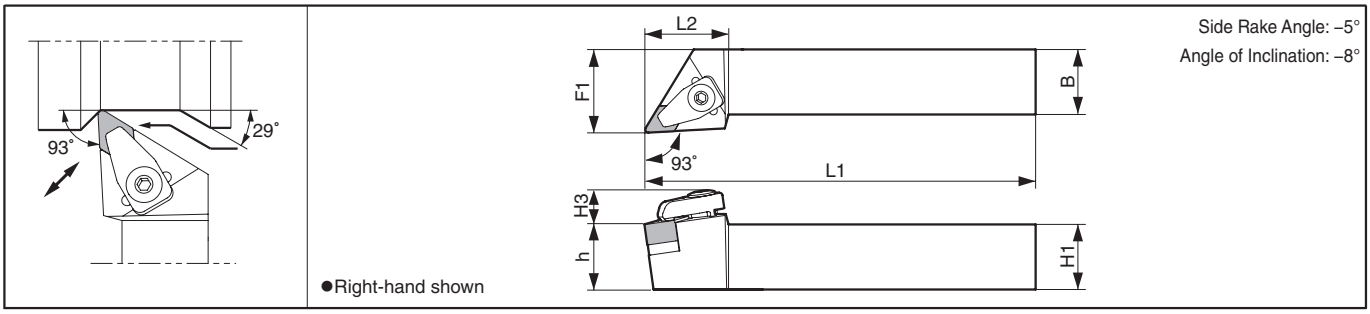
(Internal evaluation)

● : Std. Item

CDHN-GX (External / Copying / Back Turning)



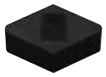
CDJN-GX (External / Copying / Back Turning)



● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	
CDHN R/L	2525M-12GX	●	●	25	14	25	150	30	32		1.2	CE-410	LW-4	SP-521	M3X8	
	2525M-15GX	●	●		15			33				CE-430		SP-541		
CDJN R/L	2525M-12GX	●	●	25	14	25	150	32	32		1.2	CE-410	LW-4	SP-521	M3X8	
	2525M-15GX	●	●		15			38				CE-430		SP-541		

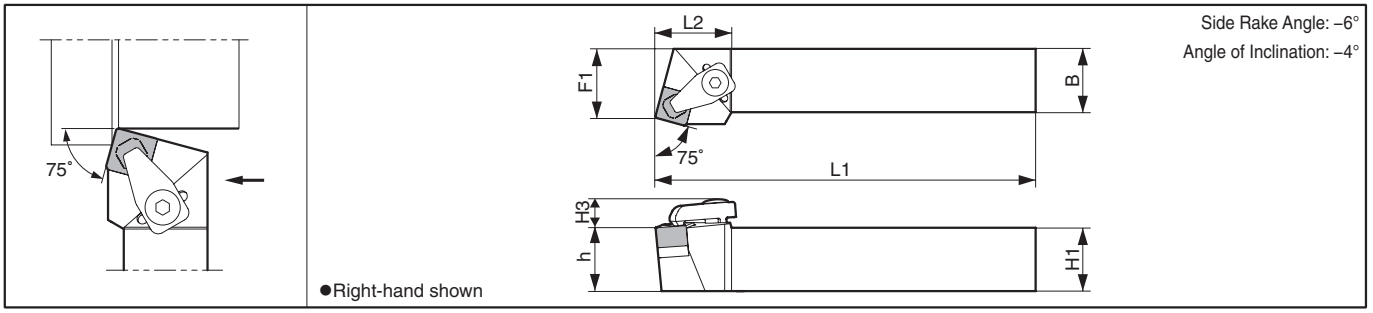
● Applicable Inserts

Applications		Cast Iron
Ref. to Page		B99
Insert / Toolholder Description		Ceramic 
CDHN R/L	2525M-12GX	DNGX1207···
	2525M-15GX	DNGX1507···
CDJN R/L	2525M-12GX	DNGX1207···
	2525M-15GX	DNGX1507···

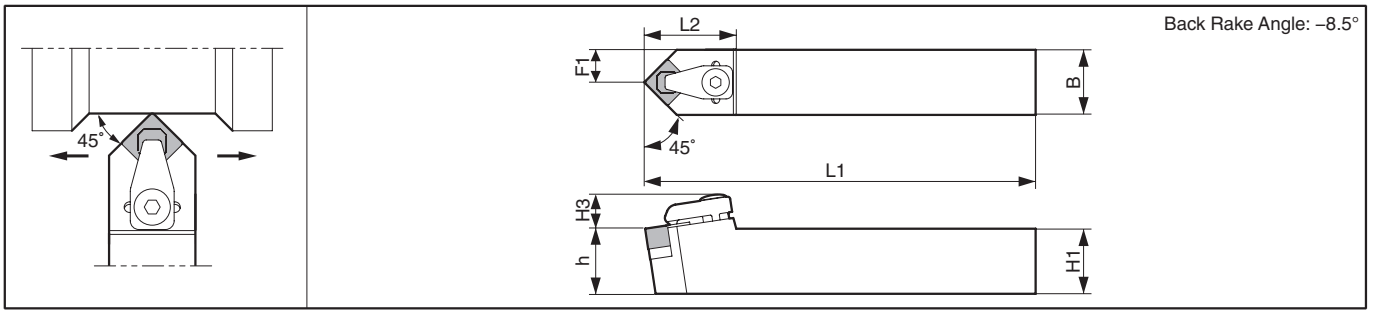
Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

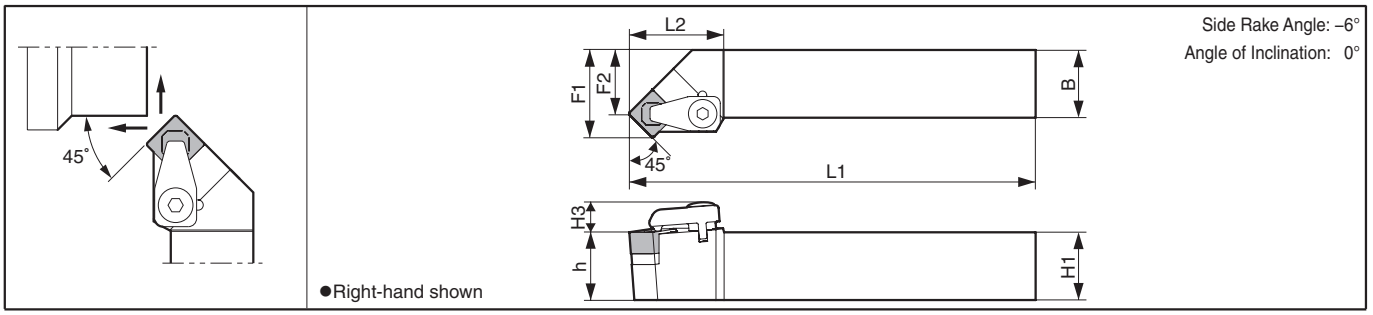
CSRN-GX (External)



CSDN-GX (External / Chamfering)



CSSN-GX (External / Facing / Chamfering)



● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
CSRNR/L	2525M-12GX	●		●	25	12	25	150	30	27	-	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●		●		13			35						SP-162	M4X10
CSDNN	2525M-12GX		●		25	13	25	150	35	12.5	-	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX		●			14			40						SP-162	M4X10
CSSNR/L	2525M-12GX	●		●	25	12	25	150	35	32	23.6	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●		●		13			40		21.1				SP-162	M4X10

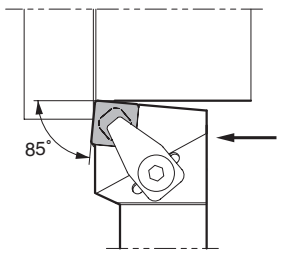
● Applicable Inserts

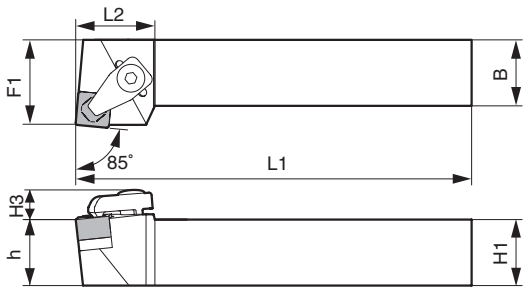
Applications		Cast Iron
Ref. to Page		B102
Insert / Toolholder Description		Ceramic
CSRNR/L	2525M-12GX	SNGX1207···
	2525M-15GX	SNGX1507···
CSDNN	2525M-12GX	SNGX1207···
	2525M-15GX	SNGX1507···
CSSNR/L	2525M-12GX	SNGX1207···
	2525M-15GX	SNGX1507···

Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

CS-N-GX (External)

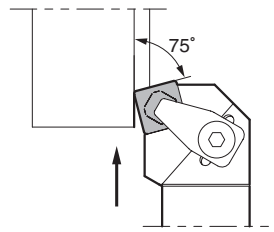


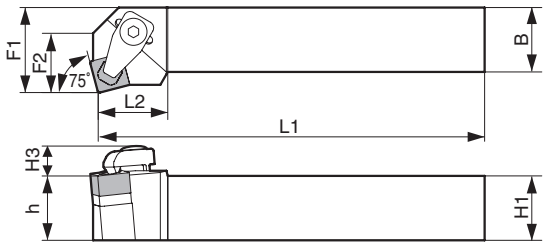


Side Rake Angle: –6°
Angle of Inclination: –4°

●Right-hand shown

CSKN-GX (Facing)

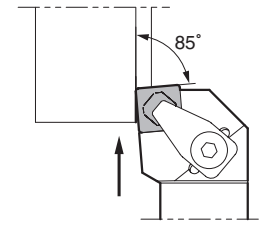


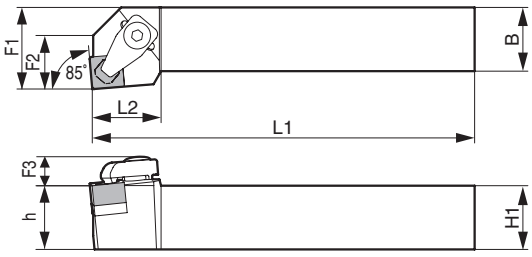


Side Rake Angle: –6°
Angle of Inclination: –4°

●Right-hand shown

CSYN-GX (Facing)





Side Rake Angle: –6°
Angle of Inclination: –4°

●Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(r_ε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
CS-N$^{R}/_{L}$	2525M-12GX	●	●	25	12	25	150	30	32	-	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●	●		13									SP-162	M4X10
CSKN$^{R}/_{L}$	2525M-12GX	●	●	25	12	25	150	27	32	23	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●	●		13			26						SP-162	M4X10
CSYN$^{R}/_{L}$	2525M-12GX	●	●	25	12	25	150	27	32	21	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●	●		13			29		23				SP-162	M4X10

● Applicable Inserts

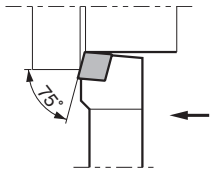
Applications		Cast Iron
Ref. to Page		B102
Insert / Toolholder Description		Ceramic
CS-N$^{R}/_{L}$	2525M-12GX	SNGX1207···
	2525M-15GX	SNGX1507···
CSKN$^{R}/_{L}$	2525M-12GX	SNGX1207···
	2525M-15GX	SNGX1507···
CSYN$^{R}/_{L}$	2525M-12GX	SNGX1207···
	2525M-15GX	SNGX1507···

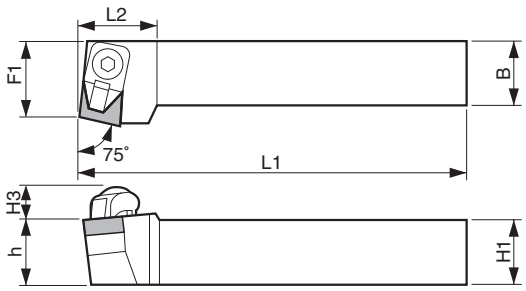
Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

Toolholders for Solid CBN Tools [CNMN Insert]

CCRN-A (External)

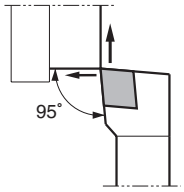


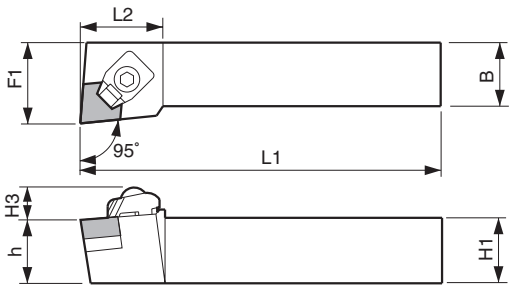


Side Rake Angle: –6°
Angle of Inclination: –6°

●Right-hand shown

CCLN-A (External / Facing)

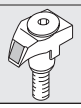




Side Rake Angle: –5°
Angle of Inclination: –5°

●Right-hand shown

● Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	
															
CCRN R/L 2525M-09A	●	●	**25**	**11**	**25**	**150**	**27**	**27**		**0.8**	**CE-030A**	**LW-4**	**SP-429**	**HH3X12**	
CCLN R/L 2525M-09A	●	●	**25**	**11**	**25**	**150**	**28**	**32**		**0.8**	**CE-030A**	**LW-4**	**SP-429**	**HH3X12**	

● Applicable Inserts

Applications	Hard Materials / Cast Iron
Ref. to Page	**C19**
Insert / Toolholder Description	**CBN (KBN900)**
CCRN R/L...-09A	CNMN0903..
CCLN R/L...-09A	

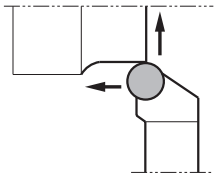
* For CNMN1204 Insert toolholder, ref. to page **D22**

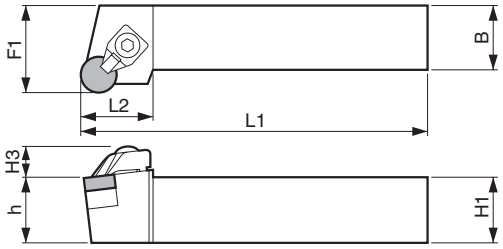
Recommended Cutting Conditions ➡ **D39~D40**

● : Std. Item

Toolholders for Solid CBN Tools [RNMN Insert]

CRSN-A (External / Facing)

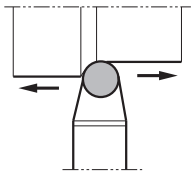


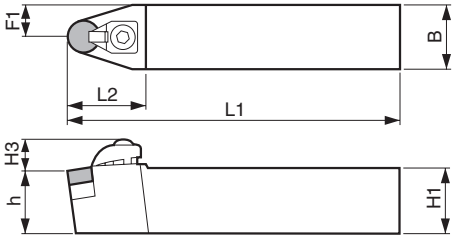


Side Rake Angle: –6°
Angle of Inclination: –6°

●Right-hand shown

CRDN-A (External / Copying)





Back Rake Angle: –8.5°

● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(r_ε)	Spare Parts: Clamp Set	Wrench	Shim		Shim Screw HH	Shim Screw BH
CRSN$^{R}_{L}$	2525M-09A	●		●	25	11	25	150	26	32		-	CE-030A	LW-4	SP-829	-	HH3X12	
	3225P -09A	●		●	32			170										
	2525M-12A	●		●	25	11	25	150	26	32		-			-	SP-849 (SP-843)	BH3X12	
	3225P -12A	●		●	32			170										
CRDNN	2525M-09A		●		25	11	25	150	29	12.5		-	CE-030A	LW-4	SP-829	-	HH3X12	
	3225P -09A		●		32			170										
	2525M-12A		●		25	11	25	150	28	12.5		-			-	SP-849 (SP-843)	BH3X12	
	3225P -12A		●		32			170										

· -12A toolholder Shim: When using RN□□1204 Insert, please purchase spare parts: SP-843 in ( ) separately.

● Applicable Inserts

Applications	Hard Materials / Cast Iron
Ref. to Page	C19
Insert / Toolholder Description	CBN (KBN900)
CRSN$^{R}_{L}$...-09A	RNMN090300
CRSN$^{R}_{L}$...-12A	RNMN120300 (RNMN120400)
CRDNN...-09A	RNMN090300
CRDNN...-12A	RNMN120300 (RNMN120400)

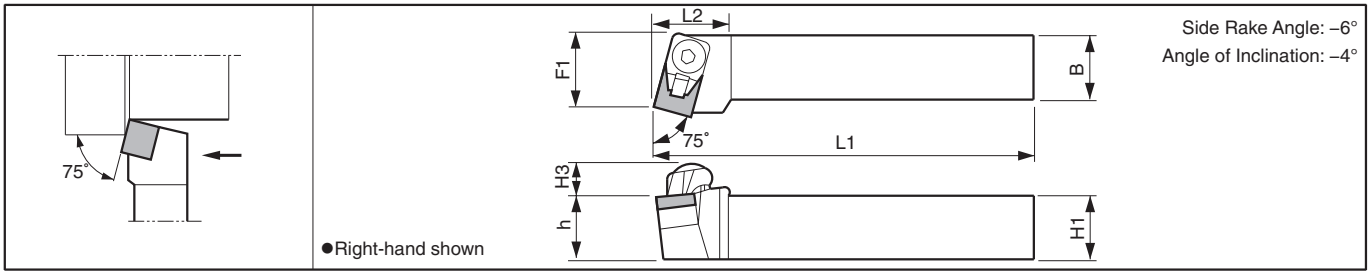
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, please purchase spare parts below separately.	
B100	Shim	Shim Screw
Ceramic		
(RNGN090400)	SP-826	-
(RNGN120400)	SP-843	M3X12
(RNGN120700)	SP-841	M3X8
(RNGN090400)	SP-826	-
(RNGN120400)	SP-843	M3X12
(RNGN120700)	SP-841	M3X8

Recommended Cutting Conditions ➡ D39~D40

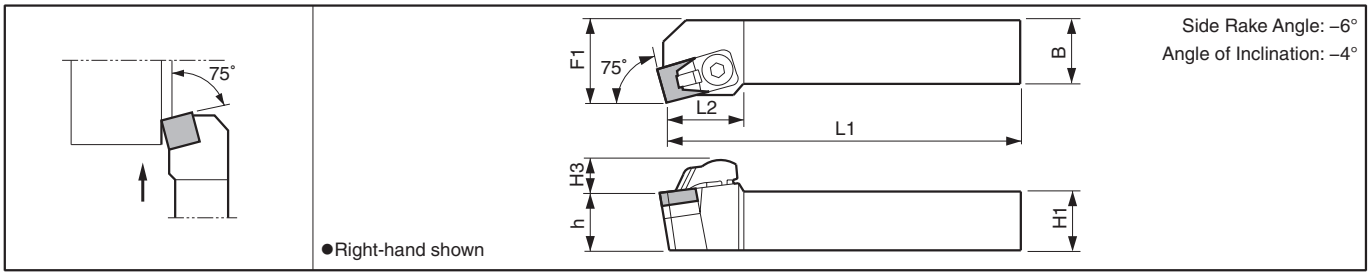
● : Std. Item

Toolholders for Solid CBN Tools [SNMN Insert]

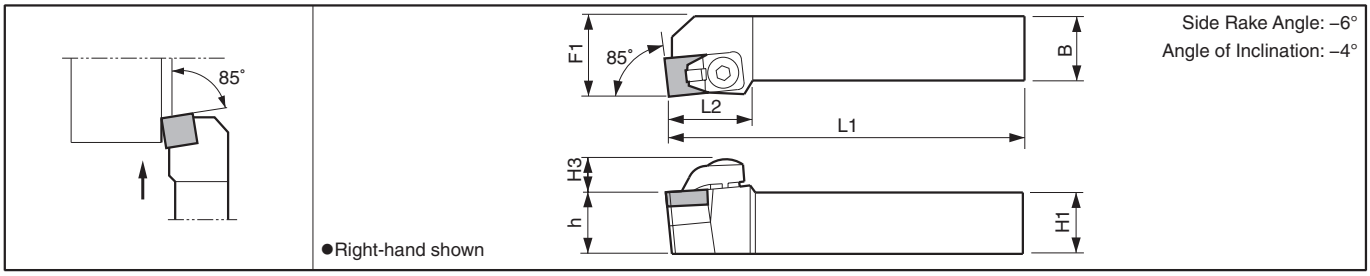
CSRN-A (External)



CSKN-A (Facing)



CSYN-A (Facing)



● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim		Shim Screw HH	Shim Screw BH
CSRNR/L	2525M-09A	●	●	25	11	25	150	22	27		0.8	CE-030A	LW-4	SP-129	-	HH3X12	
	2525M-12A	●	●											-	SP-148 (SP-143)	BH3X12	
CSKNR	2525M-09A	●		25	11	25	150	27	32		0.8	CE-030A	LW-4	SP-129	-	HH3X12	
	2525M-12A	●						29						-	SP-148 (SP-143)	BH3X12	
CSYNR/L	2525M-09A	●	●	25	11	25	150	27	32		0.8	CE-030A	LW-4	SP-129	-	HH3X12	
	2525M-12A	●	●											-	SP-148 (SP-143)	BH3X12	

· -12A toolholder Shim: When using SN□□1204 Insert, please purchase spare parts: SP-143 in ( ) separately.

● Applicable Inserts

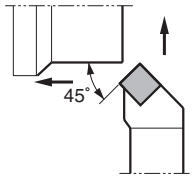
Applications	Hard Materials / Cast Iron	Cast Iron
Ref. to Page	C19	B31
Insert / Toolholder Description	CBN (KBN900)	Coated Carbide
CSRNR/L...-09A	SNMN0903..	-
CSRNR/L...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSKNR/L...-09A	SNMN0903..	-
CSKNR/L...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSYNR/L...-09A	SNMN0903..	-
CSYNR/L...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)

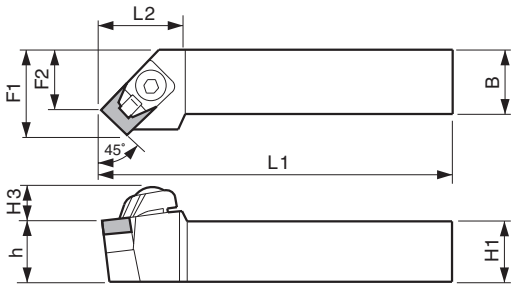
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, please purchase spare parts below separately.			
B101,B102	Chipbreaker	Clamp Set	Shim	Shim Screw
Ceramic				
-	-			
(SNGN1204..)(SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..)(SNMN1207..)			SP-141	M3X8
-	-			
(SNGN1204..)(SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..)(SNMN1207..)			SP-141	M3X8
-	-			
(SNGN1204..)(SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..)(SNMN1207..)			SP-141	M3X8

Recommended Cutting Conditions D39~D40

● : Std. Item

CSSN-A (External / Facing / Chamfering)

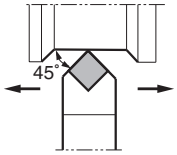


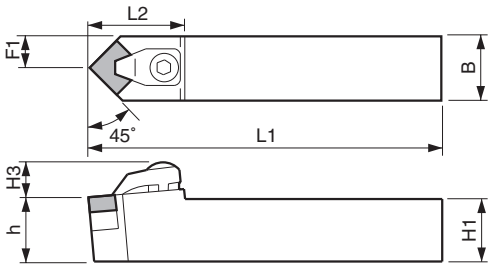


Side Rake Angle: –6°
Angle of Inclination: 0°

●Right-hand shown

CSDN-A (External / Chamfering)





Back Rake Angle: –8.5°

● Toolholder Dimensions

Description		Std.			Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
													Clamp Set	Wrench	Shim		Shim Screw
		R	N	L	H1=h	H3	B	L1	L2	F1	F2		030A 040				HH BH
CSSN$^{R}_{L}$	2525M-09A	●		●	25	11	25	150	26	32	25	0.8	CE-030A	LW-4	SP-129	-	HH3X12
	2525M-12A	●		●							23				-	SP-148 (SP-143)	BH3X12
CSDNN	2525M-09A		●		25	13	25	150	32	12.5	-	0.8	CE-040	LW-4	SP-129	-	HH3X12
	3225P -09A		●		32			170									
	2525M-12A		●		25			150							-	SP-148 (SP-143)	BH3X12

· -12A toolholder Shim: When using SN□□1204 Insert, please purchase spare parts: SP-143 in ( ) separately.

● Applicable Inserts

Applications	Hard Materials / Cast Iron	Cast Iron
Ref. to Page	C19	B31
Insert / Toolholder Description	CBN (KBN900)	Coated Carbide
CSSN$^{R}_{L}$...-09A	SNMN0903..	-
CSSN$^{R}_{L}$...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSDNN...-09A	SNMN0903..	-
CSDNN...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)

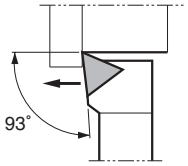
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, please purchase spare parts below separately.			
B101,B102	Chipbreaker	Clamp Set	Shim	Shim Screw
Ceramic				
-	-			
(SNGN1204..)(SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..)(SNMN1207..)			SP-141	M3X8
-	-			
(SNGN1204..)(SNMN1204..)	-	-	SP-143	M3X12
(SNGN1207..)(SNMN1207..)			SP-141	M3X8

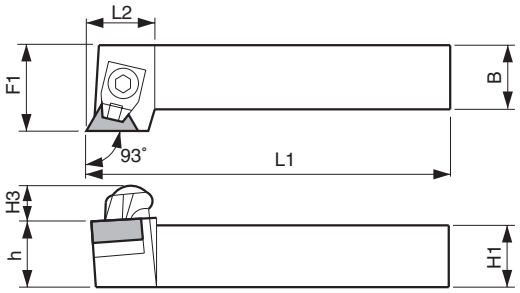
Recommended Cutting Conditions D39~D40

● : Std. Item

Toolholders for Solid CBN Tools [TNMN Insert]

CTJN-A (External)

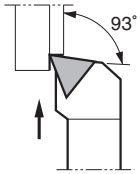


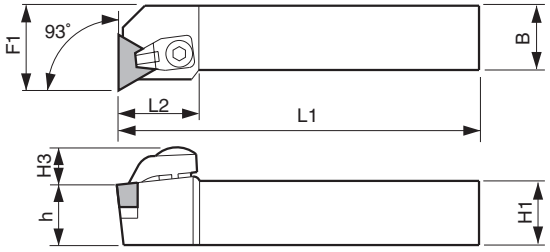


Side Rake Angle: −6°
Angle of Inclination: −4°

●Right-hand shown

CTUN-A (Facing)





Side Rake Angle: −6°
Angle of Inclination: −4°

●Right-hand shown

● Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(r_ε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	
CTJN R/L 2525M-11A	●	●	25	11	25	150	22	32		0.8	CE-030A	LW-4	SP-219	HH3X12	
CTUN R/L 2525M-11A	●	●	25	11	25	150	27	32		0.8	CE-030A	LW-4	SP-219	HH3X12	

● Applicable Inserts

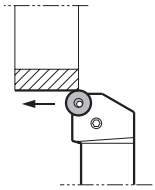
Applications	Hard Materials / Cast Iron	Cast Iron / Hard Materials
Ref. to Page	C19	B103
Insert / Toolholder Description	CBN (KBN900)	Ceramic
CTJN R/L...-11A	TNMN1103..	TNGN1103..
CTUN R/L...-11A		

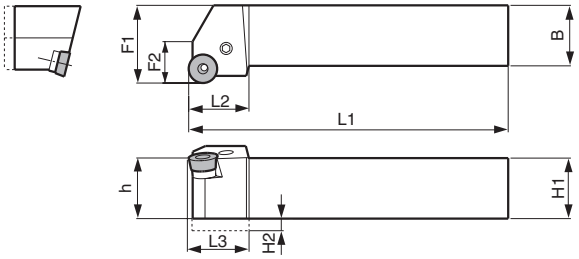
* TNMN1604 Insert toolholder is described in **D26**.

Recommended Cutting Conditions ➡ **D39~D40**

● : Std. Item

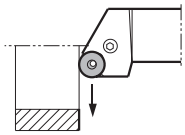
PRGC-BE (External)

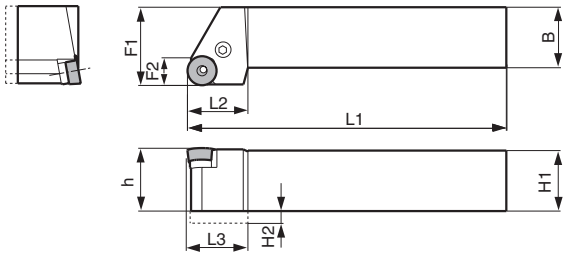




●Right-hand shown

PRGC-BF (Facing)





●Right-hand shown

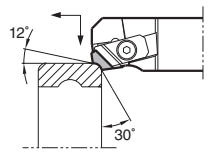
● Toolholder Dimensions

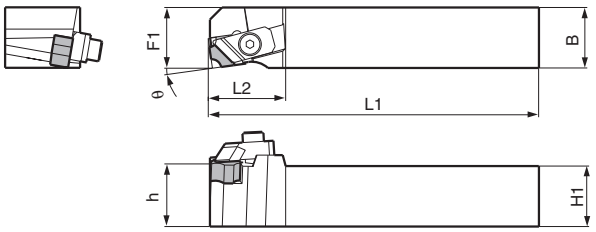
Description		Std.	Dimension (mm)								Spare Parts						Applicable Inserts ➡B95
											Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	
			H1=h	H2	B	L1	L2	L3	F1	F2							
PRGCR	2020K-12BE	●	20	-	20	125	22	-	25	15	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5	RCMT 1204M0-BB
	2525M-12BE	●	25		25	150	25		32	17							
	2020K-16BE	●	20	5	20	125	27	27	29	22	LL-2C	LS-1T	LR-16C	LSP-2	PC-2		RCMT 1606M0-BB
	2525M-16BE	●	25	-	25	150		-	32								
PRGCR	2020K-12BF	●	20	-	20	125	22	-	25	10	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5	RCMT 1204M0-BB
	2525M-12BF	●	25		25	150	25		32	11							
	2020K-16BF	●	20	5	20	125	27	27	25	17	LL-2C	LS-1T	LR-16C	LSP-2	PC-2		RCMT 1606M0-BB
	2525M-16BF	●	25	-	25	150		-	32								

Recommended Cutting Conditions ➡ D39~D40

● : Std. Item

CBSN (External Round-Chamfering)





●Right-hand shown

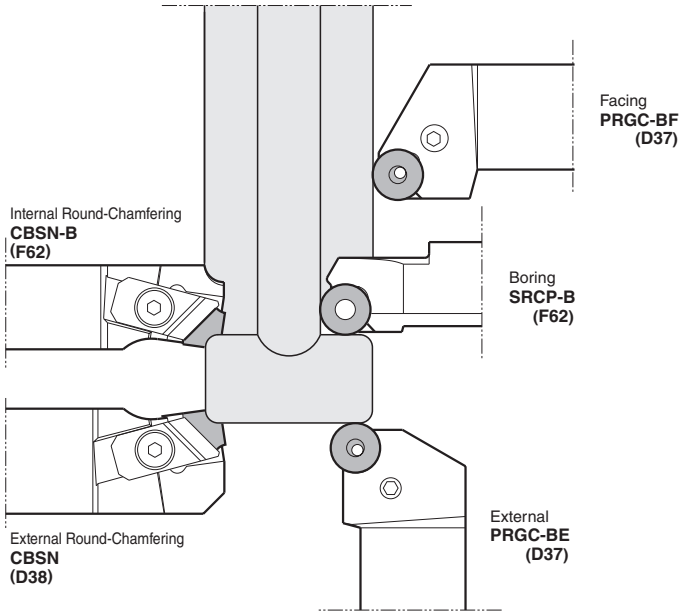
Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	θ	Spare Parts: Clamp Set	Spare Parts: Wrench	Spare Parts: Shim	Spare Parts: Shim Screw	Applicable Inserts ➡B95
CBSN R/L	2020K-12	●	●	20	20	125	32	20	9°	CP-RC R/L	LW-5	SP-RC	SP3X8	SNMF1204○○-21
	2525M-12	●	●	25	25	150		25						

· Clamp Set: CP-RCR for Right-hand Toolholder, and CP-RCL for Left-hand Toolholder.

Recommended Cutting Conditions ➡ D39~D40

Tooling for Bearing Machining



● : Std. Item

Recommended Cutting Conditions - External Turning (Negative Insert)

[ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grade	Corner-R (rε)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
P	Low Carbon Steel Low Carbon Alloy	HB ≤ 300	Finishing (Small ap)	Continuous Interruption	XF	PV710 PV720	0.4 0.8	250 - 350 - 520 240 - 320 - 480	0.05 - 0.12 - 0.6 0.05 - 0.15 - 0.6	0.03 - 0.1 - 0.22 0.04 - 0.12 - 0.25
			Finishing (Gloss Oriented)	Continuous Interruption	XP	TN610 TN620	0.4 0.8	250 - 320 - 400 240 - 310 - 370	0.2 - 0.5 - 0.7 0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2 0.07 - 0.12 - 0.2
			Finishing (Tool Life Oriented)	Continuous Interruption	XP	PV710 PV720	0.4 0.8	250 - 300 - 370 240 - 290 - 340	0.2 - 0.5 - 0.7 0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2 0.07 - 0.12 - 0.2
			Finishing-Medium (Gloss Oriented)	Continuous Interruption	XQ	TN610 TN620	0.4 0.8	250 - 320 - 400 240 - 280 - 340	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3 0.17 - 0.25 - 0.3
			Finishing-Medium (Tool Life Oriented)	Continuous Interruption	XQ	PV710 PV720	0.8 0.8	250 - 300 - 370 240 - 280 - 340	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3 0.17 - 0.25 - 0.3
			Medium-Roughing	Continuous Interruption	XS	PV720 CA515	0.8 0.8	220 - 260 - 320 160 - 210 - 260	0.8 - 1.5 - 2.0 0.8 - 1.5 - 2.0	0.25 - 0.3 - 0.4 0.25 - 0.3 - 0.4
			Roughing	Continuous Interruption	PG	CA515 CA525	0.8 1.2	180 - 220 - 260 150 - 200 - 240	1.0 - 2.5 - 3.5 1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Medium-Roughing High Feed Rate	Continuous Interruption	PT	CA515 CA525	0.8 1.2	150 - 200 - 240 120 - 180 - 220	1.5 - 3.0 - 4.5 1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45 0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous Interruption	PH	CA515 CA525	1.2 1.6	150 - 200 - 240 120 - 180 - 220	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous Interruption	PX (Single Sided)	CA515 CA525	1.2 1.6	150 - 200 - 240 120 - 180 - 220	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
	Medium Carbon Steel Medium Carbon Alloy	HB ≤ 300	Finishing (Time Oriented)	Continuous Interruption	WP (Wiper)	PV710 CA515	0.8 0.8	200 - 250 - 320 160 - 220 - 280	0.3 - 0.5 - 1.0 0.3 - 0.5 - 1.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Finishing-Medium (Time Oriented)	Continuous Interruption	WQ (Wiper)	PV710 CA525	0.8 0.8	180 - 220 - 280 130 - 180 - 240	1.0 - 2.0 - 3.0 1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Finishing (Gloss Oriented)	Continuous Interruption	PP	TN610	0.4 0.8	200 - 250 - 320 180 - 230 - 300	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing (Tool Life Oriented)	Continuous Interruption	PP	PV710 PV720	0.4 0.8	200 - 250 - 320 200 - 240 - 290	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing-Medium (Gloss Oriented)	Continuous Interruption	PQ	TN610 TN620	0.8 1.2	180 - 230 - 300 160 - 220 - 260	0.5 - 1.5 - 2.5 0.5 - 1.5 - 2.5	0.1 - 0.2 - 0.3 0.1 - 0.17 - 0.25
			Finishing-Medium (Tool Life Oriented)	Continuous Interruption	PQ	PV710 CA525	0.8 0.8	160 - 210 - 280 140 - 200 - 240	0.5 - 1.5 - 2.5 0.5 - 1.5 - 2.5	0.1 - 0.2 - 0.3 0.1 - 0.17 - 0.25
			Medium-Roughing	Continuous Interruption	PG	CA515 CA525	0.8 1.2	150 - 200 - 240 120 - 160 - 200	1.0 - 2.5 - 3.5 1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Medium-Roughing High Feed Rate	Continuous Interruption	PT	CA515 CA525	0.8 1.2	120 - 180 - 230 100 - 150 - 200	1.5 - 3.0 - 4.5 1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45 0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous Interruption	PH	CA515 CA525	1.2 1.6	120 - 180 - 230 100 - 150 - 200	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous Interruption	PX (Single Sided)	CA515 CA525	1.2 1.6	120 - 180 - 230 100 - 150 - 200	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
	High Carbon Alloy	HB ≤ 280	Finishing (Gloss Oriented)	Continuous Interruption	PP	TN610 TN620	0.4 0.8	150 - 200 - 280 140 - 180 - 240	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing (Tool Life Oriented)	Continuous Interruption	PP	PV710 CA515	0.4 0.8	120 - 180 - 260 100 - 150 - 200	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing-Medium	Continuous Interruption	PQ	CA515 CA525	0.8 0.8	120 - 160 - 220 100 - 140 - 180	0.5 - 1.5 - 2.5 0.5 - 1.5 - 2.5	0.15 - 0.25 - 0.3 0.15 - 0.2 - 0.25
			Medium-Roughing	Continuous Interruption	PG	CA515 CA525	0.8 0.8	120 - 150 - 200 100 - 130 - 180	1.0 - 2.0 - 3.0 1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.5 0.15 - 0.2 - 0.3
			Medium-Roughing High Feed Rate	Continuous Interruption	PT	CA515 CA525	0.8 1.2	100 - 140 - 180 80 - 120 - 160	1.5 - 3.0 - 4.5 1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45 0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous Interruption	PH	CA515 CA525	1.2 1.6	100 - 140 - 180 80 - 120 - 160	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous Interruption	PX (Single Sided)	CA515 CA525	1.2 1.6	100 - 140 - 180 80 - 120 - 160	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7

Recommended Cutting Conditions - External Turning (Negative Insert)

[ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grade	Corner-R (rε)	Lower Limit - **Recommendation** - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
M	Stainless Steel	HB ≤ 220	Finishing (Gloss Oriented)	Continuous Interruption	PQ	TN620	0.8 0.8	120 - 160 - 200 100 - 120 - 150	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2 0.05 - 0.1 - 0.15
			Finishing	Continuous Interruption	MQ	CA6515 CA6525	0.4 0.8	120 - 180 - 240 100 - 160 - 220	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2 0.05 - 0.1 - 0.15
			Medium-Roughing (Chip Control Oriented)	Continuous Interruption	MS	CA6515 CA6525	0.4 0.8	120 - 160 - 200 80 - 140 - 180	1.0 - 2.0 - 3.0 1.0 - 2.0 - 3.0	0.1 - 0.2 - 0.3 0.2 - 0.3 - 0.4
			Medium-Roughing (Sharpness Oriented)	Continuous Interruption	MU	CA6515 CA6525	0.4 0.8	120 - 160 - 200 80 - 140 - 180	1.0 - 2.0 - 3.0 1.0 - 2.0 - 3.0	0.15 - 0.25 - 0.35 0.15 - 0.25 - 0.3
			Roughing	Continuous Interruption	Standard	CA6515 CA6525	0.8 1.2	100 - 140 - 180 80 - 120 - 150	1.0 - 2.0 - 4.0 1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
	Stainless Steel	HB ≤ 300	Finishing (Gloss Oriented)	Continuous Interruption	PQ	TN620	0.8 0.8	100 - 120 - 150 80 - 100 - 120	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15 0.05 - 0.08 - 0.1
			Finishing	Continuous Interruption	MQ	CA6515 CA6525	0.4 0.8	100 - 120 - 150 80 - 100 - 120	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2 0.05 - 0.1 - 0.15
			Medium-Roughing (Chip Control Oriented)	Continuous Interruption	MS	CA6515 CA6525	0.4 0.8	100 - 120 - 150 80 - 100 - 120	1.0 - 1.5 - 2.0 1.0 - 2.0 - 3.0	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Medium-Roughing (Sharpness Oriented)	Continuous Interruption	MU	CA6515 CA6525	0.4 0.8	100 - 120 - 150 80 - 100 - 120	1.0 - 1.5 - 2.0 1.0 - 2.0 - 3.0	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Roughing	Continuous Interruption	Standard	CA6515 CA6525	0.8 1.2	80 - 100 - 120 60 - 80 - 100	1.0 - 2.0 - 3.0 1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
K	Gray Cast Iron	HB ≤ 250	High Speed Machining	Continuous Continuous Interruption	Without Chipbreaker	KBN475 KBN900 KBN900	0.8 1.2 1.2	400 - 800 -1200 500 - 900 -1200 500 - 700 - 900	0.05 - 0.2 - 0.5 0.1 - 0.5 - 1.0 0.5 - 1.0 - 1.5	0.1 - 0.2 - 0.3 0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing (Gloss Oriented)	Continuous Interruption	Standard	PV7005 PV720	0.8 0.8	300 - 350 - 400 150 - 200 - 300	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.1 - 0.2 - 0.3 0.08 - 0.15 - 0.2
			Finishing (Ceramic)	Continuous Continuous	Without Chipbreaker	KA30 PT600M	1.2 0.8	300 - 500 - 700 300 - 450 - 600	0.3 - 0.5 - 1.0 0.3 - 0.5 - 1.0	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3
			Medium (Ceramic)	Continuous Interruption		CS7050 KS6050	1.2 1.2	300 - 450 - 550 250 - 400 - 500	1.0 - 2.0 - 3.0 1.0 - 2.0 - 3.0	0.15 - 0.25 - 0.35 0.15 - 0.2 - 0.3
			Medium	Continuous Interruption	Standard	CA4505 CA4515	0.8 1.2	200 - 250 - 300 150 - 200 - 250	0.5 - 2.0 - 2.5 0.5 - 2.0 - 2.5	0.1 - 0.2 - 0.3 0.08 - 0.15 - 0.2
			Roughing	Continuous Interruption	ZS	CA4505 CA4515	0.8 1.2	200 - 250 - 300 150 - 200 - 250	1.0 - 2.0 - 4.0 1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
	Nodular Cast Iron	HB ≤ 270	High Speed Machining	Continuous Continuous	Without Chipbreaker	KBN60M PT600M	0.4 0.8	200 - 300 - 400 200 - 250 - 350	0.1 - 0.3 - 0.5 0.1 - 0.5 - 1.0	0.1 - 0.15 - 0.2 0.1 - 0.2 - 0.4
			Finishing (Gloss Oriented)	Continuous Interruption	Standard	PV7005 PV720	0.8 0.8	150 - 250 - 300 120 - 200 - 250	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.1 - 0.2 - 0.3 0.08 - 0.15 - 0.2
			Medium	Continuous Interruption	Standard	CA4505 CA4515	0.8 1.2	150 - 200 - 250 120 - 180 - 220	0.5 - 2.0 - 2.5 0.5 - 2.0 - 2.5	0.1 - 0.2 - 0.3 0.08 - 0.15 - 0.2
			Roughing	Continuous Interruption	ZS	CA4505 CA4515	0.8 1.2	150 - 200 - 250 120 - 180 - 220	1.0 - 2.0 - 4.0 1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys	HB ≤ 100	High Speed Machining (Rainbow Surface Gross)	Continuous	Without Chipbreaker	KPD001	0.4	300 - 800 -2000	0.05 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Finishing (Long Tool Life)	Continuous Interruption	A3	PDL025	0.4 0.8	400 - 500 - 700 400 - 500 - 700	0.5 - 1.0 - 2.0 0.5 - 1.0 - 2.0	0.1 - 0.2 - 0.25 0.1 - 0.2 - 0.25
			Finishing	Continuous Interruption	A3	KW10	0.8 0.8	400 - 500 - 700 400 - 500 - 700	0.5 - 1.0 - 2.0 0.5 - 1.0 - 2.0	0.1 - 0.2 - 0.25 0.1 - 0.2 - 0.25
			Medium	Continuous Interruption	AH	KW10	0.8 0.8	200 - 300 - 500 200 - 300 - 500	1.0 - 2.0 - 3.5 1.0 - 2.0 - 3.5	0.1 - 0.3 - 0.4 0.1 - 0.3 - 0.4
S	Titanium Alloys	HB ≤ 400	Precision Finishing (Rainbow Surface Gross)	Continuous Interruption	Without Chipbreaker	KPD001	0.4 0.4	100 - 150 - 180 70 - 120 - 150	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	MQ	SW05	0.4 0.4	40 - 70 - 100 40 - 70 - 100	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.2 - 0.3 0.05 - 0.15 - 0.2
			Medium	Continuous Interruption	MU	SW05	0.8 0.8	40 - 60 - 80 40 - 60 - 80	0.5 - 1.0 - 3.0 0.5 - 1.0 - 3.0	0.1 - 0.25 - 0.35 0.1 - 0.2 - 0.3
	Heat-resistant Alloys	HB ≤ 350	Finishing	Continuous Interruption	MQ	PR1310	0.4 0.8	40 - 60 - 80 40 - 60 - 80	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.03 - 0.08 - 0.12 0.05 - 0.1 - 0.15
			Medium	Continuous Interruption	MS	PR1310	0.8 1.2	40 - 60 - 80 40 - 60 - 80	0.5 - 1.0 - 2.0 0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.15 0.1 - 0.15 - 0.2
H	Hardened Steel Hard Materials	40~50 HRC	Finishing	Continuous Interruption	PQ Standard	CA515	0.8 0.8	60 - 100 - 120 30 - 50 - 70	0.1 - 0.3 - 0.5 0.1 - 0.3 - 0.5	0.05 - 0.08 - 0.1 0.05 - 0.08 - 0.1
		40~50HRC 50~65HRC	Finishing	Continuous Continuous	Without Chipbreaker	PT600M	0.8 1.2	60 - 80 - 100 30 - 40 - 60	0.2 - 0.5 - 0.7 0.2 - 0.5 - 0.7	0.05 - 0.1 - 0.15 0.05 - 0.1 - 0.15
		50~68 HRC	Finishing	Continuous Interruption	ME MET	KBN05M	0.8 1.2	100 - 150 - 200 90 - 140 - 180	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1 0.05 - 0.08 - 0.1
			Medium	Continuous Interruption	Without Chipbreaker	KBN900	1.2 Radius	80 - 100 - 120 70 - 90 - 110	0.5 - 1.0 - 2.0 0.3 - 0.7 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.15

Small Tools (External)

E

E1~E48

Summary of External Turning / Advice on one point E2~E10

Small Tools Identification System E11

Toolholders for Back Turning E12~E19

TKFB Insert	(Back Turning, Goose-neck Holder)	E12
TKF-AS Insert	(Back Turning, Goose-neck Holder)	E16
ABS Insert	(Back Turning)	E17
ABW Insert	(Back Turning)	E18

Goose-neck Holder E20~E21

DC□□ Insert	(Goose-neck Holder)	E20
VP□□ Insert	(Goose-neck Holder)	E21

Toolholders for External Turning (Back Clamp / Screw Clamp) E22~E33

CC□□ Insert	(Without Offset / With Offset)	E22
DC□□ Insert	(Without Offset / With Offset)	E24
DP□□ Insert	(Without Offset)	E28
TC / TP□□ Insert		E29
VB / VC□□ Insert	(Without Offset / With Offset)	E30
VP□□ Insert	(Without Offset / With Offset)	E32

External Sleeve Holder E34~E36

CC□□ Insert		E34
DC□□ Insert		E35
VB / VC□□ Insert		E36

Toolholders for Small Double Sided Tooling (Screw Clamp) E37~E39

CN□U Insert	(Without Offset)	E38
DN□U Insert	(Without Offset)	E38
TN□U Insert	(Without Offset)	E39

Toolholder for Double Sided Tooling for Automatic Lathe (Lever Lock) E40~E41

CN□□ Insert	(Without Offset)	E40
TN□□ Insert	(Without Offset)	E41

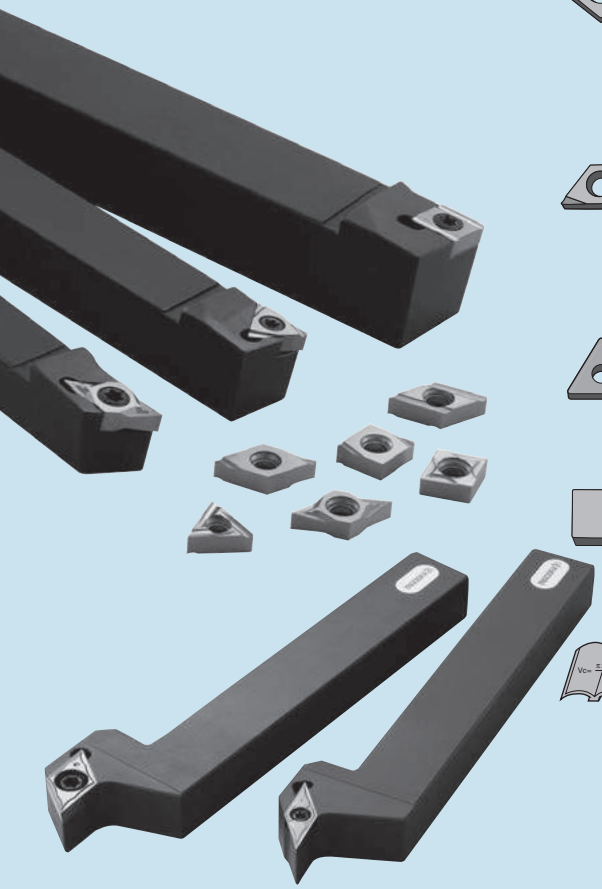
External Toolholder (Top Clamp) E42~E43

SP□R / SP□N Insert		E42
TP□R / TP□N Insert		E43

Technical Information E44~E45

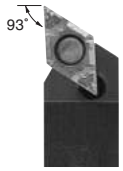
Recommended Cutting Conditions		E44

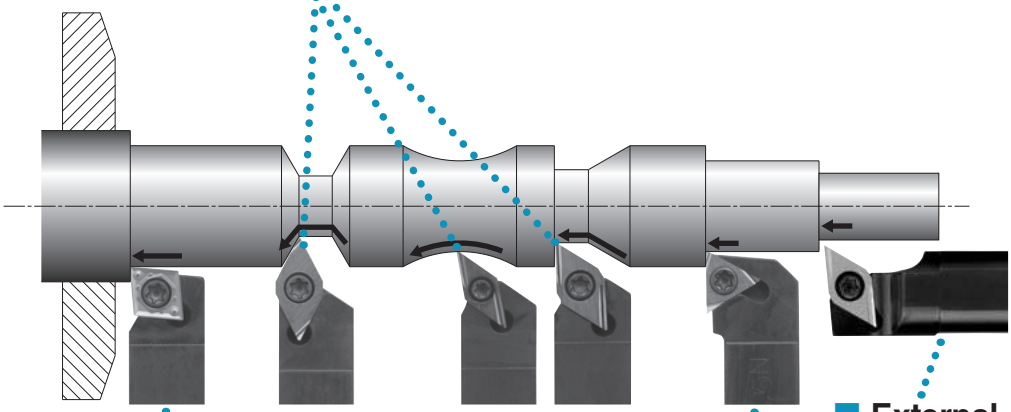
Alternative Toolholder Reference Table for Small Tools E46~E48



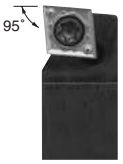
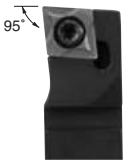
Summary of External Turning

External / Copying

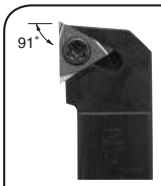
						
ADJC-FF	SDJC-FF	SDJC	SDLC-FF SDLP-FF	SDLN-FF	SDNC-F	SDNC
Back Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp	Screw Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp	Screw Clamp
E24	E25	E25	E26,E28	E38	E27	E27



External / Facing

			
ACLC-FF	SCLC-FF	SCLC	SCLN-FF
Back Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp	Screw Clamp Without Offset
E22	E23	E23	E38

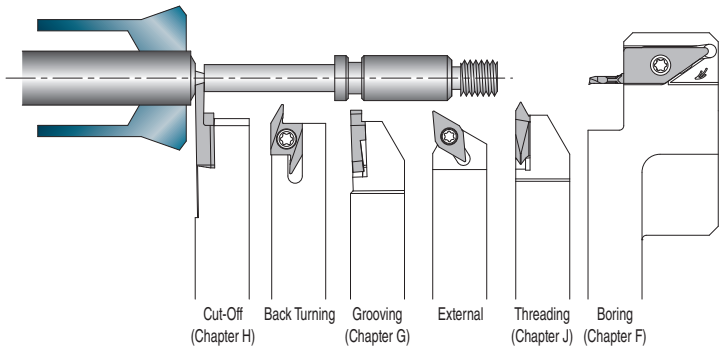
External

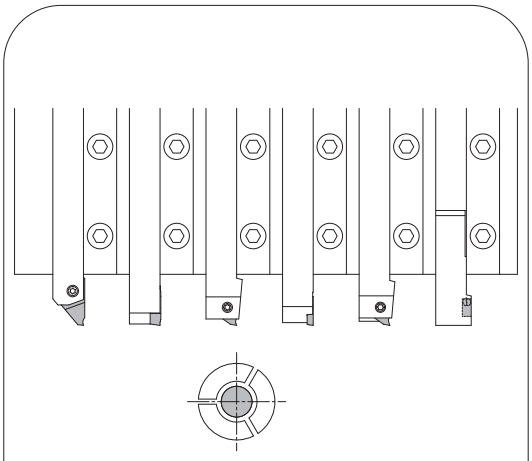
	
STGC(P)	STLN-FF
Screw Clamp	Screw Clamp Without Offset
E29	E39

External Sleeve Holder

S...SDLC
Screw Clamp Shank Dia. : φ12 ~ φ25.4
E35

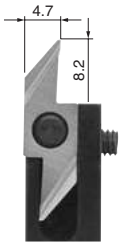
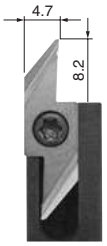
Tooling example (1) CNC Automatic lathe (Gang Type)

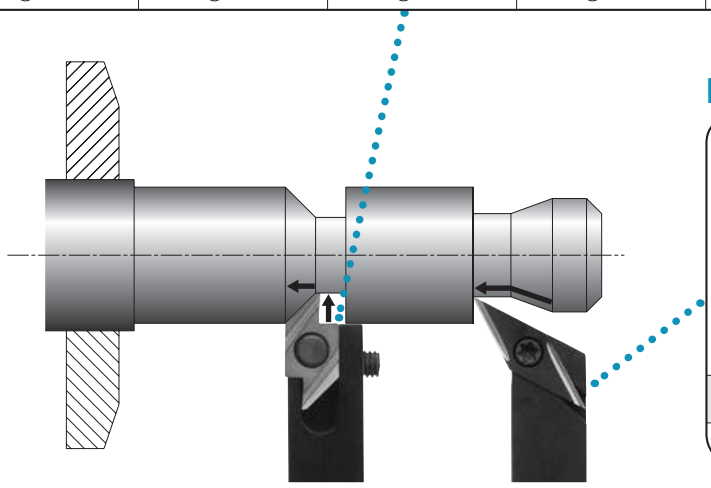




Tools installed on Gang Type Automatic Lathe

Back Turning

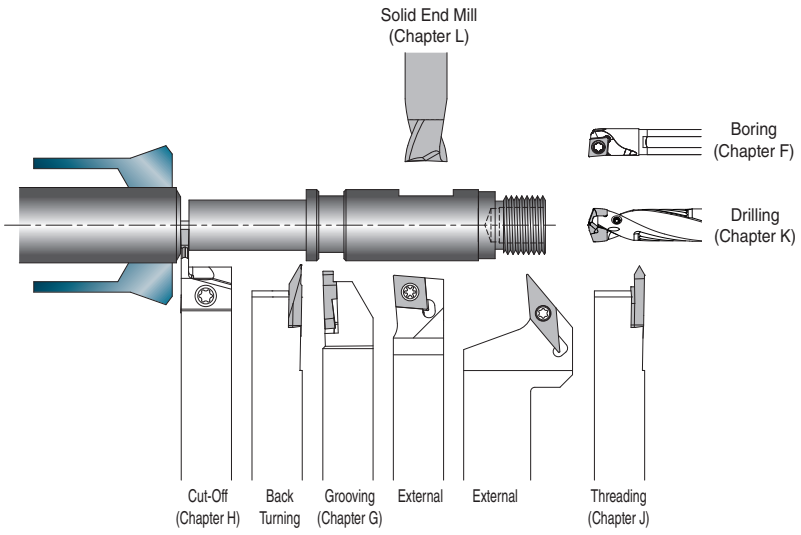
						
AABS-40F	SABS-40F	AABW-40F	SABW-40F	AABW-50F	SABW-50F	KTKF
Back Clamp Edge Width: 2.8 ap: ~4.0	Screw Clamp Edge Width: 2.8 ap: ~4.0	Back Clamp Edge Width: 4.7 ap: ~4.0	Screw Clamp Edge Width: 4.7 ap: ~4.0	Back Clamp Edge Width: 4.7 ap: ~5.0	Screw Clamp Edge Width: 4.7 ap: ~5.0	Screw Clamp Edge Width: 1.5 ~3.8 Max. ap: 1.8 ~5.5
E17	E17	E18	E18	E19	E19	E12

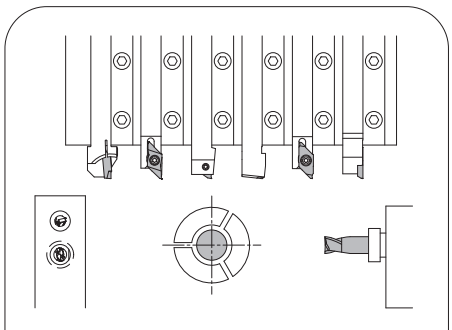


External / Facing / Copying / Undercutting

SVPB	SVPP-FF
Screw Clamp	Screw Clamp Without Offset
E31	E33

Tooling example (2) CNC Automatic lathe (Gang Type)





Tools installed on gang tool post + milling toolholder

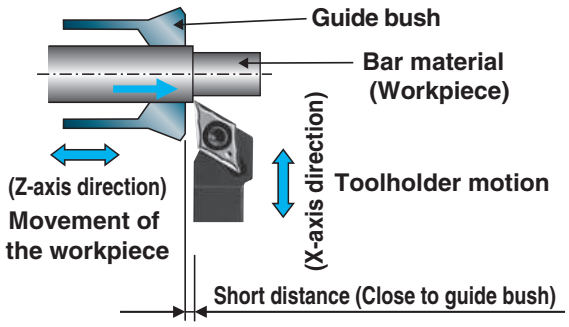
For Swiss tool automatic lathe (Gang type tool post)

How to use Goose-neck holder

Swiss tool automatic lathe (Guide bush system)

Goose-neck holder is applicable to automatic lathes whose toolholder does not move to longitudinal direction (Z-axis direction).

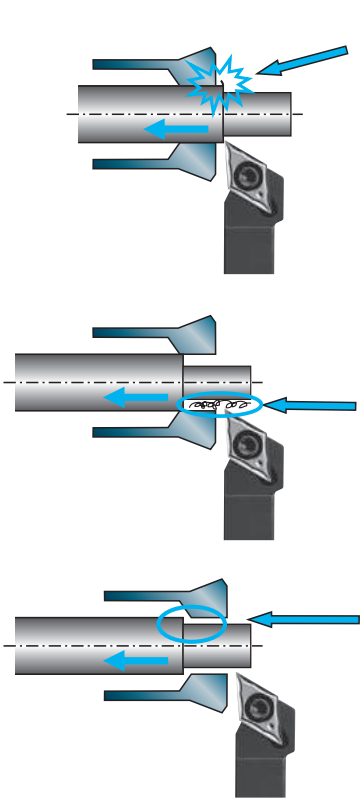
In case of machining with the conventional toolholder



Goose-neck Holder is applicable to automatic lathe that toolholder does not move to longitudinal direction (Z-axis direction)

Problems of machining with the conventional toolholder

Problems of machining with the conventional toolholder



<Case 1>
During multiple passes, when bar material returns into guide bush, the burr contacts and breaks guide bush.

<Case 2>
The workpiece burr contacts the guide bush and causes dimensional variation.

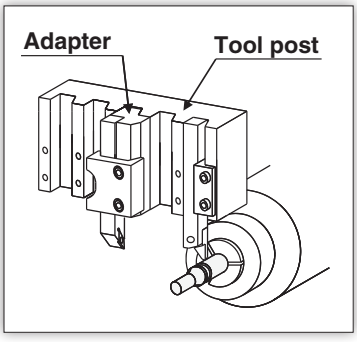
<Case 3>
During multiple passes, when bar material returns into guide bush, the chips contacts and breaks guide bush.

<Case 4>
Bar material deviation from the guide bush disables machining.

Problems of Toolholder Installation

When using a conventional toolholder

1) Additional space is required for an adapter.
2) Toolholder's handling is difficult due to limited space.
3) Necessary to buy an adapter.
4) An adapter may interfere with the next tool post.



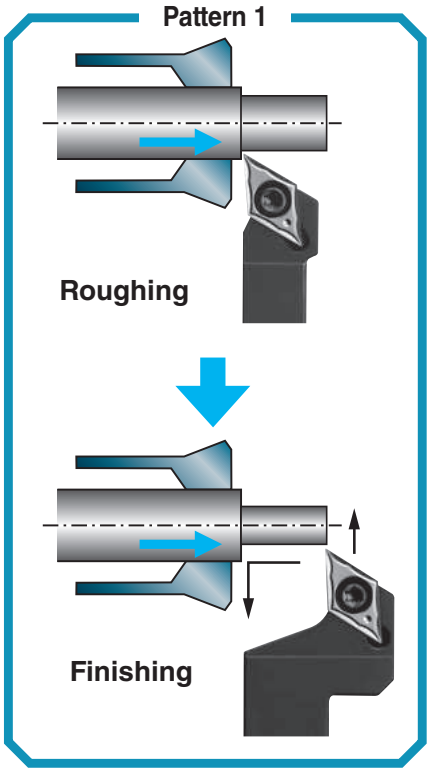
Advantages of Goose-neck Holder

Advantages of Using Goose-neck Holder

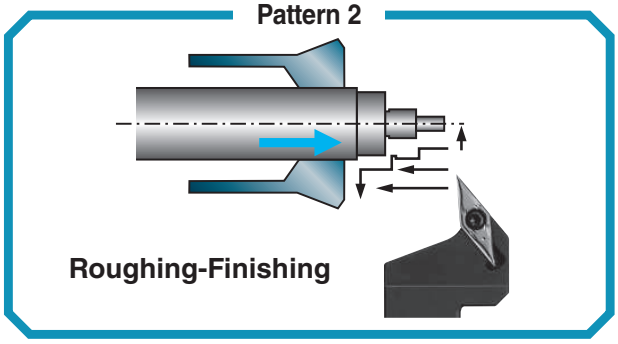
When using Goose-neck Holder

1) Machining precision improves by additional finishing process.
2) Chips do not come into the guide bush.
3) Better chip control due to large chip evacuation space.

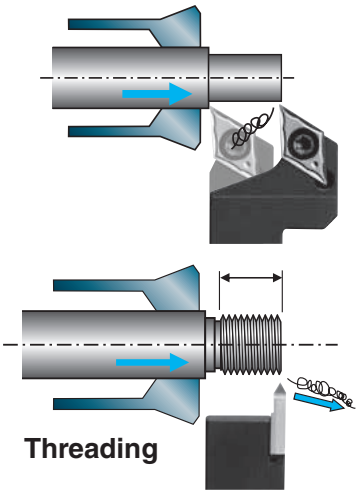
Available for machining after roughing without returning bar material into guide bush, preventing damages and improving precision.



Available for roughing and finishing with one Goose-neck Holder.



For better chip control



Optimum cutting edge position and large space for efficient chip evacuation.

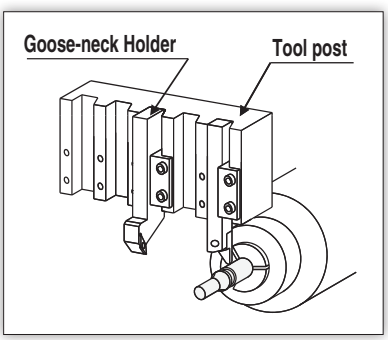
* With conventional threading toolholders, chip biting into guide bush can cause damages on threads.

Advantages of Toolholder installation

When using a Goose-neck holder

1) Maximum number of toolholders can be attached.

2) No interference with next tool post.

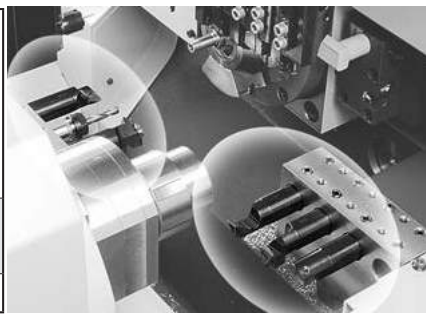


External Sleeve Holder

More tools attachable to CNC Automatic Lathe!

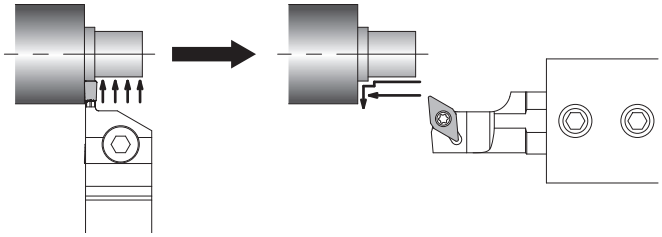
Limit to attachable tools at intricate part machining ►►► Use External Sleeve Holders

S...SCLC	S...SDUC	S...SDLC	S...SVUB(C)
Screw Clamp Shank Dia. φ12 ~ φ25.4	Screw Clamp Shank Dia. φ14 ~ φ25.4	Screw Clamp Shank Dia. φ12 ~ φ25.4	Screw Clamp Shank Dia. φ12 ~ φ25.4
E34	E35	E35	E36



Ref. to Page R36~R43 for Tooling Layout and Automatic Lathe List by Manufacturer.

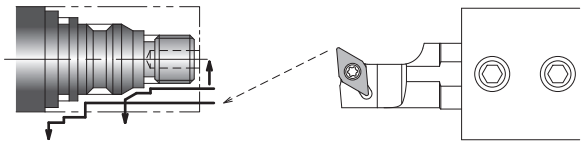
● Finishing by Sleeve Holder



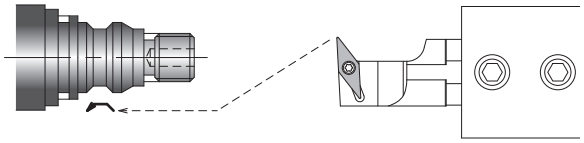
1) Roughing by grooving toolholder
2) Finishing by Sleeve Holder improves chip control and reduces cutting time

Tooling Example (3) CNC Automatic Lathe (Opposed Gang Type)

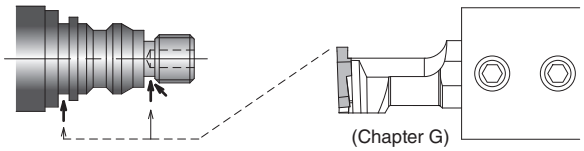
External / Facing



External / Copying

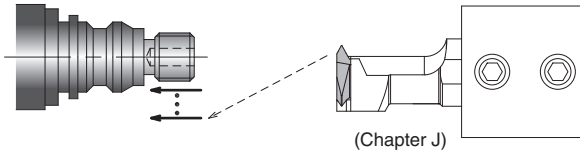


Grooving



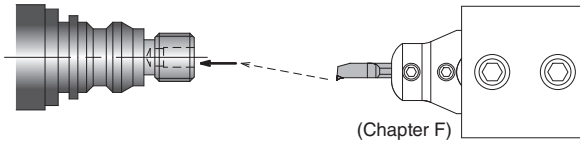
(Chapter G)

Threading

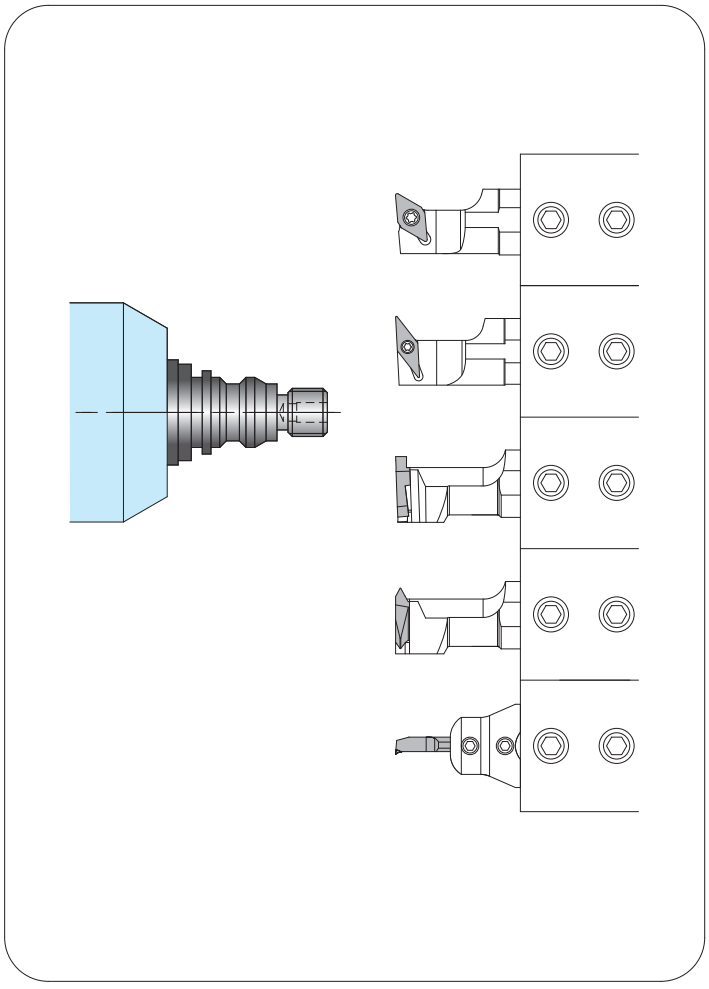


(Chapter J)

Boring

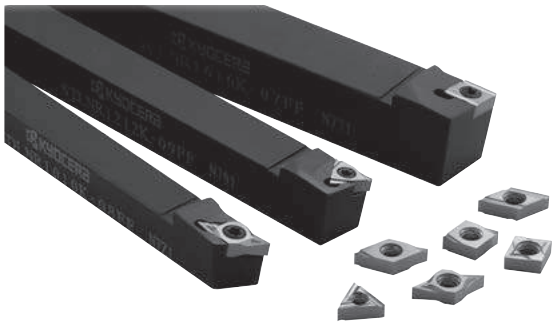


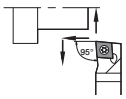
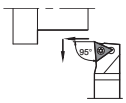
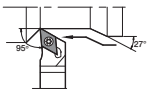
(Chapter F)



Ref. to Page R36~R43 for Tooling Layout and Automatic Lathe List by Manufacturer.

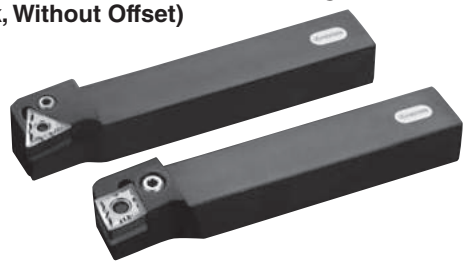
Toolholders for Small Double Sided Tooling (Screw Clamp)

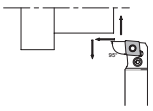
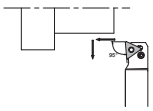


Applications	External / Facing	External / Up Facing	External / Copying
Cutting Edge Angle	95°	95°	95°
Screw Clamp (Without Offset)	 SCLN	 STLN	 SDLN
Ref. to Page	E38	E39	E38

Newly designed negative inserts (double-sided) enable high productivity and stability by economical doubled insert edge numbers
Sharp cutting equivalent to positive inserts (single-sided)

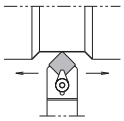
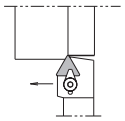
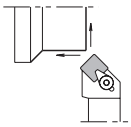
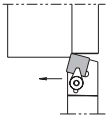
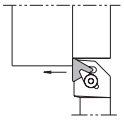
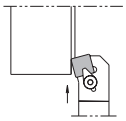
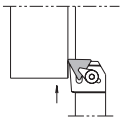
Toolholder for Double Sided Tooling for Automatic Lathe
(Lever Lock, Without Offset)



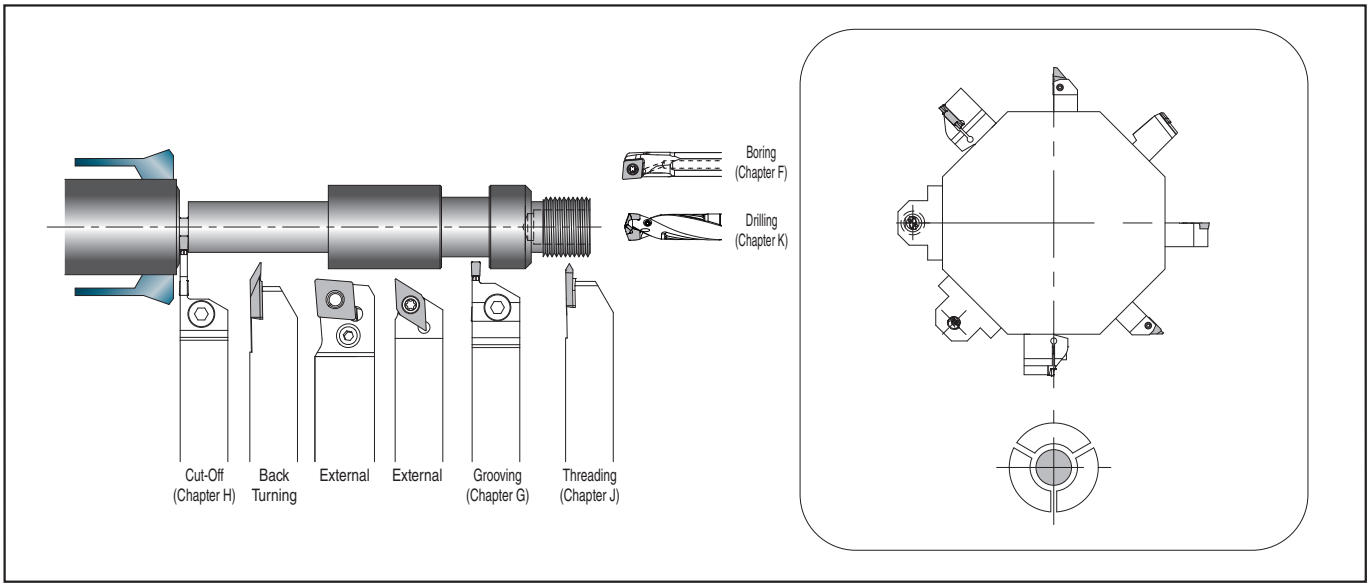
Applications	External / Facing	External / Up Facing
Cutting Edge Angle	95°	95°
Lever Lock (Without Offset)	 PCLN-FF	 PTLN-FF
Ref. to Page	E40	E41

The Lever lock type is available for small tools for external machining.

Top Clamp (for Insert without Hole)

Applications	External / Chamfering		External / Facing / Chamfering	External		Facing	
Cutting Edge Angle	45°	60°	45°	75°	91°	15°	-1°
Top Clamp	 CSDP	 CTTP	 CSSP	 CSBP	 CTGP	 CSKP	 CTFP
Ref. to Page	E42	E43	E42	E42	E43	E42	E43

Tooling Example (4)

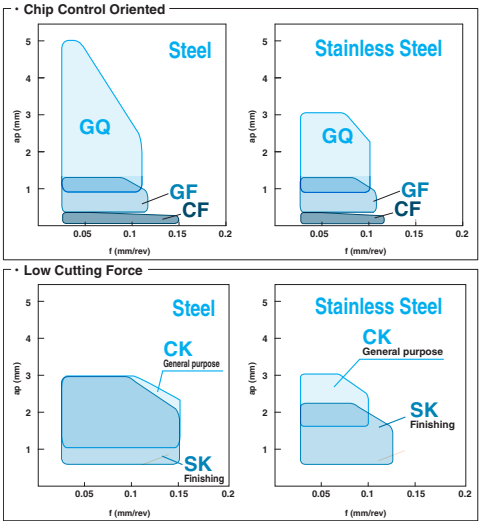


Ref. to Page **R36~R43** for Tooling Layout and Automatic Lathe List by Manufacturer.

Chip control improvement at external machining

1) Choose a chipbreaker applicable for varying ap

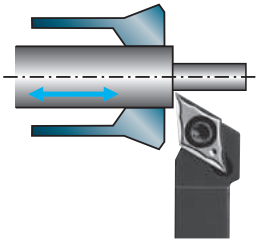
- Applicable to high precision cutting, sharp cutting due to periphery ground edge
- Superior surface finish due to anti-adhesion polished edge



2) Improve chip control dividing tool passes into 2; roughing and finishing

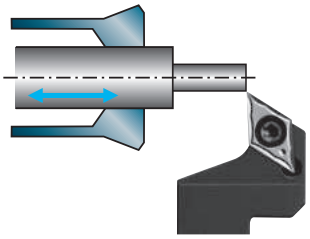
- When chip control is not good in 1 pass machining
  ⇨Use Goose-neck Holders or Sleeve Holders

Roughing and finishing at one time by conventional toolholder
<Case>
Bad chip control

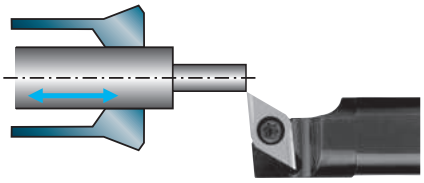


After roughing

Countermeasures (1)
Finishing by Goose-neck Holder



Countermeasures (2)
Finishing: Move Sleeve Holder forward



How to choose toolholders to improve productivity in external turning

Applications	Tooling Example	Toolholder	Advantages	Workpiece Dia.	Medium-roughing of steel (Radial ap: mm)
Medium-Roughing	SCLN-FF SDLN-FF STLN-FF	Small Double Sided Tooling (Screw Clamp)	Cost reduction	Over φ6	ap=~2.5mm
	PCLN-FF PTLN-FF	Toolholder for Double Sided Tooling for Automatic Lathe (Lever Lock) +FP-TK Chipbreaker	Cost reduction	Over φ16	ap=1.5~5mm
Medium-Roughing + Finishing	**Ref. to Page E9 Fig.1**	Small Double Sided Tooling (Screw Clamp)	Cost reduction	Under φ16	ap=~2.5mm
		Goose-neck Holder (External Sleeve Holder)	Chip Control	-	-
	Ref. to Page E9 Fig.2	Toolholder for Double Sided Tooling for Automatic Lathe (Lever Lock) +FP-TK Chipbreaker	Cost reduction	φ16~φ32	ap=1.5~5mm
		Goose-neck Holder (External Sleeve Holder)	Chip Control	-	-
	Ref. to Page E9 Fig.3	Grooving Toolholder	Long curled chips are evacuated toward a fixed direction	φ16~φ32	ap=over 4mm
		Goose-neck Holder (External Sleeve Holder)	Chip Control	-	-

External toolholder selection for productivity improvement

Guideline for roughing: ap=~2.5mm

<Roughing>
Use Small Double Sided Tooling

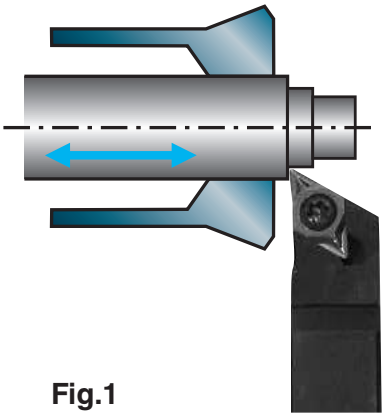
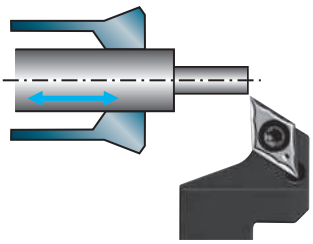
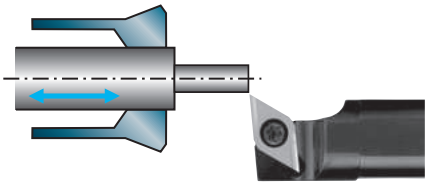


Fig.1

Improvement of Finishing (1)
Use Goose-neck Holder



Improvement of Finishing (2)
Use External Sleeve Holder



Guideline for roughing: ap=1.5~5mm

<Roughing>
Use FP-TK Chipbreaker (G-class negative insert)

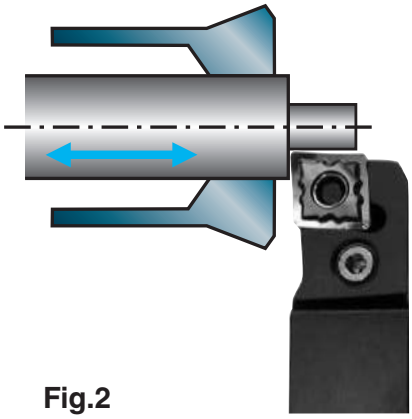
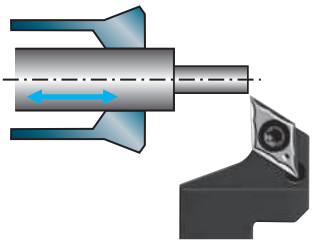
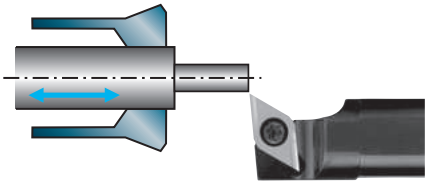


Fig.2

Improvement of Finishing (1)
Use Goose-neck Holder



Improvement of Finishing (2)
Use External Sleeve Holder



Guideline for roughing: ap= over 4mm

<Roughing>
Use grooving toolholder

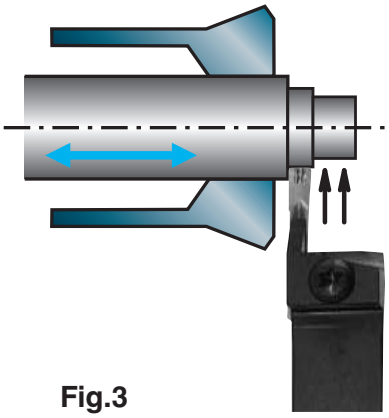
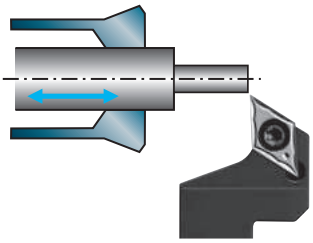
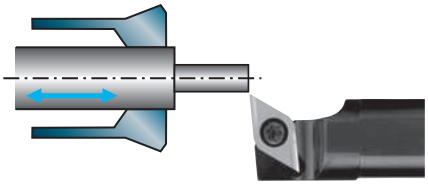


Fig.3

Improvement of Finishing (1)
Use Goose-neck Holder



Improvement of Finishing (2)
Use External Sleeve Holder

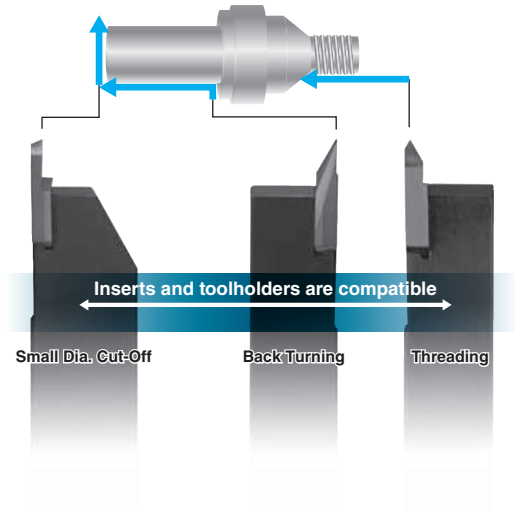


Summary of External Turning

Cutting tool for small workpiece

KTKF

Ref. to Page E12



Inserts for back turning

TKFB

Ref. to Page E12

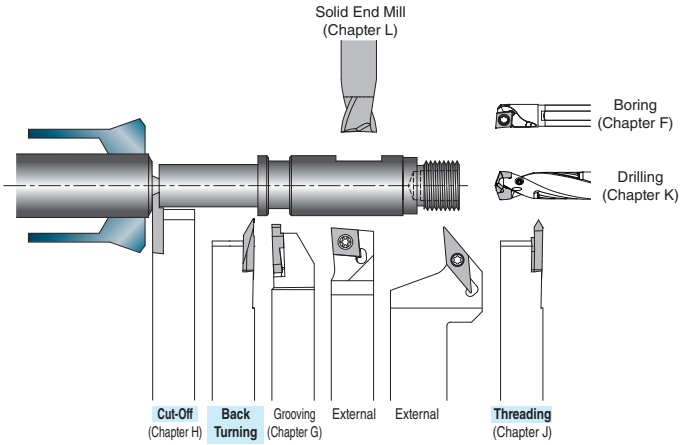
- Molded Chipbreaker (GQ Chipbreaker) NEW
  Added to anti-adhesion polished edge
  Improved chip control
- Insert Grades for Steel Machining PR1425
- Insert Grades for Stainless Steel Machining PR1535 NEW
- "TKF..L-ASR" type is added in "TKF-AS" PCD inserts

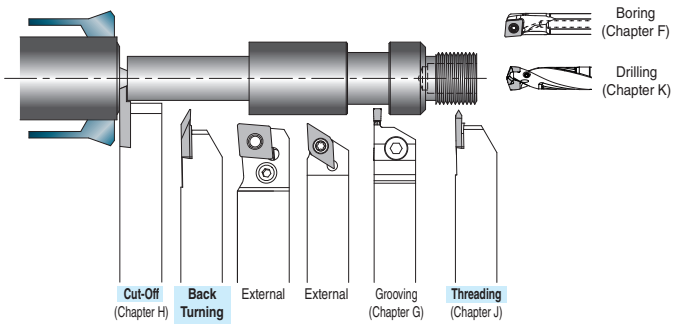
GQ Chipbreaker

TKF-AS

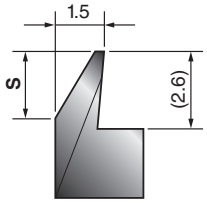
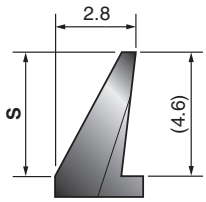
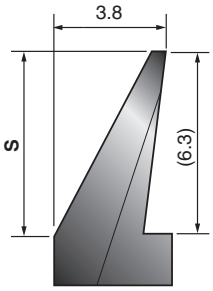
KTKF is applicable to back turning, threading and cut-off with one toolholder

Tooling example of KTKF toolholder





Details of cutting edge

Small machining	General purpose	Large machining
		

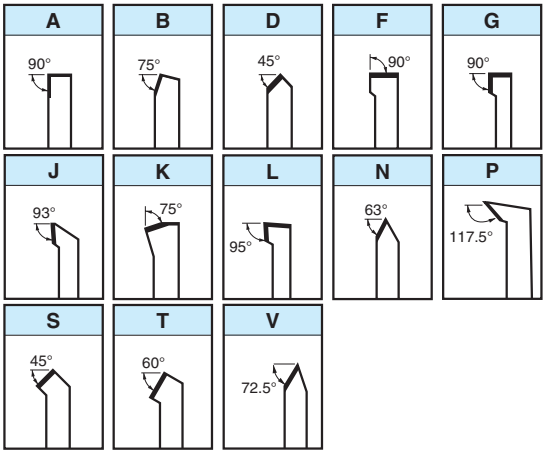
Description	Cutting Edge Length S	Description	Cutting Edge Length S	Description	Cutting Edge Length S
TKFB12R15..	2.1	TKFB12R28..	4.2	TKFB16R38..	5.8
-	-	TKFB12L28..	4.4	TKFB16L38..	6.2
For small diameter and short length workpiece Stable machining with minimum overhang		For general purpose Good chip control		Large ap at one pass	

Square Shank Identification System

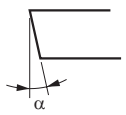
Clamping System	Insert Shape	Hand of Tool	Shank Height	Shank Width	Others
A : Back Clamp **C** : Top Clamp **P** : Lever Lock **S** : Screw Clamp	**C** : 80° Rhombic **D** : 55° Rhombic **S** : 90° Square **T** : 60° Triangle **V** : 35° Rhombic	**R** : Right-hand **L** : Left-hand **N** : Neutral	Shank Height (mm)	Shank Width (mm)	Manufacture's Option Optional Mark or Number e.g.) FF: Without Offset

S	C	L	C	R	12	12	JX	–	09	FF

Cutting Edge Angle

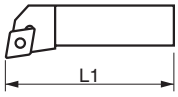


Insert Relief Angle



B: 5° Positive
C: 7° Positive
N: 0° Negative
P: 11°Positive

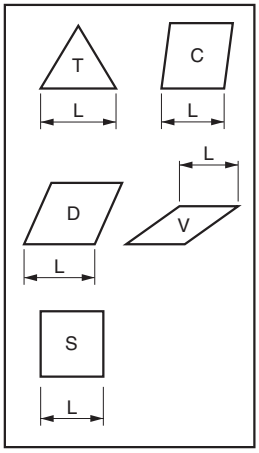
Toolholder Length



(mm)

F : 80 (85)	**JX**: 120
H : 100	**K** : 125
	M : 150

Insert Size



● Some back turning toolholders are Kyocera's original products, therefore their descriptions are not accordant with international standards.

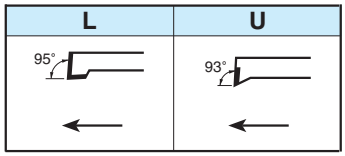
External Sleeve Holder Identification System

Shank	Toolholder Length	Clamping System	Insert Shape	Hand of Tool
S Steel	**F** : 80 (85) **G** : 90 **H** : 100 **K** : 125 (120)	**S** : Screw Clamp	**C** : 80˚ Rhombic **D** : 55˚ Rhombic **V** : 35˚ Rhombic	**L** : Left-hand

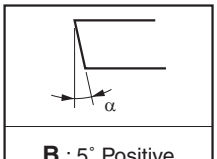
S	20	K	–	S	C	L	C	L	09

Shank Diameter

Cutting Edge Angle

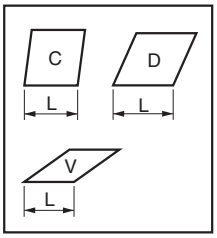


Insert Relief Angle



B : 5˚ Positive
C : 7˚ Positive

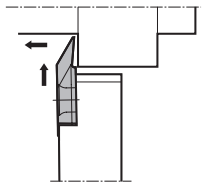
Insert Size



●Specification may change without any prior notice.

●Due to the installation size contrains on the machine, the toolholder length of some products may not match with the symbol.

KTKF / KTKF Goose-neck Holder



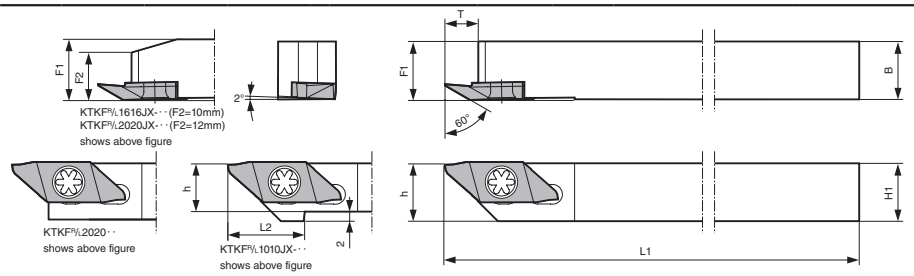
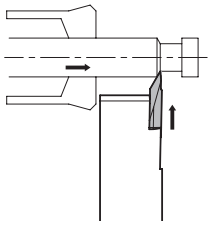


Fig.1

● Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.



<Goose-neck Holder>

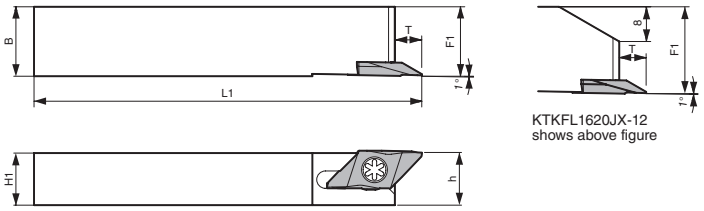


Fig.2

● Left-hand shown

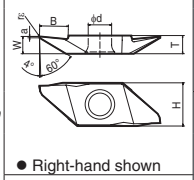
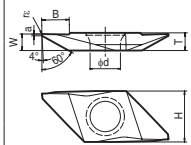
Left-hand Insert for Left-hand Toolholder.

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	T	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts
KTKFR/L	1010JX-12	●	●	10	10	120	15	10	6	Fig.1	SB-4590TRWN	LTW-10S	TKFB12R/L…
	1212JX-12	●	●	12	12		-	12					
	1616JX-12	●	●	16	16			16					
	2020JX-12	●	●	20	20			20					
KTKFR/L	1010JX-16	●	●	10	10	120	20	10	8		SB-4590TRWN	LTW-10S	TKFB16R/L…
	1212JX-16	●	●	12	12		-	12					
	1616JX-16	●	●	16	16			16					
	2020JX-16	●	●	20	20			20					
KTKFR/L	1212F-12	●	●	12	12	85	-	12	6		SB-4590TRWN	LTW-10S	TKFB12R/L…
	1212F-16	●	●						8				TKFB16R/L…
KTKFL	1216JX-12		●	12	16	120	-	16	6	Fig.2	SB-4590TRWN	LTW-10S	TKFB12L…
	1620JX-12		●	16	20			20					

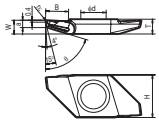
· Dimension T shows the distance from the Toolholder to the cutting edge.

● Applicable Inserts (Ref. to Page B92)

Insert (Photo shows Right-hand)	Description		Corner-R(rε) (mm)
	TKFB	12R15005M	<0.05
 ● Right-hand shown		12R28005M	<0.05
		12R28010M	<0.1
	TKFB	16R38005M	<0.05
		16R38010M	<0.1
 ● Left-hand shown	TKFB	12L28005MR	<0.05
		12L28010MR	<0.1
	TKFB	16L38005MR	<0.05
		16L38010MR	<0.1

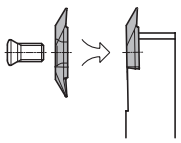
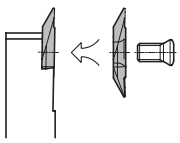
Recommended Cutting Conditions ➡ E45

● Applicable Inserts (Molded Chipbreaker, P: Polished edge, Ref. to Page B93)

Insert	Description		Corner-R(rε) (mm)
 ● Right-hand shown	TKFB	12R28005(P)-GQ	0.05
		12R28015(P)-GQ	0.15
	TKFB	16R38005(P)-GQ	0.05
		16R38015(P)-GQ	0.15

Recommended Cutting Conditions ➡ E45

◆ Combination of Toolholders and Inserts

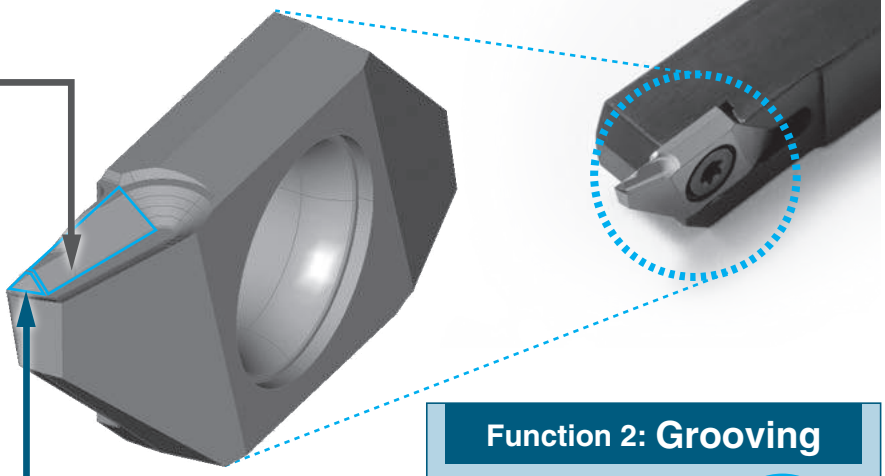
Toolholder	Right-hand	Toolholder	Left-hand
Insert	Right-hand	Insert	Left-hand
			

● : Std. Item

TKFB type GQ Chipbreaker for back Turning

Solution for problems in the conventional back-turning tools
Original 3D molded chipbreaker realizes excellent surface finish by smooth chip control

Point 1 Original double-function chipbreaker for improved chip control

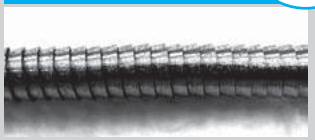


Function 1: External

Preventing chip entanglement

Stable chip control

GQ Chipbreaker



Competitor A (Ground Chipbreaker)

Function 2: Grooving

Preventing chip biting

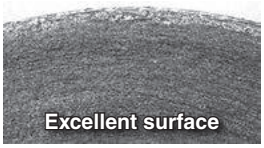
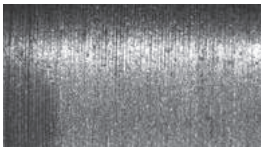
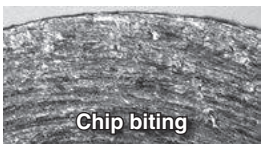
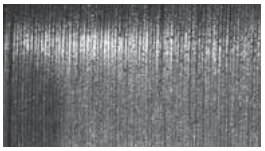
Good surface roughness

GQ Chipbreaker	Competitor A (Ground Chipbreaker)

Point 2 Excellent surface finish by preventing chip biting and clogging

Surface finish comparison

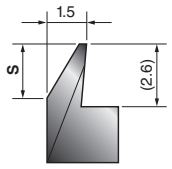
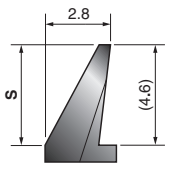
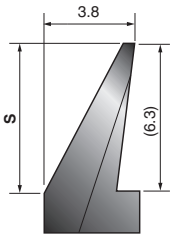
Cutting Conditions : Vc=100m/min ap=3.0mm f=0.02mm/rev (Grooving), 0.05mm/rev (External)
Workpiece Material :S45C Wet

	TKFB GQ Chipbreaker		Competitor B (Ground Chipbreaker)	
	Facing	External	Facing	External
Workpiece surface	 Excellent surface		 Chip biting	
	2.9μmRz	3.8μmRz	31.2μmRz	7.6μmRz

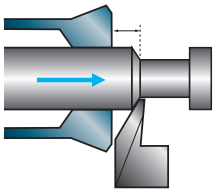
GQ Chipbreaker realizes excellent surface finish with single pass. Suitable for cycle time reduction.

Details of cutting edge and how to select

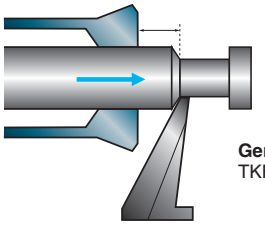
Details of cutting edge

Small machining		General purpose		Large machining	
					
Description	Cutting Edge Length S	Description	Cutting Edge Length S	Description	Cutting Edge Length S
TKFB12R15..	2.1	**TKFB12R28..**	4.2	**TKFB16R38..**	5.8
-	-	**TKFB12L28..**	4.4	**TKFB16L38..**	6.2
For small diameter and short length workpiece Stable machining with minimum overhang		For general purpose Good chip control		Large ap at one pass	

Selection



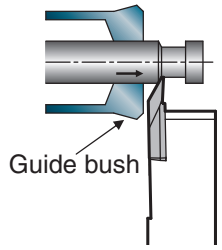
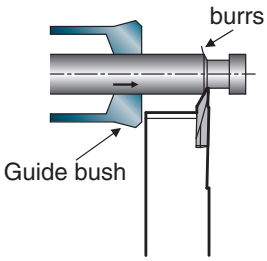
Small machining
TKFB12R15..



General purpose
TKFB12R28..

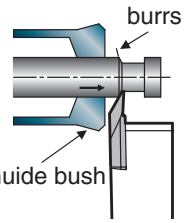
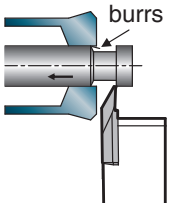
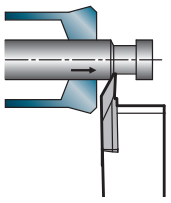
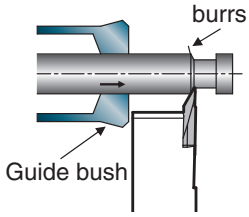
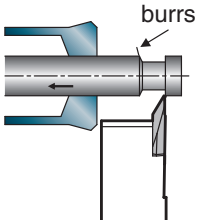
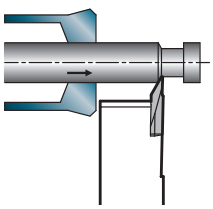
In case ap is same, if the insert with narrower edge width is used, overhang length from the guide bush is shorter, which enables better stability due to less workpiece deflection.
⇨High precision machining

How to select back turning toolholder hand

Right-hand		Machining near the guide bush is possible Narrow cutting edge width of TKFB12R15005M →Optimum for small parts and high precision machining
Left-hand	The workpiece burr does not contact the guide bush. 	Machining with a distance from guide bush Good chip control due to large space between the guide bush and the tool. →Excellent chip control in roughing and finishing (plural passes) Stable accuracy of external diameter dimension: When burrs occur, if a Left-hand toolholder is used, it is not necessary to return workpiece into guide bush in finishing. Also, Left-hand toolholders prevent guide bush wear caused by chip biting.

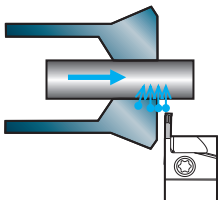
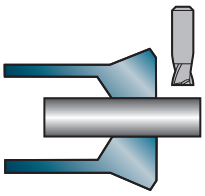
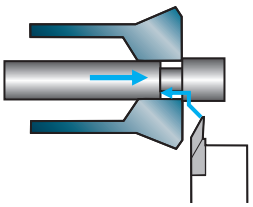
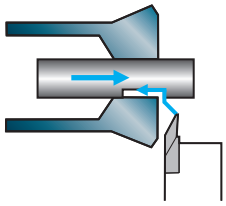
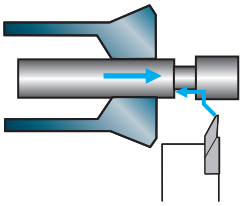
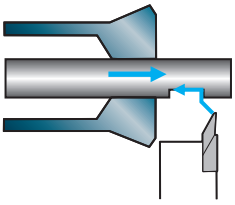
Workpiece movement and tool hand selection

In roughing and finishing

	Roughing	Workpiece position after roughing	Finishing
Right-hand			
Left-hand			

* Good dimension accuracy: If a Left-hand toolholder is used, burrs on workpiece generated in roughing do not damage the guide bush in finishing.

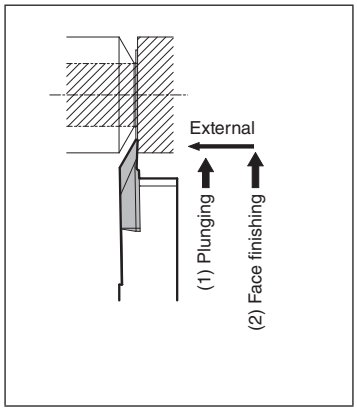
Chip control improvement in back turning

	Chip control improvement by tool pass changes I	Chip control improvement by tool pass changes II
Roughing	● Roughing with grooving tools (1) GMM2420-020MW (Grooving) 	● Pre-Stage machining is processed with solid end mill (1) 2FESW040-040-04 (Solid End Mill) 
Finishing (Countermeasures 1) Use Right-hand toolholder	(1) When using TKFB12R28010M (for back turning / right hand)  Advantages : Good surface roughness Disadvantages : If a machining pass is long, the guide bush can not support the workpiece.	(1) When using TKFB12R28010M (for back turning / right hand)  Advantages :1. Minimal deflection in long machining passes 2. Chips are broken into small pieces, though the workpiece material is sticky Disadvantages: The pre-stage machining may cause fractures, because of interrupted machining.
Finishing (Countermeasures 2) Use Left-hand toolholder	(2) When using TKFB12L28010M (for back turning / left hand)  Advantages : 1. Good surface roughness 2. High precision machining if the machined portion does not contact the guide bush. Disadvantages : If a machining pass is long, the guide bush can not support the workpiece.	(2) When using TKFB12L28010M (for back turning / left hand)  Advantages : 1. Minimal deflection in long machining passes 2. Chips are broken into small pieces, though the workpiece material is sticky. 3. High precision machining if the machined portion does not contact the guide bush. Disadvantages: The pre-stage machining may cause fractures, because of interrupted machining.

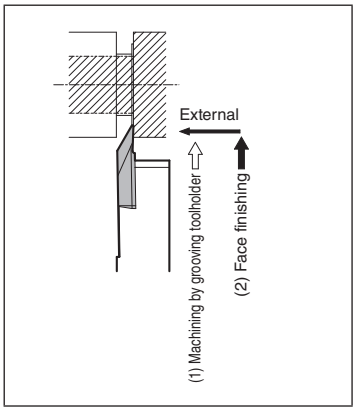
Countermeasure against peeled surface in face back turning

When peeled surface occurs on the workpiece face, please apply the countermeasures below.

● **Countermeasures 1**
Face finishing

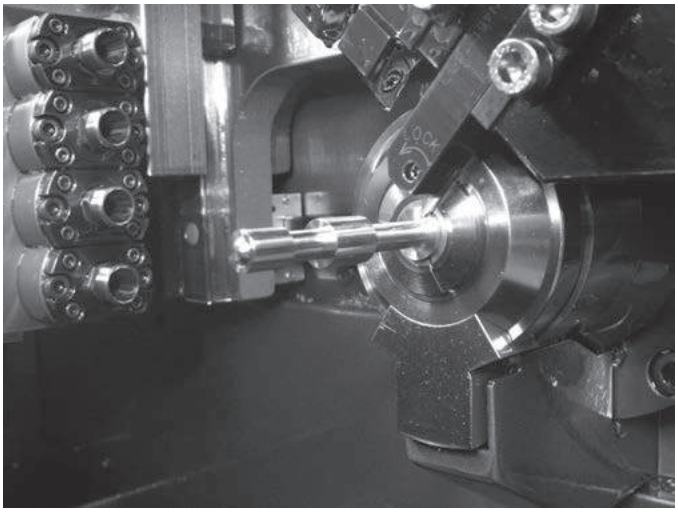


● **Countermeasures 2**
Face finishing after grooving



When using TKF-AS type Inserts

The KTKF toolholder can be used as a multi-functional tooling for non-ferrous metals and non-metals when combined with a TKF-AS insert. (Fig.1)



Example of spool machining

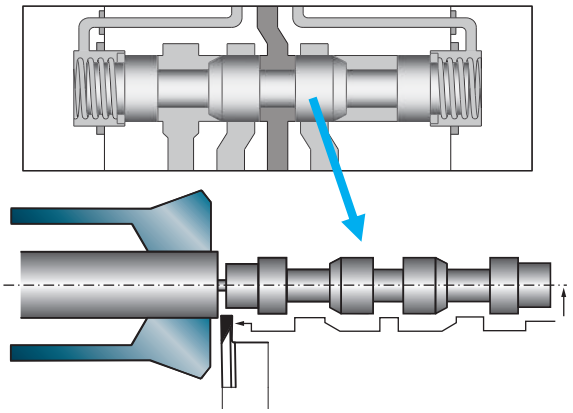
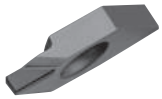
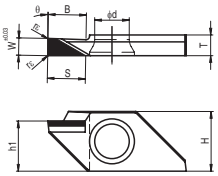
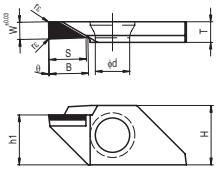
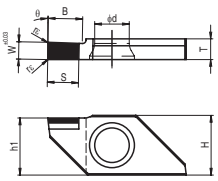


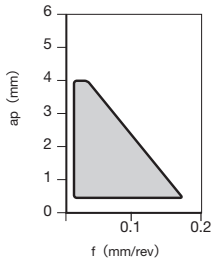
Fig.1 Example of the pass of KTKF toolholder + TKF-AS insert

Applicable Inse rts (Ref. to Page C32)

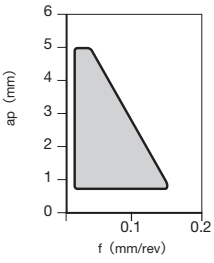
Insert Photo shows Right-hand		Description	
 Turning / Grooving	 ● Right-hand shown	TKF12R/L	200-AS
			250-AS
		TKF16R/L	250-AS
	 ● Insert hand: Left-hand / PCD edge hand: Right-hand	TKF12L	200-ASR
			250-ASR
		TKF16L	250-ASR
 Grooving (Turning is possible)	 ● Right-hand shown	TKF12R/L	150-NB
			200-NB
			250-NB
			250-NB4.5

Applicable Range

TKF12-AS/-ASR



TKF16-AS/-ASR



* PCD Inserts for turning and Grooving

* Not recommended for cut-off

Inserts Identification System

TKF	12	R	200	-	AS	
TKF	12	L	200	-	AS	R

- TKF — Insert Type
- 12 — Insert Size
- R / L — Insert Hand: R : Right-hand; L : Left-hand
- 200 — Width (Edge Width)
- AS / NB — Name of Chipbreaker: AS: AS Chipbreaker; NB: Without Chipbreaker
- R — PCD insert hand: Without Indication: The edge hand is same as the insert hand. R : Right-hand

Applicable Toolholders ➔ E12
Recommended Cutting Conditions ➔ E45

Note 1) The cutting edge of the TKF-AS / -ASR will be 1 mm lower than the center line when attached to the KTKF toolholder (Ref. to Fig.2). Adjust the height by making NC lathe parameter settings or inserting a plate.

2) If the 1 mm adjustment is not possible, use the TKF..-NB. (Ref. to Fig.3)

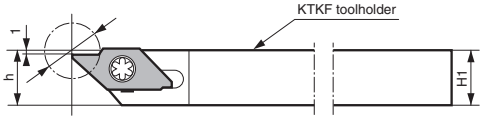


Fig.2 When a TKF-AS / -ASR insert is attached
(The cutting edge is 1mm lower than the center line)

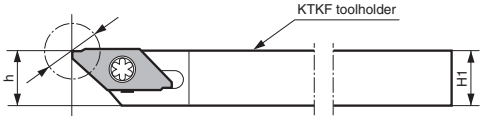
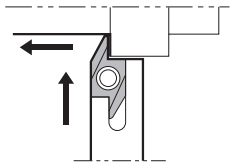
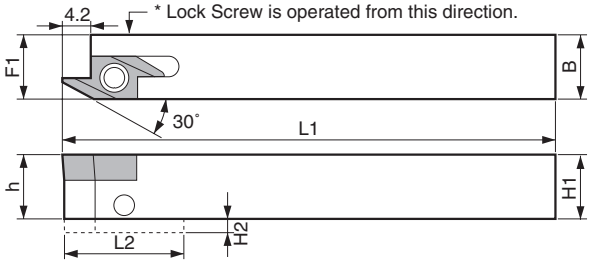


Fig.3 When a TKF-NB insert is attached

Toolholders for Back Turning [ABS15 Insert]

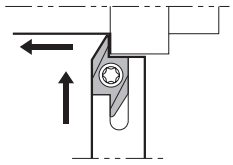
AABS-40F (Edge Width: 2.8mm, MAX. Depth: 4mm)

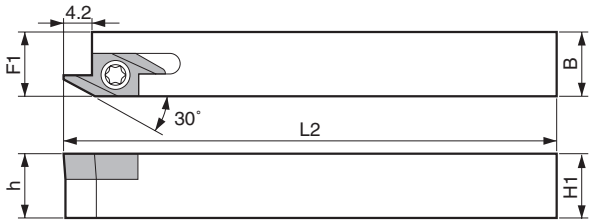




● Right-hand shown

SABS-40F (Edge Width: 2.8mm, MAX. Depth: 4mm)



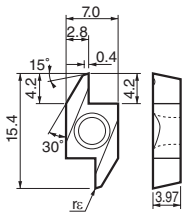


● Right-hand shown

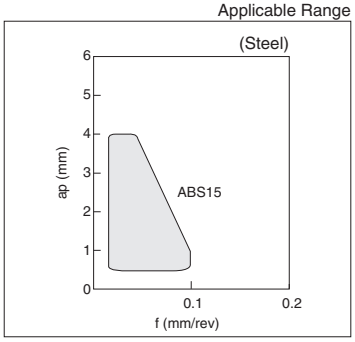
● Toolholder Dimensions

Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
			H1=h	H2	B	L1	L2	F1			Anchor Pin	Lock Screw	Clamp Screw	Wrench	
AABSR	1010JX-40F	●	10		10			10.2			LPA-11				
	1212JX-40F	●	12	-	12	120	-	12.2		0.15	LPA-13	HSB4X8R	-	FH-2	
	1616JX-40F	●	16		16			16.2			LPA-17				
SABSR	1010JX-40F	●	10		10			10.2							
	1212JX-40F	●	12	-	12	120	-	12.2		0.15	-	-	SB-3080TR	FT-10	
	1616JX-40F	●	16		16			16.2							
SABSR	1212F -40F	●	12	-	12	85	-	12.2		0.15	-	-	SB-3080TR	FT-10	
	2020K -40F	●	20		20	125		20.2							

● Applicable Inserts

Insert		Description	Corner-R(rε) (mm)	Ref. to Page
		**ABS15R4005**	0.05	**B94**
		15R4015	0.15	
		ABS15R4005M	<0.05	
		15R4015M	<0.15	

Applicable Range

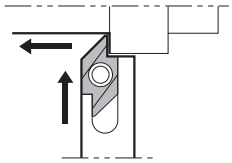


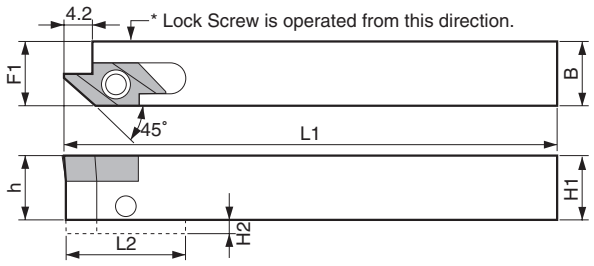
Recommended Cutting Conditions ➔ E45

● : Std. Item

Toolholders for Back Turning [ABW15 Insert]

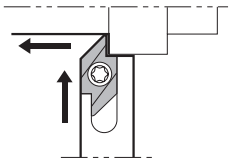
AABW-40F (Edge Width: 4.7mm, MAX. Depth: 4mm)

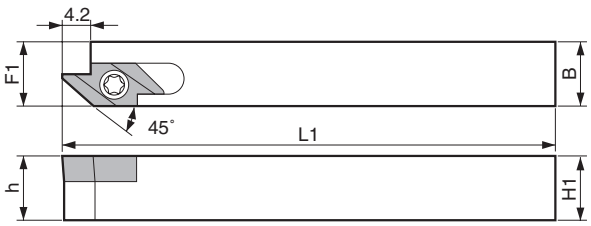




● Right-hand shown

SABW-40F (Edge Width: 4.7mm, MAX. Depth: 4mm)



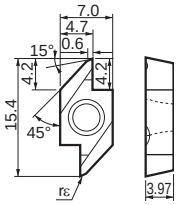


● Right-hand shown

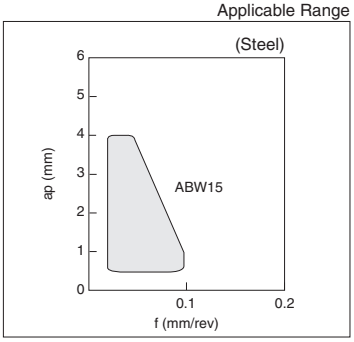
● Toolholder Dimensions

Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
			H1=h	H2	B	L1	L2	F1			Anchor Pin	Lock Screw	Clamp Screw	Wrench	
AABWR	1010JX-40F	●	10		10			10.2			LPA-11				
	1212JX-40F	●	12	-	12	120	-	12.2		0.15	LPA-13	HSB4X8R	-	FH-2	
	1616JX-40F	●	16		16			16.2			LPA-17				
SABWR	1010JX-40F	●	10		10			10.2							
	1212JX-40F	●	12	-	12	120	-	12.2		0.15	-	-	SB-3080TR	FT-10	
	1616JX-40F	●	16		16			16.2							
SABWR	2020K -40F	●	20	-	20	125	-	20.2		0.15	-	-	SB-3080TR	FT-10	

● Applicable Inserts

Insert		Description	Corner-R(rε) (mm)	Ref. to Page
		**ABW15R4005** **15R4015**	0.05 0.15	**B94**
		ABW15R4005M **15R4015M**	<0.05 <0.15	

Applicable Range

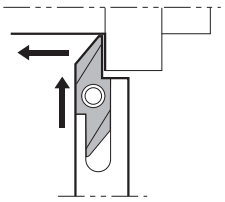


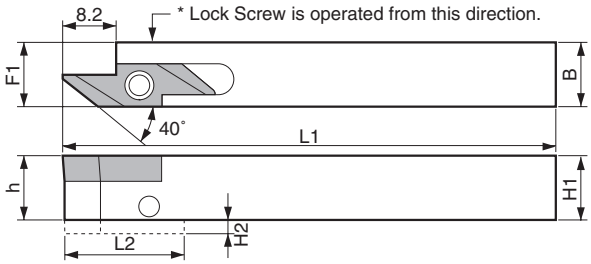
Recommended Cutting Conditions ➡ E45

● : Std. Item

Toolholders for Back Turning [ABW23 Insert]

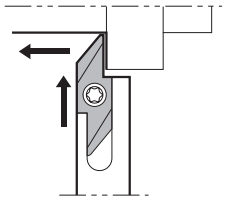
AABW-50F (Edge Width: 4.7mm, MAX. Depth: 5mm)

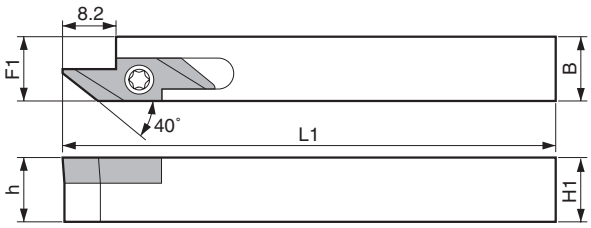




● Right-hand shown

SABW-50F (Edge Width: 4.7mm, MAX. Depth: 5mm)



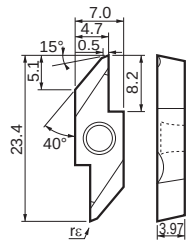


● Right-hand shown

● Toolholder Dimensions

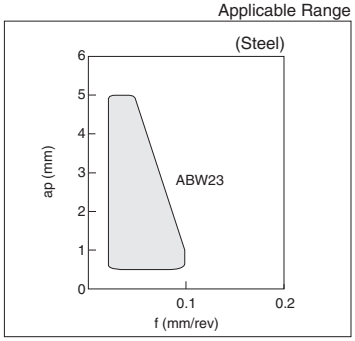
Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
			H1=h	H2	B	L1	L2	F1			Anchor Pin	Lock Screw	Clamp Screw	Wrench	
AABWR	1010JX-50F	●	10		10			10.2			LPA-11				
	1212JX-50F	●	12	-	12	120	-	12.2		0.15	LPA-13	HSB4X8R	-	FH-2	
	1616JX-50F	●	16		16			16.2			LPA-17				
SABWR	1010JX-50F	●	10		10			10.2							
	1212JX-50F	●	12	-	12	120	-	12.2		0.15	-	-	SB-3080TR	FT-10	
	1616JX-50F	●	16		16			16.2							
SABWR	2020K -50F	●	20	-	20	125	-	20.2		0.15	-	-	SB-3080TR	FT-10	

● Applicable Inserts

Insert		Description	Corner-R(rε) (mm)	Ref. to Page
		**ABW23R5005** **23R5015**	0.05 0.15	**B94**
		ABW23R5005M **23R5015M**	<0.05 <0.15	

Recommended Cutting Conditions ➔ **E45**

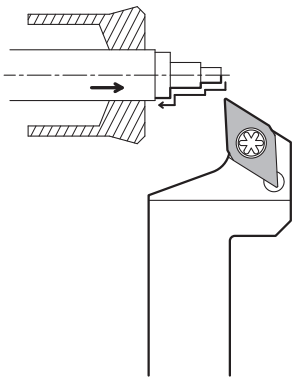
Applicable Range (Steel)

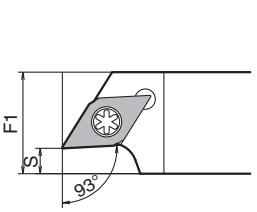


● : Std. Item

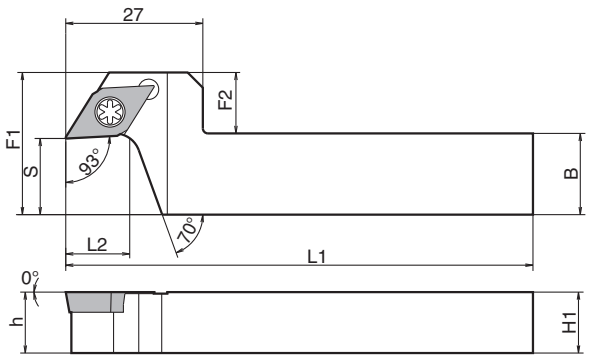
Goose-neck Holder [DC□□ Insert]

SDJC (External / Copying)





SDJCR1620JX-11-F05
shows above figure



● Right-hand shown

● Toolholder Dimensions

Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts		
			H1=h	B	L1	L2	F1	F2	S		Clamp Screw	Wrench	
SDJCR	1216JX-11-F05	●	12	16	120	12.6	18	2	5	0.2	SB-4085TR	FT-15	
	1216JX-11-F15	●					28	12	15				
	1620JX-11-F05	●	16	20			20	-	5				
	1620JX-11-F15	●					28	8	15				

● Applicable Inserts

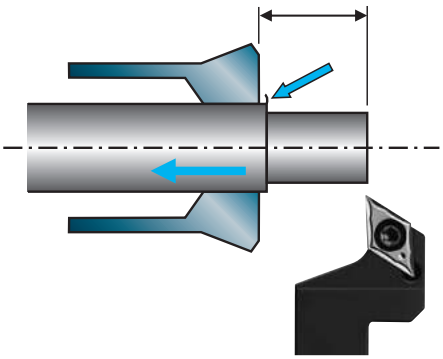
Applications	Minute ap	Finishing	*Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. to Page	B57	B57	B58	B58	B58	B58	B61	B60	B62,B63	B62
Insert / Toolholder Description	CF	GF	WP(Wiper)	PP	GK	GQ	R-F	R-FSF	(E/F)R-U	FR-USF
SDJCR..-11-F..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

Applications	Low Feed	Low Feed / Precision	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B64,B65	B64	B59	B59	B60	B65	B65	B65	C25	C15
Insert / Toolholder Description	(E/F)R-J	FR-JSF	XP	XQ	MQ	Without Chipbreaker	AH	R-A3	PCD	CBN
SDJCR..-11-F..	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

* For WP chipbreaker, cutting edge offsets or program corrections are required. F42

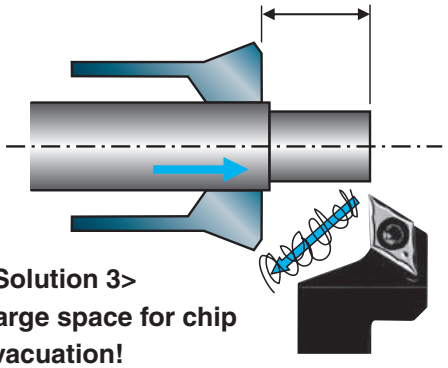
Recommended Cutting Conditions E44

● Goose-neck holder is available for multiple passes at roughing and finishing!



<Solution 1>
The workpiece burr does not contact the guide bush and no breakage will be caused!

<Solution 2>
Longitudinal dimension will be stable. External diameter will be stable owing to multiple pass machining (roughing and finishing).

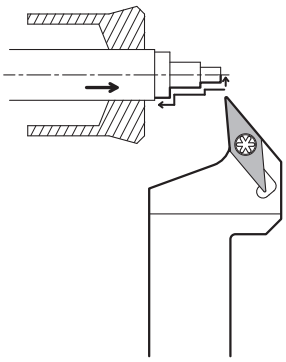


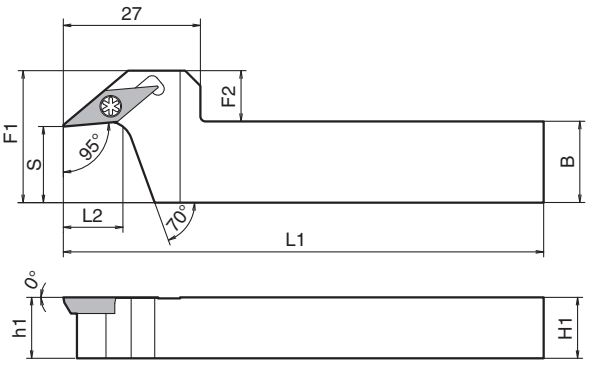
<Solution 3>
Large space for chip evacuation!
Better and smooth chip control.

● : Std. Item

Goose-neck Holder [VP□□ Insert]

SVLP (External / Copying)





● Right-hand shown

● Toolholder Dimensions

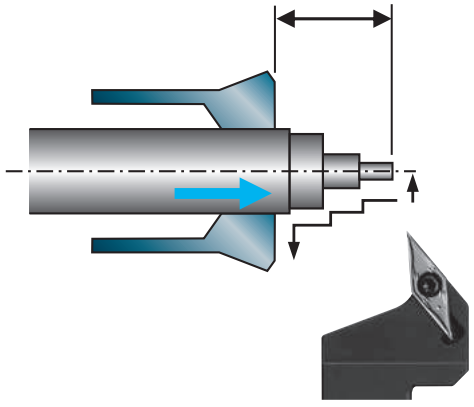
Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts		
			H1=h	B	L1	L2	F1	F2	S		Clamp Screw	Wrench	
SVLPR	1216JX-11-F15	●	12	16	120	12	26	10	15	0.2	SB-2570TR	FT-8	
	1620JX-11-F15	●	16	20				6					

● Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision				
Ref. to Page	B86	B86	B86	B87	B88	B88				
Insert / Toolholder Description	CF	CK	GF	R-FSF	FR-U	FR-USF				
SVLPR...-11-F..	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPET1103..	VPET1103..				

Recommended Cutting Conditions E44

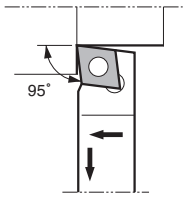
● One toolholder for complex shape workpiece

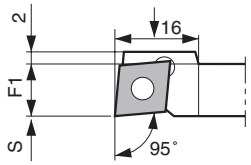


Toolholder for VP type insert is available!
Complex shape workpiece can be processed with one toolholder.
It can be used for undercutting and external / face finishing.

● : Std. Item

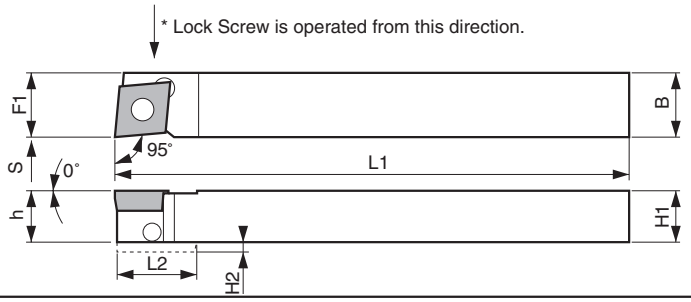
ACLC-FF (Without Offset) (External / Facing)





ACLC$^{R}_{L}$1010JX-09FF
shows above figure

● Right-hand shown

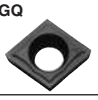


● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	B	L1	L2	F1	S	Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Wrench		
ACLC$^{R}_{L}$	1010JX-06FF	●	●	10	-	10	120	-	10	0	0.2	LPF-11	HSB4X8$^{R}_{L}$	FH-2		
	1010JX-09FF	●	●	10	2	10		16	10			LPF-13				
	1212JX-09FF	●	●	12	-	12	120	-	12							
	1616JX-09FF	●	●	16		16			16			LPF-17				

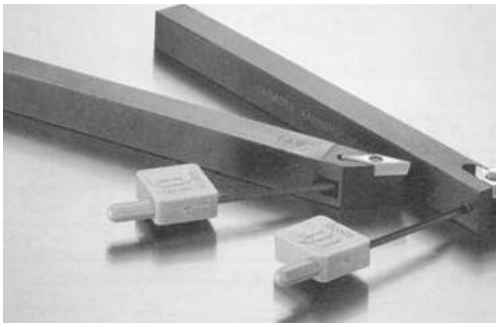
· Lock Screw: HSB4X8R for Right-hand Toolholder, HSB4X8L for Left-hand Toolholder.

● Applicable Inserts

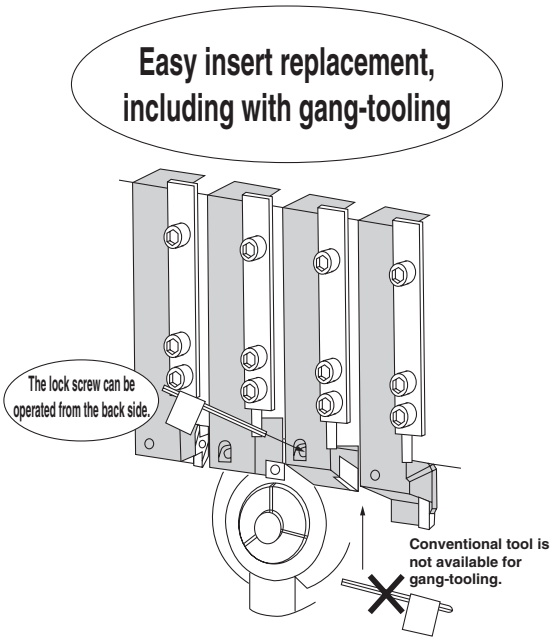
Applications	Finishing	Finishing-Medium	Finishing-Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B49	B50	B49,B50	B53,B54	B51	B55	B55	B55	C24	C14
Insert / Toolholder Description	GF	GK	GQ	(E/F)$^{R}_{L}$-U	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
										
ACLC$^{R}_{L}$...-06FF	CCGT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
ACLC$^{R}_{L}$...-09FF	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

Recommended Cutting Conditions E44

● Back Clamp Toolholders



1. The lock screw can be operated from the back side and allows simple insert replacement on Swiss type automatic lathes. (Fig.1)
2. Simple insert replacement by slightly turning the wrench.
3. Rigid clamping with anchor pin and lock screw. (Fig.2)



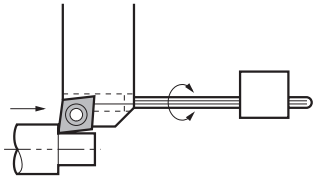


Fig.1

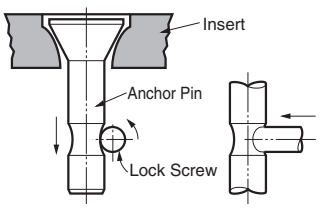
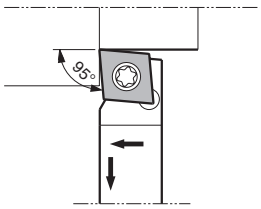


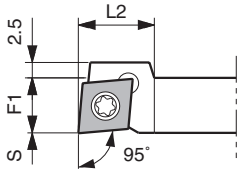
Fig.2

● : Std. Item

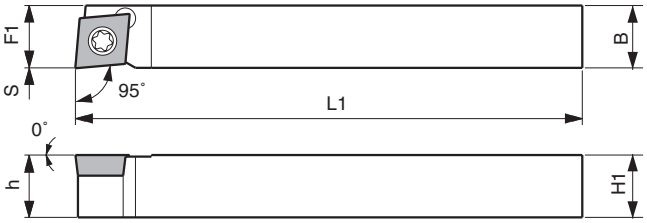
External Toolholders [CC□□ Insert]

SCLC-FF (Without Offset) (External / Facing)





SCLC$^{R}_{L}$1010JX-09FF
shows above figure

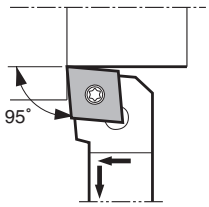


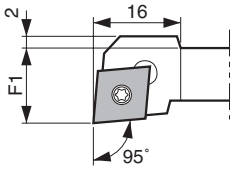
● Right-hand shown

● Toolholder Dimensions

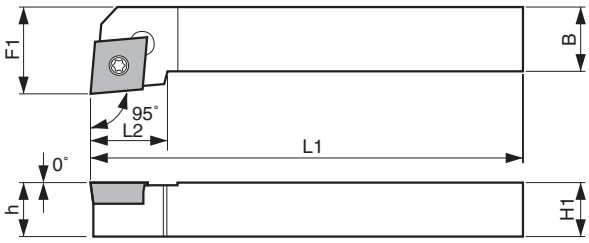
Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	S		Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench			
SCLC$^{R}_{L}$	0808F-06FF	●	●	8	8	85	-	8	0		0.2	SB-2570TR	FT-8			
	1212F-09FF	●	●	12	12			12				SB-4085TR	FT-15			
SCLC$^{R}_{L}$	1010JX-06FF	●	●	10	10	120	-	10	0		0.2	SB-2570TR	FT-8			
	1010JX-09FF	●	●	10	10		15	10			0.2	SB-4085TR	FT-15			
	1212JX-09FF	●	●	12	12			12								
	1616JX-09FF	●	●	16	16		-	16								
NEW	2020JX-09FF	●	●	20	20			20								

SCLC (External / Facing)





SCLC$^{R}_{L}$1010F-09
shows above figure



● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Wrench		
SCLC$^{R}_{L}$	1010F -06	●	●	10	10	80	9	12			0.2	SB-2570TR	FT-8	-		
	1010F -09	●	●	10	10	80	14	14			0.2	SB-4085TR	FT-15	-		
	1212H -09	●	●	12	12	100		16								
	1616H -09	●	●	16	16		15	20								
	2020K -09	●	●	20	20	125	20	25								
	2525M -09	●	●	25	25	150	22	32								
	1616H -12	●	●	16	16	100	20	20			0.4	SB-5090TR	-	LTW-20		
	2020K -12	●	●	20	20	125	22	25								
	2525M -12	●	●	25	25	150		32								

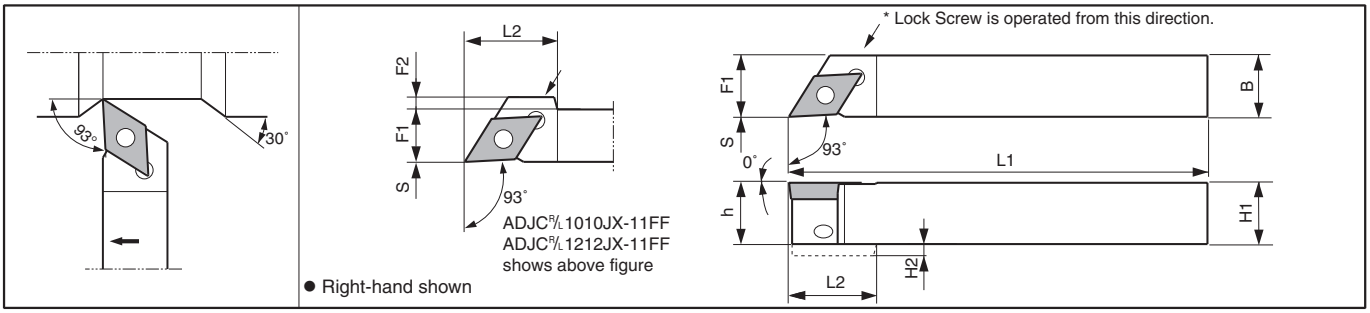
● Applicable Inserts (SCLC-FF / SCLC)

Applications	Finishing	Finishing-Medium	Finishing-Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B49	B50	B49,B50	B53,B54	B51	B55	B55	B55	C24	C14
Insert / Toolholder Description	GF	GK	GQ	(E/F)$^{R}_{L}$-U	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
SCLC$^{R}_{L}$...-06FF/-06	CCGT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
SCLC$^{R}_{L}$...-09FF/-09	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..
SCLC$^{R}_{L}$...-12	-	CCMT1204..	-	-	-	-	-	CCGT1204..	-	-

Recommended Cutting Conditions ➡ E44

● : Std. Item

ADJC-FF (Without Offset) (External / Copying)



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	B	L1	L2	F1	F2	S	Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Wrench
ADJCR/L	1010JX-07FF	●	●	10	-	10	120	-	10	-	0	0.2	LPF-11	HSB4X8R/L	FH-2
	1010JX-11FF	●	●	10	2	10		20	10	3		0.2	LPF-13		
	1212JX-11FF	●	●	12	-	12			12	1					
	1616JX-11FF	●	●	16		16		-	16	-			LPF-17		

· Lock Screw: HSB4X8R for Right-hand Toolholder, HSB4X8L for Left-hand Toolholder.

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	*Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing	Finishing / Precision	Low Feed
Ref. to Page	B57	B57	B57,B58	B58	B58	B58	B58	B61	B60	B62,B63
Insert / Toolholder Description	CF	GF	CK	WP(Wiper)	PP	GK	GQ	R/L-F	R/L-FSF	(E/F)R/L-U
ADJCR/L...-07FF	DCGT0702..	DCGT0702..	DCGT0702..	DCMX0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
ADJCR/L...-11FF	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B62	B64,B65	B59	B59	B60	B65	B65	B65	C25	C15
Insert / Toolholder Description	F R/L-USF	(E/F)R/L-J	XP	XQ	MQ	Without Chipbreaker	AH	R/L-A3	PCD	CBN
ADJCR/L...-07FF	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
ADJCR/L...-11FF	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

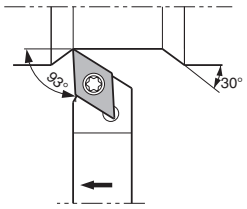
* For WP chipbreaker, cutting edge offsets or program corrections are required. F42

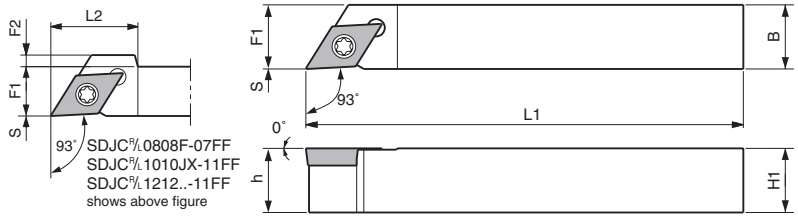
Recommended Cutting Conditions E44

● : Std. Item

External Toolholders [DC□□ Insert]

SDJC-FF (Without Offset) (External / Copying)



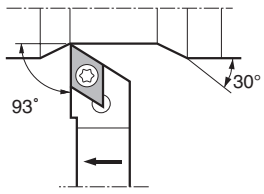


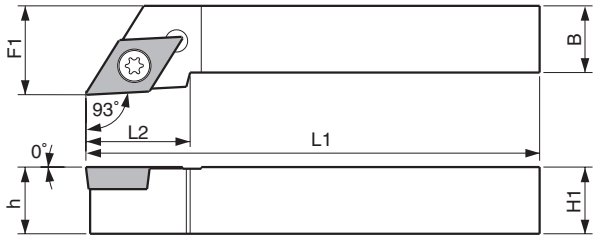
● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	S	Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDJC□	0808F -07FF	●	●	8	8	85	14	8	0.5	0	0.2	SB-2570TR	FT-8
	1212F -11FF	●	●	12	12		20	12	1			SB-4085TR	FT-15
SDJC□	1010JX-07FF	●	●	10	10	120	-	10	-	0	0.2	SB-2570TR	FT-8
	1010JX-11FF	●	●	10	10		20	10	3		0.2	SB-4085TR	FT-15
	1212JX-11FF	●	●	12	12			12	1				
	1616JX-11FF	●	●	16	16		-	16	-				
NEW	2020JX-11FF	●	●	20	20			20					

SDJC (External / Copying)





● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDJC□	1010F -07	●	●	10	10	80	12	12	0.2	SB-2570TR	FT-8
SDJC□	1010F -11	●	●	10	10	80	18	12	0.2	SB-4085TR	FT-15
	1212H -11	●	●	12	12	100		16			
	1616H -11	●	●	16	16			20			
	2020K -11	●	●	20	20	125		25			
	2525M -11	●	●	25	25	150	23	32			

● Applicable Inserts

Applications	Minute ap	Finishing	Finishing	*Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing	Finishing / Precision	Low Feed
Ref. to Page	B57	B57	B57,B58	B58	B58	B58	B58	B61	B60	B62,B63
Insert / Toolholder Description	CF	GF	CK	WP(Wiper)	PP	GK	GQ	□/L-F	□/L-FSF	(E/F)□/L-U
SDJC□/L...-07FF/-07	DCGT0702..	DCGT0702..	DCGT0702..	DCMX0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
SDJC□/L...-11FF/-11	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..

Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B62	B64,B65	B59	B59	B60	B65	B65	B65	C25	C15
Insert / Toolholder Description	F□/L-USF	(E/F)□/L-J	XP	XQ	MQ	Without Chipbreaker	AH	□/L-A3	PCD	CBN
SDJC□/L...-07FF/-07	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDJC□/L...-11FF/-11	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

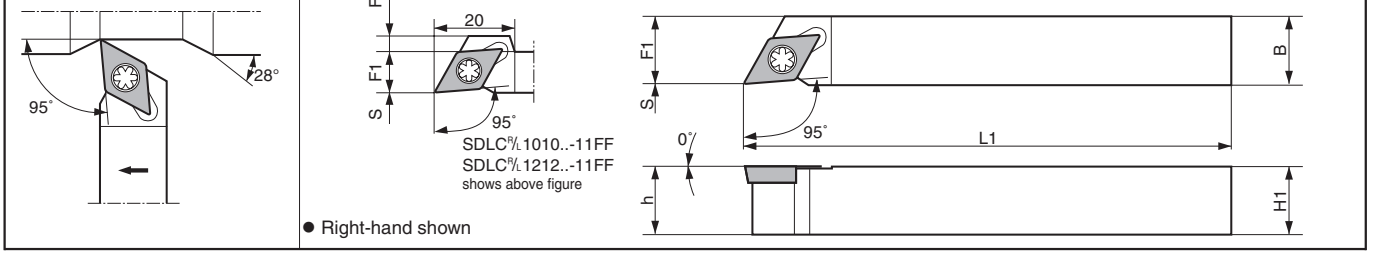
* For WP chipbreaker, cutting edge offsets or program corrections are required. F42

Recommended Cutting Conditions E44

● : Std. Item

External Toolholders [DC□□ Insert]

SDLC-FF (Without Offset) (External / Copying)

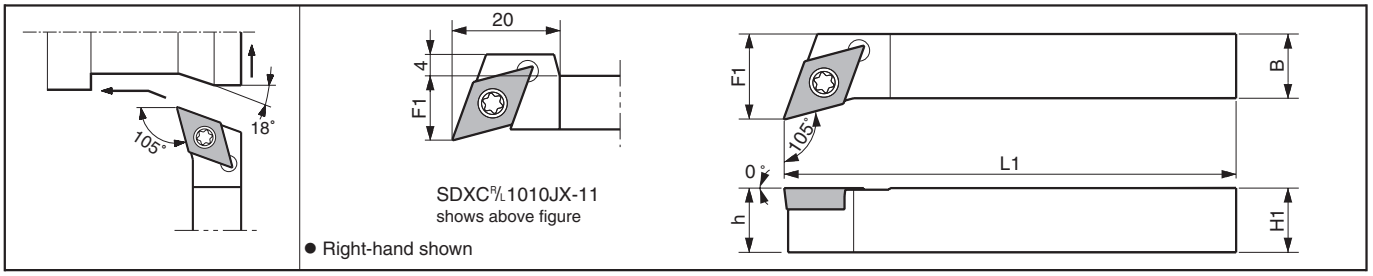


● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	F1	F2	S		Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDLC R/L	1010JX-07FF	●	●	10	10	120	10	-	0		0.2	SB-2570TR	FT-8
	1212JX-07FF	●	●	12	12		12						
	1616JX-07FF	●	●	16	16		16						
SDLC R/L	1010JX-11FF	●	●	10	10	120	10	4	0		0.2	SB-4085TR	FT-15
	1212JX-11FF	●	●	12	12		12	2					
	1616JX-11FF	●	●	16	16		16	-					
SDLC R/L	1212F -07FF	●	●	12	12	85	12	-	0		0.2	SB-2570TR	FT-8
SDLC R/L	1010F -11FF	●	●	10	10	80	10	4	0		0.2	SB-4085TR	FT-15
	1212F -11FF	●	●	12	12	85	12	2					
	1616H -11FF	●		16	16	100	16	-					

SDXC (External / Facing / Copying)



● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	F1				Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDXC R/L	1010JX-07	●	●	10	10	120	12				0.2	SB-2570TR	FT-8
	1010JX-11	●	●	10	10		12				0.2	SB-4085TR	FT-15
	1212JX-11	●	●	12	12		16						
	1616JX-11	●	●	16	16		20						

● Applicable Inserts (SDLC-FF / SDXC)

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing	Finishing / Precision	Low Feed
Ref. to Page	B57	B57	B57,B58	-	B58	B58	B58	B61	B60	B62,B63
Insert / Toolholder Description	CF	GF	CK	WP(Wiper)	PP	GK	GQ	R/L-F	R/L-FSF	(E/F)R/L-U
SDLC R/L...-07FF	DCGT0702..	DCGT0702..	DCGT0702..	-	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
SDXC R/L...-07										
SDLC R/L...-11FF	DCGT11T3..	DCGT11T3..	DCGT11T3..	-	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..
SDXC R/L...-11										

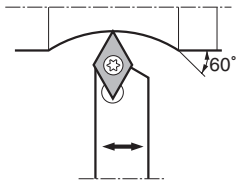
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B62	B64,B65	B59	B59	B60	B65	B65	B65	C25	C15
Insert / Toolholder Description	F R/L-USF	(E/F)R/L-J	XP	XQ	MQ	Without Chipbreaker	AH	R/L-A3	PCD	CBN
SDLC R/L...-07FF	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDXC R/L...-07										
SDLC R/L...-11FF	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
SDXC R/L...-11										

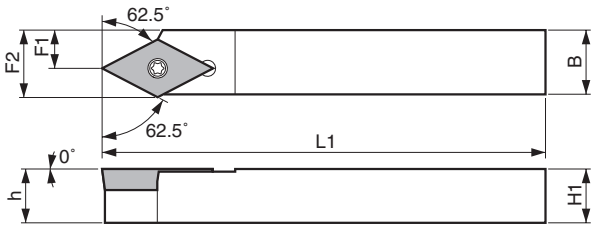
Recommended Cutting Conditions E44

● : Std. Item

External Toolholders [DC□□ Insert]

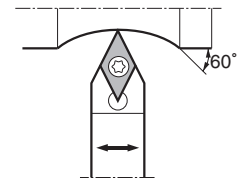
SDNC-F (External / Copying)

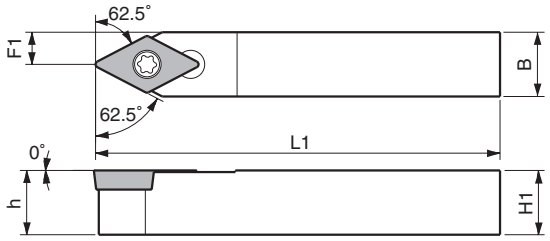




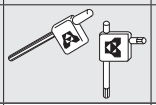
● Right-hand shown

SDNC (External / Copying)





● Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	F1	F2			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench		
																
SDNC$^{R}_{L}$	1010JX-07F	●		●	10	10	120	7	10.5			0.2	SB-2570TR	FT-8		
SDNCN	1010JX-07		●		10	10		5	-			0.2	SB-2570TR	FT-8		
	1212JX-07		●		12	12		6								
	1010JX-11		●		10	10	120	5				0.2	SB-4085TR	FT-15		
	1212JX-11		●		12	12		6	-							
	1616JX-11		●		16	16		8								
SDNCN	0808F-07		●		8	8	85	4	-			0.2	SB-2570TR	FT-8		
SDNCN	1010F-11		●		10	10	80	5								
	1212F-11		●		12	12	85	6	-			0.2	SB-4085TR	FT-15		
	1616H-11		●		16	16	100	8								

● Applicable Inserts

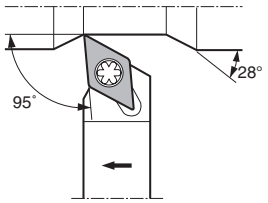
Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing	Finishing / Precision	Low Feed
Ref. to Page	B57	B57	B57,B58	-	B58	B58	B58	B61	B60	B62,B63
Insert / Toolholder Description	CF	GF	CK	WP(Wiper)	PP	GK	GQ	$^{R}_{L}$-F	$^{R}_{L}$-FSF	(E/F)$^{R}_{L}$-U
SDNC$^{R}_{L}$...-07F	DCGT0702..	DCGT0702..	DCGT0702..	-	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
SDNCN...-07										
SDNCN...-11	DCGT11T3..	DCGT11T3..	DCGT11T3..	-	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..

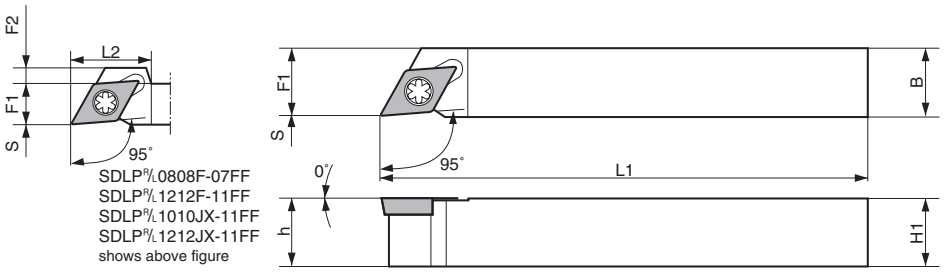
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B62	B64,B65	B59	B59	B60	B65	B65	B65	C25	C15
Insert / Toolholder Description	F$^{R}_{L}$-USF	(E/F)$^{R}_{L}$-J	XP	XQ	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
SDNC$^{R}_{L}$...-07F	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDNCN...-07										
SDNCN...-11	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

Recommended Cutting Conditions ➔ E44

● : Std. Item

SDLP-FF (Without Offset) (External / Copying)





SDLP$^{R/L}$0808F-07FF
SDLP$^{R/L}$1212F-11FF
SDLP$^{R/L}$1010JX-11FF
SDLP$^{R/L}$1212JX-11FF
shows above figure

● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	S	Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDLP$^{R/L}$	0808F -07FF	●	●	8	8	85	14	8	0.5	0	0.2	SB-2570TR	FT-8
	1212F -11FF	●	●	12	12		20	12	2			SB-4085TR	FT-15
SDLP$^{R/L}$	1010JX-07FF	●	●	10	10	120	-	10	-	0	0.2	SB-2570TR	FT-8
	1010JX-11FF	●	●	10	10		20	10	4		0.2	SB-4085TR	FT-15
	1212JX-11FF	●	●	12	12			12	2				
	1616JX-11FF	●	●	16	16		-	16	-				

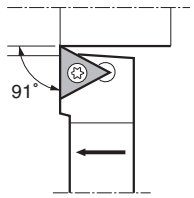
● Applicable Inserts

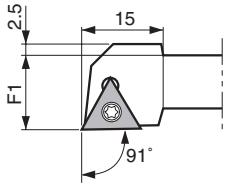
Applications	Finishing / Precision	Low Feed / Precision
Ref. to Page	B66	B66
Insert / Toolholder Description	$^{R/L}$-FSF	F$^{R/L}$-USF
SDLP$^{R/L}$...-07FF	DPET0702..	DPET0702..
SDLP$^{R/L}$...-11FF	DPET11T3..	DPET11T3..

Recommended Cutting Conditions E44

● : Std. Item

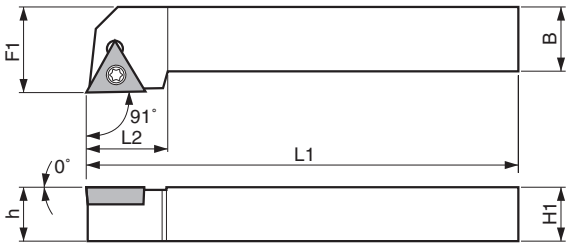
STGC(P) (External)





STGC(P)R/L1010F-11
shows above figure

● Right-hand shown



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench			
STGCR/L	0808E -08	●	□	8	8	70	12	10			0.2	SB-2050TR	FT-6			
	1010F -08	●	●	10	10	80		12								
STGCR/L	1010F -11	●	●	10	10	80	15	14			0.4	SB-2570TR	FT-8			
	1212H -11	●	●	12	12	100		16								
	1616H -11	●	●	16	16			20								
	2020K -11	●	●	20	20	125		25								
	2525M -11	●	●	25	25	150	20	32								
STGPR/L	0808E -08	●		8	8	70	12	10			0.2	SB-2050TR	FT-6			
	1010F -08	□	□	10	10	80		12								
STGPR/L	1010F -11	●	●	10	10	80	15	14			0.2	SB-3080TR	FT-10			
	1212H -11	●	●	12	12	100		16								
	1616H -11	●	●	16	16			20								

Applicable Inserts (STGC)

Applications	Low Feed	Low Feed / Precision	Cast Iron	Non-ferrous Metals	Non-ferrous Metals
Ref. to Page	B72	B71	B73	B73	C26
Insert / Toolholder Description	(E/F)R/L-U	FR/L-USF	Without Chipbreaker	R/L-A3	PCD
STGCR/L...-08	TCGT0802..	TCET0802..	TCGW0802..	-	TCMT0802..
STGCR/L...-11	TCGT1103..	TCET1103..	TCGW1103..	TCGT1103..	TCMT1103.. TCGW1103..

Applicable Inserts (STGP)

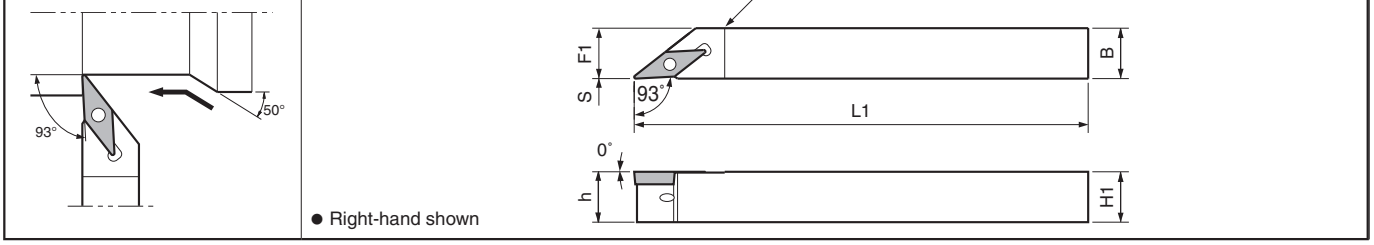
Applications	Minute ap	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Low Feed / Precision	Medium	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Cast Iron
Ref. to Page	B74	B74	B75	B75,B76	B78	B78	B77	B75	B75	B79
Insert / Toolholder Description	CF	PP	HQ	R/L	R/L-FSF	FR/L-USF	R/L-H	XP	XQ	Without Chipbreaker
STGPR/L...-08	TPGT0802..	-	-	TPGH0802..	TPET0802..	TPET0802..	-	-	-	TPGB0802..
STGPR/L...-11	-	TPMT1103..	TPMT1103..	TPGH1103..	TPET1103..	TPET1103..	TPGH1103..	TPMT1103..	TPMT1103..	TPGB1103..

Applications	Non-ferrous Metals	Hard Materials
Ref. to Page	C26 ~ C28	C16
Insert / Toolholder Description	PCD	CBN
STGPR/L...-08	TPMH0802.. TPGB0802..	TPGB0802..
STGPR/L...-11	TPMH1103.. TPGB1103..	TPGB1103..

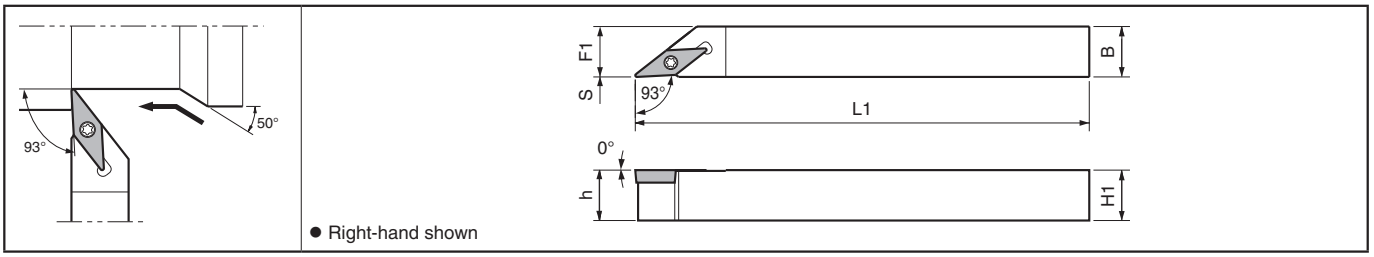
Recommended Cutting Conditions E44

● : Std. Item □: Deleted from the next catalogue

AVJB-FF (Without Offset) (External / Copying)



SVJB-FF (Without Offset) (External / Copying)

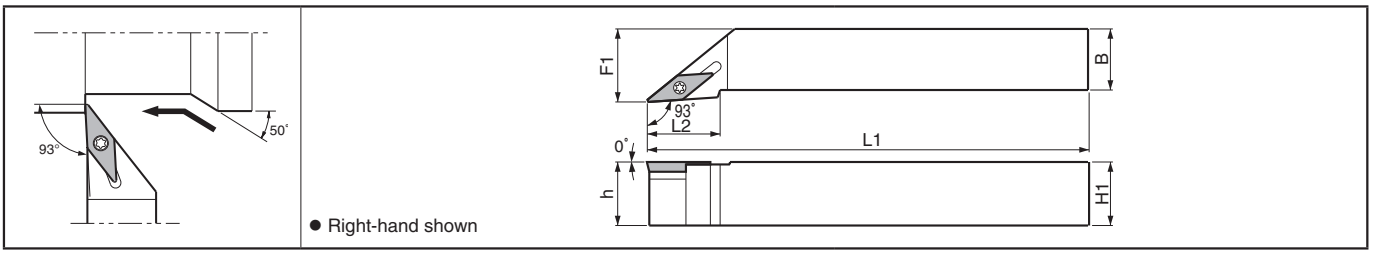


● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	S		Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Clamp Screw	Wrench
AVJB R/L	1010JX-11FF	●	●	10	10	120	-	10	0		0.4	LPF-11	HSB4X8 R/L	-	FH-2
	1212JX-11FF	●	●	12	12			12				LPF-1113			
	1616JX-11FF	●	●	16	16			16				LPF-1117			
SVJB R/L	1010JX-11FF	●	●	10	10	120	-	10	0		0.4	-	-	SB-2570TR	FT-8
	1212JX-11FF	●	●	12	12			12							
	1616JX-11FF	●	●	16	16			16							
NEW	2020JX-11FF	●	●	20	20			20							

· Lock Screw: HSB4X8R for Right-hand Toolholder, HSB4X8L for Left-hand Toolholder.

SVJB (External / Copying)



● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVJB R/L	2020K-11	●	●	20	20	125	30	25			0.4	SB-2570TR	FT-8	-	-	-
	2525M-11	●	●	25	25	150	35	32								
SVJB R/L	2020K-16N	●	●	20	20	125	30	25			0.8	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
	2525M-16N	●	●	25	25	150		32								

· For insert with corner-R(rε) 0.2 or 0.4, shim of marked * is recommended (sold separately).

● Applicable Inserts (AVJB-FF / SVJB-FF / SVJB)

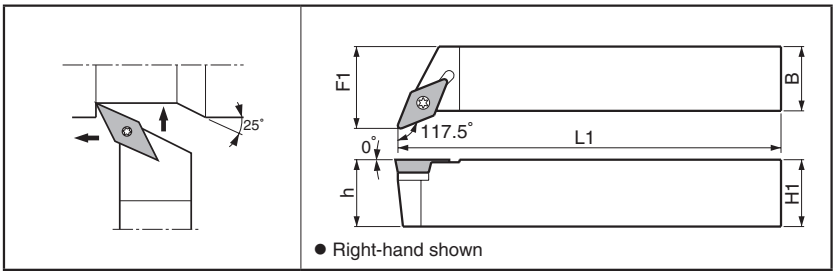
Applications	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B82	B82	B82	B83	B82	B84	B85	B85	C28	C17
Insert / Toolholder Description	GP	VF	HQ	R/L-F	R/L-FSF	R/L-Y	AH	R/L-A3	PCD	CBN
□ VJB R/L ...-11FF/-11	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	VBMT1103..	VBGW1103..
SVJB R/L ...-16N	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..

Recommended Cutting Conditions E44

● : Std. Item

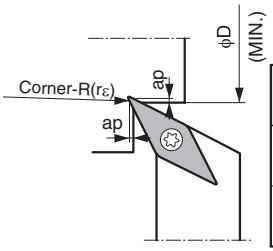
External Toolholders [VB□□ / VC□□ Insert]

SVPB (External / Facing / Copying / Undercutting)



● Right-hand shown

● Undercutting diameter of SVPB



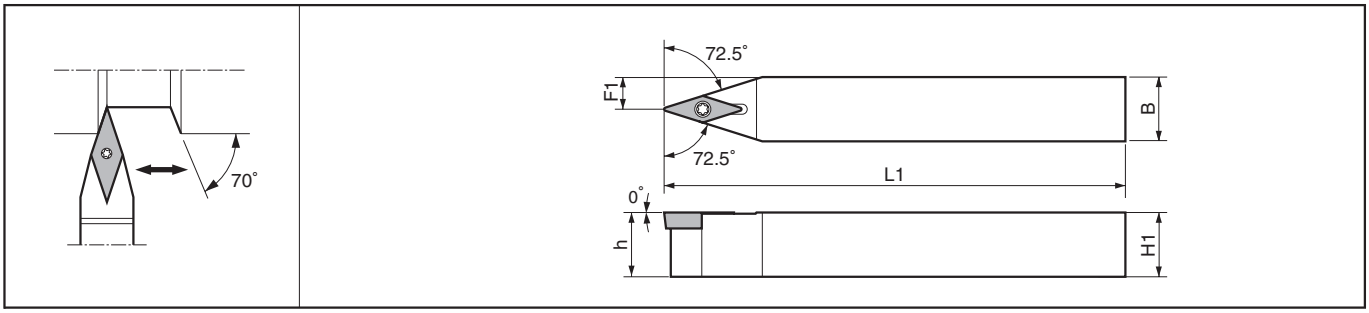
Corner-R (rε)	ap	φD (MIN.)
0.4	0.5	φ25
	1	φ30
0.8	0.5	φ45
	1	φ55

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVPB R/L	1010JX-11	●	●	10	10	120	-	14.5			0.4	SB-2570TR	FT-8	-	-	-
	1212JX-11	●	●	12	12			16.5								
	1616JX-11	●	●	16	16			20.5								
SVPB R/L	2020K-11	●	●	20	20	125	-	25			0.4	SB-2570TR	FT-8	-	-	-
	2525M-11	●	●	25	25	150		32								
SVPB R/L	2020K-16N	●	●	20	20	125	-	25			0.8	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
	2525M-16N	●	●	25	25	150		32								

· For insert with corner-R(rε) 0.2 or 0.4, shim of marked * is recommended (sold separately).

SVVB (External / Copying)



● Toolholder Dimensions

Description		Std.	Dimension (mm) H1=h	B	L1	F1				Standard Corner-R(rε)	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVVBN	1212F-11	●	12	12	85	6				0.4	SB-2570TR	FT-8	-	-	-
SVVBN	1010JX-11	●	10	10	120	5									
	1212JX-11	●	12	12		6									
	1616JX-11	●	16	16		8									
SVVBN	1010F-11	●	10	10	80	5				0.4	SB-2570TR	FT-8	-	-	-
	1616H-11	●	16	16	100	8									
	2020K-11	●	20	20	125	10									
	2525M-11	●	25	25	150	12.5									
SVVBN	2020K-16N	●	20	20	125	10				0.8	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
	2525M-16N	●	25	25	150	12.5									

· For insert with corner-R(rε) 0.2 or 0.4, shim of marked * is recommended (sold separately).

● Applicable Inserts (SVPB / SVVB)

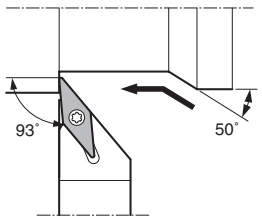
Applications	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B82	B82	B82	B83	B82	B84	B85	B85	C28	C17
Insert / Toolholder Description	GP	VF	HQ	R/L-F	R/L-FSF	R/L-Y	AH	R/L-A3	PCD	CBN
SVPB R/L ...-11	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	VBMT1103..	VBGW1103..
SVVBN...-11										
SVPB R/L ...-16N	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..
SVVBN...-16N										

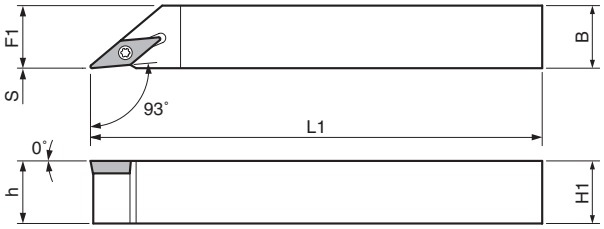
Recommended Cutting Conditions E44

● : Std. Item

External Toolholders [VP□□ Insert]

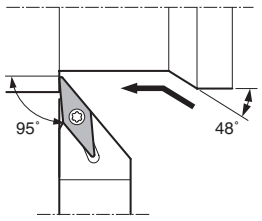
SVJP-FF (Without Offset) (External / Copying)

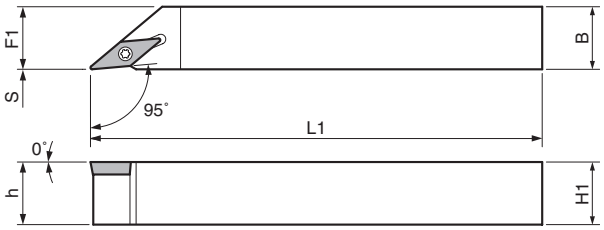




● Right-hand shown

SVLP-FF (Without Offset) (External / Copying)





● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	L3	F1	S	Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SVJP R/L	1212F -11FF	●	●	12	12	85	-	-	12	0	0.2	SB-2570TR	FT-8
	1212JX-11FF	●	●	12	12	120			12				
	1616JX-11FF	●	●	16	16				16				
NEW	2020JX-11FF	●	●	20	20				20				
SVLP R/L	1010JX-08FF	●	●	10	10	120	-	-	10	0	0.1	SB-2050TR	FT-6
	1212JX-08FF	●	●	12	12				12				
	1616JX-08FF	●	●	16	16				16				
SVLP R/L	1212JX-11FF	●	●	12	12	120	-	-	12	0	0.2	SB-2570TR	FT-8
	1616JX-11FF	●	●	16	16				16				
SVLP R/L	1212F -08FF	●	●	12	12	85	-	-	12	0	0.1	SB-2050TR	FT-6
	1212F -11FF	●	●	12	12	85	-	-	12	0	0.2	SB-2570TR	FT-8

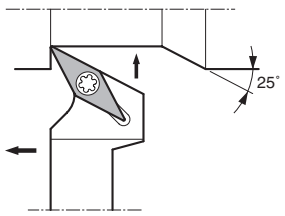
● Applicable Inserts

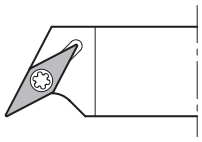
Applications	Minute ap	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. to Page	B86	B86	B86	B87	B88	B88
Insert / Toolholder Description	CF	CK	GF	R/L-FSF	FR/L-U	FR/L-USF
SVLP R/L...-08FF	-	VPGT0802..	-	VPET0802..	-	VPET0802..
SV□P R/L...-11FF	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPET1103..	VPET1103..

Recommended Cutting Conditions E44

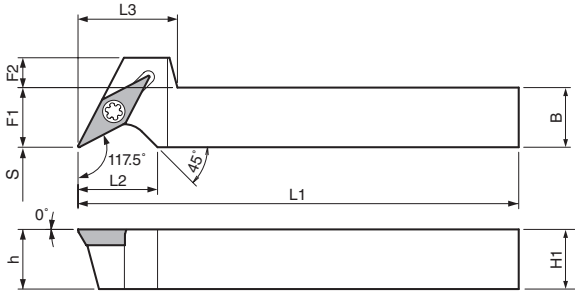
● : Std. Item

SVPP-FF (Without Offset) (External / Facing / Copying / Undercutting)





SVPPR1616..-08FF
shows above figure



● Right-hand shown

● Toolholder Dimensions

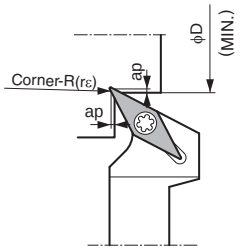
Description		Std.	Dimension (mm)								Standard Corner-R(rε)	Spare Parts				
			H1=h	B	L1	L2	L3	F1	F2	S		Clamp Screw	Wrench			
SVPPR	1010JX-08FF	●	10	10	120	12	16	10	4	0	0.1	SB-2050TR	FT-6			
	1212JX-08FF	●	12	12				12	2							
	1616JX-08FF	●	16	16			-	16	-							
SVPPR	1010JX-11FF	●	10	10	120	16	20	10	8	0	0.2	SB-2570TR	FT-8			
	1212JX-11FF	●	12	12				12	6							
	1616JX-11FF	●	16	16				16	2							
SVPPR	1212F -08FF	●	12	12	85	12	16	12	2	0	0.1	SB-2050TR	FT-6			
	1212F -11FF	●	12	12	85	16	20	12	6	0	0.2	SB-2570TR	FT-8			

● Applicable Inserts

Applicable Inserts	Minute ap	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. to Page	B86	B86	B86	B87	B88	B88
Insert / Toolholder Description	CF	CK	GF	F-FSF	F-U	F-USF
SVPPR...-08FF	-	VPGT0802..	-	VPET0802..	-	VPET0802..
SVPPR...-11FF	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPET1103..	VPET1103..

Recommended Cutting Conditions E44

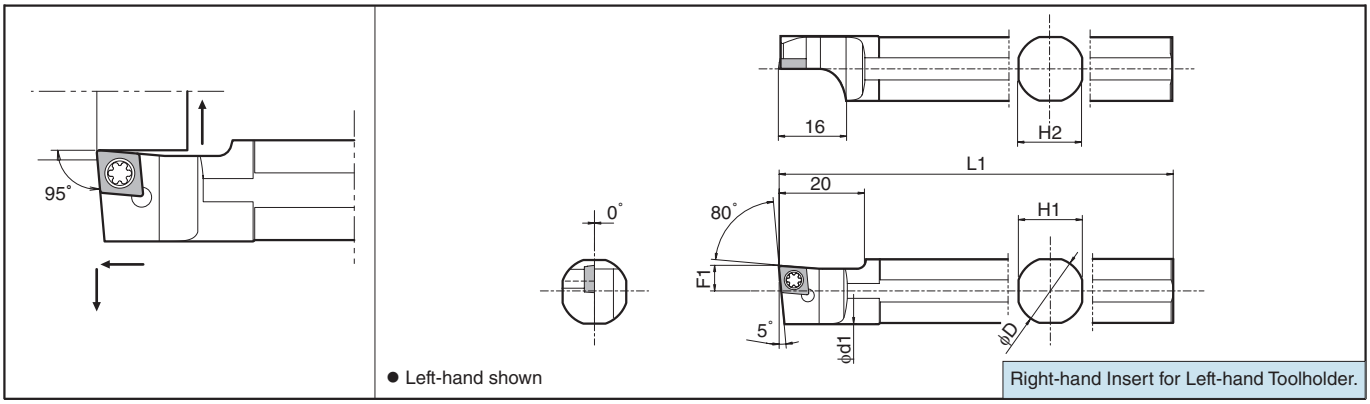
● Undercutting diameter of SVPP-FF



Corner-R (rε)	ap	φD (MIN.)
0.2	0.5	φ20
	1	φ25

● : Std. Item

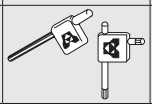
S...SCLC (External / Facing)



● Left-hand shown

Right-hand Insert for Left-hand Toolholder.

● Toolholder Dimensions

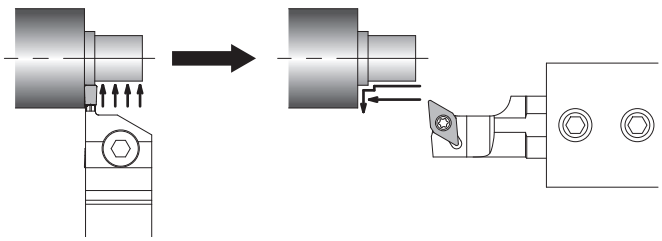
Description	Std.	Dimension (mm) φD	L1	F1	φd1	H1=H2		Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench		
												
S12F -SCLCL06	●	12	80	6	13.4	11		0.4	SB-2560TR	FT-8		
S14H -SCLCL06	●	14	100			13						
S15F -SCLCL06	●	15.875	85		15.4	15			SB-2570TR			
S16F -SCLCL06	●	16										
S19G -SCLCL06	●	19.05	90		18.4	17						
S19K -SCLCL06	●		120									
S20G -SCLCL06	●	20	90		19.4	18						
S20K -SCLCL06	●		120									
S19G -SCLCL09	●	19.05	90	10	18.4	17		0.4	SB-4065TR	FT-15		
S19K -SCLCL09	●		120									
S20G -SCLCL09	●	20	90		19.4	18						
S20K -SCLCL09	●		120									
S25.0H-SCLCL09	●	25	100		24.4	23						
S25K -SCLCL09	●	25.4	120		24.8							

● Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing-Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B49	B50	B49,B50	B53,B54	B51	B55	B55	B55	C24	C14
Insert / Toolholder Description	GF	GK	GQ	(E/F)R-U	MQ	Without Chipbreaker	AH	R-A3	PCD	CBN
S...SCLCL06	CCGT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
S...SCLCL09	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

Recommended Cutting Conditions E44

● Finishing by Sleeve Holder

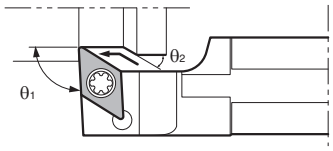


1) Roughing by grooving toolholder
2) Finishing by Sleeve Holder improves chip control and reduces cutting time

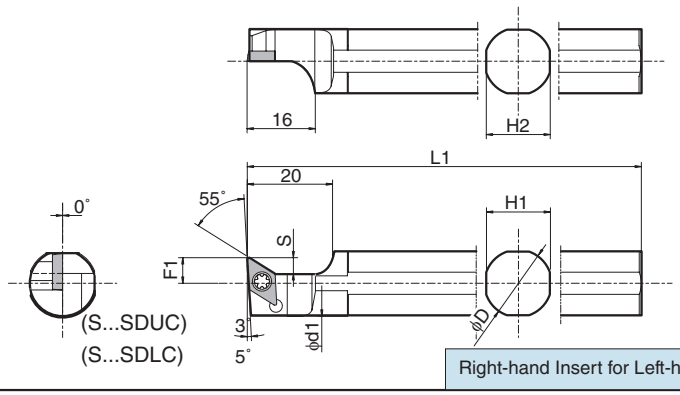
● : Std. Item

External Sleeve Holder [DC□□ Insert]

S...SDUC (External / Copying) / S...SDLC (External / Copying)



θ1=93°(S...SDUC)
θ1=95°(S...SDLC)
θ2=30°(S...SDUC)
θ2=28°(S...SDLC)



● Left-hand shown

Right-hand Insert for Left-hand Toolholder.

● Toolholder Dimensions

Description	Std.	Dimension (mm) φD	L1	F1	φd1	H1=H2	S	Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
S14H -SDUCL07	●	14	100	6	13.4	13	3.8	0.4	SB-2560TR	FT-8
S15F -SDUCL07	●	15.875	85		15.4	15				
S19G -SDUCL07	●	19.05	90		18.4	17				
S19K -SDUCL07	●		120							
S20G -SDUCL07	●	20	90		19.4	18				
S20K -SDUCL07	●		120							
S19G -SDUCL11	●	19.05	90	10	18.4	17	5.8	0.4	SB-4085TR	FT-15
S19K -SDUCL11	●		120							
S20G -SDUCL11	●	20	90		19.4	18				
S20K -SDUCL11	●		120							
S22K -SDUCL11	●	22	120		21.4	20				
S25.0H-SDUCL11	●	25	100		24.4	23				
S25K -SDUCL11	●	25.4	120		24.8					
S12F -SDLCL07	●	12	80	6	13.4	11	3.8	0.4	SB-2560TR	FT-8
S14H -SDLCL07	●	14	100			13				
S15F -SDLCL07	●	15.875	85		15.4	15				
S16F -SDLCL07	●	16								
S19G -SDLCL07	●	19.05	90		18.4	17				
S19K -SDLCL07	●		120							
S20G -SDLCL07	●	20	90		19.4	18				
S20K -SDLCL07	●		120							
S19G -SDLCL11	●	19.05	90	10	18.4	17	5.8	0.4	SB-4085TR	FT-15
S19K -SDLCL11	●		120							
S20G -SDLCL11	●	20	90		19.4	18				
S20K -SDLCL11	●		120							
S22K -SDLCL11	●	22	120		21.4	20				
S25.0H-SDLCL11	●	25	100		24.4	23				
S25K -SDLCL11	●	25.4	120		24.8					

● Applicable Inserts

Applications	Minute ap	Finishing	Finishing	*Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing	Finishing / Precision	Low Feed
Ref. to Page	B57	B57	B57,B58	B58	B58	B58	B58	B61	B60	B62,B63
Insert / Toolholder Description	CF	GF	CK	WP(Wiper)	PP	GK	GQ	R-F	R-FSF	(E/F)R-U
S...SD□CL07	DCGT0702..	DCGT0702..	DCGT0702..	DCMX0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
S...SD□CL11	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..

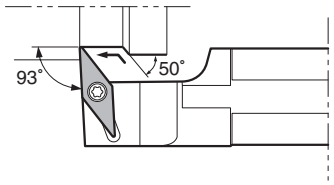
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B62	B64,B65	B59	B59	B60	B65	B65	B65	C25	C15
Insert / Toolholder Description	FR-USF	(E/F)R-J	XP	XQ	MQ	Without Chipbreaker	AH	R-A3	PCD	CBN
S...SD□CL07	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
S...SD□CL11	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

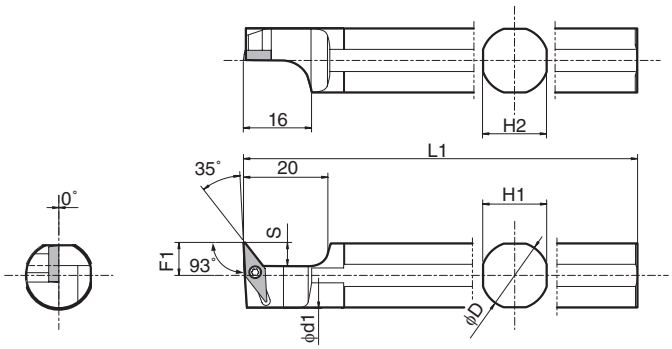
* For WP chipbreaker, cutting edge offsets or program corrections are required. (S...SDLC type can not be used) F42

● : Std. Item

Recommended Cutting Conditions E44

S...SVUB(C) (External / Copying)





● Left-hand shown

Right-hand Insert for Left-hand Toolholder.

● Toolholder Dimensions

Description	Std.	Dimension (mm) φD	L1	F1	φd1	H1=H2	S		Standard Corner-R(re)	Spare Parts: Clamp Screw	Spare Parts: Wrench			
S12F -SVUCL08	●	12	80	7.5	13.4	11	5.5		0.4	SB-2050TR	FT-6			
S14H -SVUCL08	●	14	100			13								
S15F -SVUCL08	●	15.875	85	8	15.4	15								
S16F -SVUCL08	●	16												
S19G -SVUBL11	●	19.05	90	10.5	18.4	17	8		0.4	SB-2570TR	FT-8			
S19K -SVUBL11	●		120											
S20G -SVUBL11	●	20	90		19.4	18								
S20K -SVUBL11	●		120											
S25.0H-SVUBL11	●	25	100		24.4	23								
S25K -SVUBL11	●	25.4	120		24.8									

● Applicable Inserts

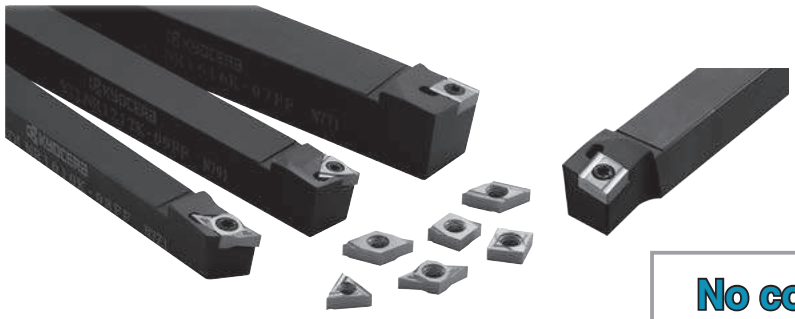
Applications	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Non-ferrous Metals	Hard Materials	
Ref. to Page	**B82**	**B82,B85**	**B82,B85**	**B83**	**B82**	**B84**	**C28**	**C17**	
Insert / Toolholder Description	**GP**	**VF**	**HQ**	**R-F**	**R-FSF**	**R-Y**	**PCD**	**CBN**	
S...SVUCL08	–	VCMT0802..	VCMT0802..	-	-	-	VCMT0802..	VCGW0802..	
S...SVUBL11	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	VBMT1103..	VBGW1103..	

Recommended Cutting Conditions E44

● : Std. Item

Toolholders for Small Double Sided Tooling
(Screw Clamp, Without Offset)

Specially designed negative inserts (double-sided) for small workpieces enables sharp cutting equivalent to positive inserts, achieving high productivity due to economical doubled insert edge numbers.



Designed small negative insert

TNGU09 Type

Small Double Sided Insert

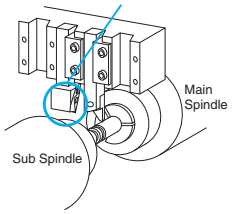
TNGG16 Type

Negative Insert

No constraint of tool position

against tool post into the newly designed small negative insert.

The conventional toolholders for negative insert possibly interferes with sub spindle.



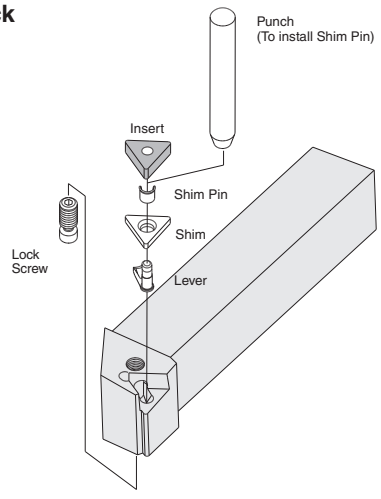
No interference with sub spindle

Toolholder for Double Sided Tooling for Automatic Lathe
(Without Offset, Lever Lock)

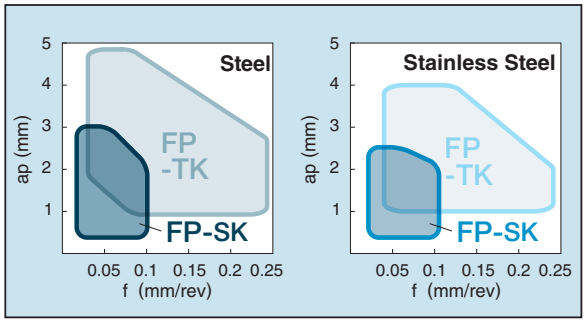
For medium to large ap in automatic lathes (When machining workpieces of medium to large dia.)

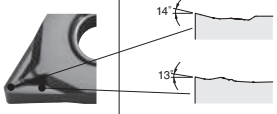
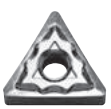
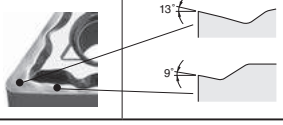
Sharp cutting oriented FP-SK/TK Chipbreaker with polished and sharp edge preparation.

● **Lever Lock**

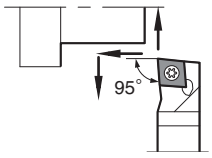


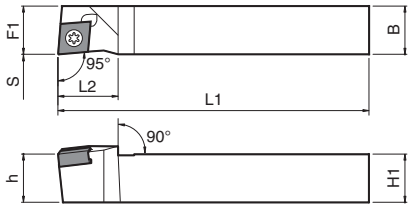
● **Applicable Chipbreaker Range**



Design			Advantages
FP-SK			2-step dot design provides reliable chip control at various ap.
FP-TK			Polished chipbreaker. Smooth chip control and less adhesion.

SCLN (Without Offset) (External / Facing)





Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

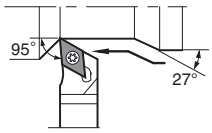
● Toolholder Dimensions

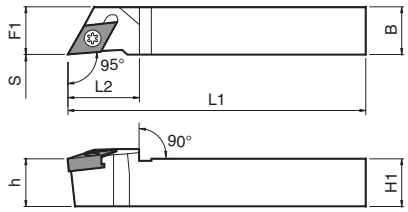
Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	F1	S			Clamp Screw	Wrench	
SCLNR	1010K-07FF	●	10	10	120	15	10	0		0.2	SB-3080TR	LTW-10SS	CNGU0703.. CNMU0703..
	1212F-07FF	●	12	12	85		12						
	1212K-07FF	●			120								
	1616K-07FF	●	16	16			16						

● Applicable Inserts

Applications	Finishing-Medium	Medium-Roughing	Finishing	Low Feed
Ref. to Page	B46	B46	B46	B46
Insert / Toolholder Description	SK	GK	FR-F	(F/E)R-U
SCLNR...-07FF	CNGU0703..	CNMU0703..	CNGU0703..	CNGU0703..

SDLN (Without Offset) (External / Copying)





Side Rake Angle: -6°
Angle of Inclination: -7°

● Right-hand shown

● Toolholder Dimensions

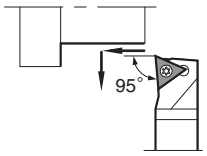
Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	F1	S			Clamp Screw	Wrench	
SDLNR	1010K-08FF	●	10	10	120	18	10	0		0.2	SB-3080TR	LTW-10SS	DNGU0803.. DNMU0803..
	1212F-08FF	●	12	12	85		12						
	1212K-08FF	●			120								
	1616K-08FF	●	16	16			16						

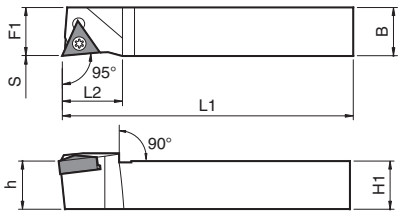
● Applicable Inserts

Applications	Finishing-Medium	Medium-Roughing	Finishing	Low Feed
Ref. to Page	B47	B47	B47	B47
Insert / Toolholder Description	SK	GK	FR-F	(F/E)R-U
SDLNR...-08FF	DNGU0803..	DNMU0803..	DNGU0803..	DNGU0803..

● : Std. Item

STLN (Without Offset) (External / Up Facing)





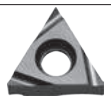
Side Rake Angle: -6˚
Angle of Inclination: -7˚

● Right-hand shown

Toolholder Dimensions

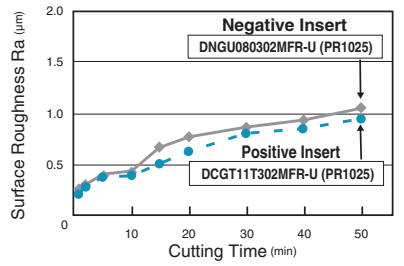
Description		Std.	Dimension (mm)							Standard Corner-R(re)	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	F1	S			Clamp Screw	Wrench	
STLNR	1010K-09FF	●	10	10	120	15	10	0		0.2	SB-2570TR	LTW-8SS	TNGU0903..
	1212F-09FF	●	12	12	85		12						
	1212K-09FF	●			120								
	1616K-09FF	●	16	16			16						

Applicable Inserts

Applications	Finishing	Low Feed
Ref. to Page	B48	B48
Insert / Toolholder Description	FR-F 	(E/F)R-U
STLNR...-09FF	TNGU0903..	TNGU0903..

Double-sided design allows all edges to be used. Compared to the positive type, the double-sided design offers less cost per insert and more stability.

Comparison of surface roughness (Sharp edge)



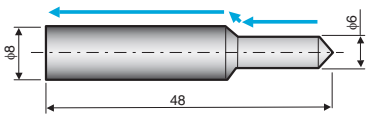
<Cutting Conditions>
Workpiece Material : S45C Vc=100m/min, ap=1.5mm, f=0.03mm/rev, Wet

(Internal evaluation)

Case Studies

SUS303

· Spool
<Dia. 6mm portion>
· Vc=66m/min
· ap=1.25mm
· f=0.025mm/rev
· Wet
<Dia. 8mm portion>
· Vc=130m/min
· ap=0.25mm
· f=0.025mm/rev
· Wet



Required Surface Roughness 0.8μmRa

DNGU080302MF-SK (PR1025)	60,000pcs/insert (4 edges)
Competitor D (DCGT type)	20,000 pcs/insert (2 edges)

Competitor D (DCGT type) machined 10,000 pcs/edge. PR1025 machined 15,000 pcs./edge resulting in 3 times longer tool life per insert.

(Evaluation by the user)

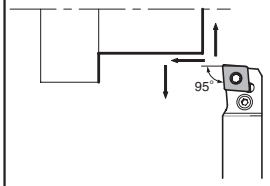
Recommended Cutting Conditions

Workpiece Material	Insert Grades			
	PR1005	PR1025	PR1225	PR1425
Free-cutting steel	◕ Vc=100m/min (60 ~ 150)	–	–	–
Carbon steel / Alloy steel	◔ Vc=100m/min (60 ~ 150)	◔ Vc=100m/min (60 ~ 150)	◔ Vc=100m/min (60 ~ 150)	◕ Vc=120m/min (60 ~ 200)
Stainless Steel	–	◔ Vc=100m/min (60 ~ 150)	● Vc=80m/min (50 ~ 150)	○ Vc=100m/min (80 ~ 150)

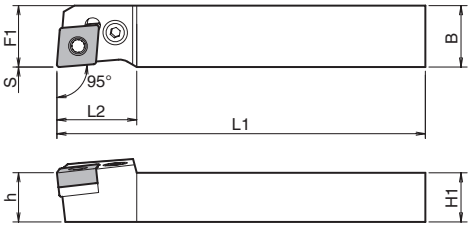
◕ : Continuous to Light interruption / 1st Recommendation
◔ : Continuous to Light interruption / 2nd Recommendation
● : Continuous / 1st Recommendation
○ : Continuous / 2nd Recommendation

● : Std. Item

PCLN-FF (Without Offset) (External / Facing)



Side Rake Angle: -6°
Angle of Inclination: -6°



● Right-hand shown

Toolholder Dimensions

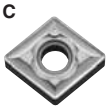
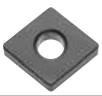
Description		Std.	Dimension (mm)						Standard Corner-R(rε)	Spare Parts					
			H1=h	B	L1	L2	F1	S		Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PCLNR	1620JX-12FF	●	16	20	120	26	20	0	0.8	LL-2N	LS-2N	LC-42N	LSP-2	PC-2	LW-3
	2020JX-12FF	●	20												

Applicable Inserts (1st Choice)

Applications	Finishing-Medium	Medium-Roughing
Ref. to Page	B17	B17
Insert / Toolholder Description	FP-SK	FP-TK
PCLNR...-12FF	CNGG1204..FP-SK	CNGG1204..FP-TK

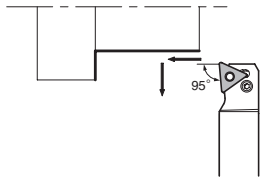
Recommended Cutting Conditions E39

Applicable Inserts (Optional)

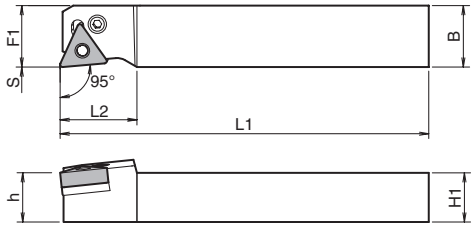
Applications	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing
Insert	WP(Wiper)	WQ(Wiper)	PP	PQ	CQ	CJ	GS	PG
Size	12	12	12	12	12	12	12	12
Page	B14	B14	B14	B14	B14	B14	B15	B15
Applications	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing	Roughing	Single Sided / Roughing / High Feed Rate	Medium	Medium-Roughing / Low Cutting Force
Insert	PS	HS	PT	Standard	PH	PX	R	R-25R
Size	12	12	12	12	12	12	12	12
Page	B15	B15	B15	B16	B16	B16	B20	B20
Applications	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron
Insert	XF	XP	XQ	XS	MQ	MS	MU	C 
Size	12	12	12	12	12	12	12	12
Page	B17	B17	B17	B17	B18	B18	B18	B19
Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	ZS	GC	Without Chipbreaker	Ceramic 	AH	A3	PCD	CBN
Size	12	12	12	12	12	12	12	12
Page	B19	B19	B19	B98	B19	B19	C23	C6,C7

● : Std. Item

PTLN-FF (Without Offset) (External / Up Facing)



Side Rake Angle: -6°
Angle of Inclination: -6°



● Right-hand shown

● Toolholder Dimensions

Description		Std.	Dimension (mm)						Standard Corner-R(rε)	Spare Parts					
			H1=h	B	L1	L2	F1	S		Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PTLNR	1620JX-16FF	●	16	20	120	24	20	0	0.8	LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
	2020JX-16FF	●	20												

· When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

● Applicable Inserts (1st Choice)

Applications	Finishing-Medium	Medium-Roughing
Ref. to Page	B35	B35
Insert / Toolholder Description	FP-SK	FP-TK
PTLNR...-16FF	TNGG1604..FP-SK	TNGG1604..FP-TK

Recommended Cutting Conditions E39

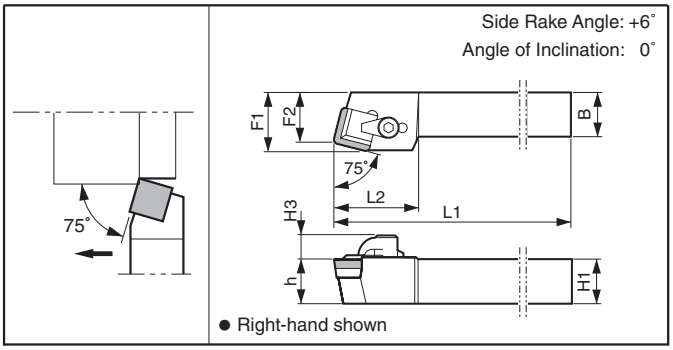
● Applicable Inserts (Optional)

Applications	Finishing	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Medium-Roughing / High Feed Rate	Roughing
Insert	PP	PQ	CQ	GS	PG	PS	PT	GT	PH
Size	16	16	16	16	16	16	16	16	16
Page	B33	B33	B33	B33	B33	B33	B34	B34	B34
Applications	Single Sided / Roughing / High Feed Rate	Roughing	Finishing	Finishing-Roughing	Medium-Roughing / Low Cutting Force	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing
Insert	PX	Standard	R-S	R-□	R-25R	XF	XP	XQ	XS
Size	16	16	16	16	16	16	16	16	16
Page	B34	B34	B38	B38,B39	B39	B35	B35	B35	B35
Applications	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals
Insert	MQ	MS	MU	C	ZS	GC	Without Chipbreaker	Ceramic	AH
Size	16	16	16	16	16	16	16	16	16
Page	B36	B36	B36	B37	B37	B37	B37	B103	B37
Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials						
Insert	R-A3	PCD	CBN						
Size	16	16	16						
Page	B37	C23	C10,C11						

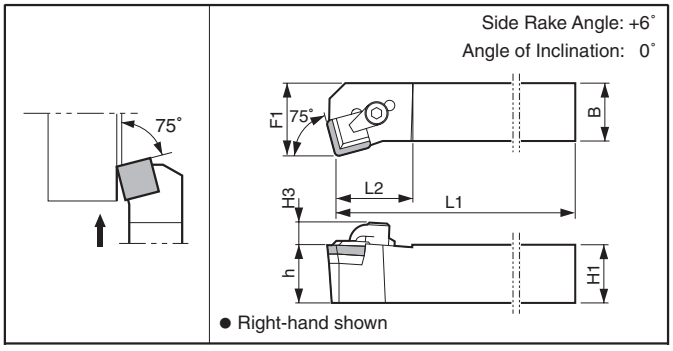
● : Std. Item

External Toolholders [SP□R / SP□N Insert]

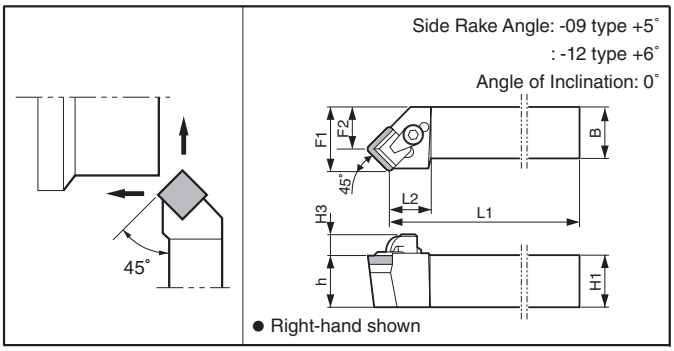
CSBP (External)



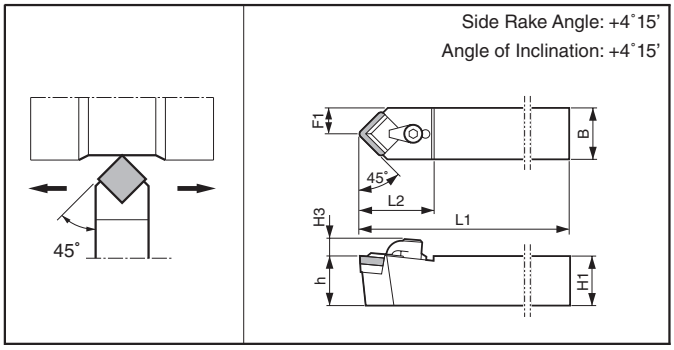
CSKP (Facing)



CSSP (External / Facing / Chamfering)



CSDP (External / Chamfering)



● Toolholder Dimensions

Description		Std.			Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
		R	N	L	H1=h	H3	B	L1	L2	F1	F2		Clamp Set	Wrench	Shim	Shim Screw	*Chipbreaker
CSBPR	1212F -09N	●			12	7.5	12	80	23	15.7	13	0.4	CPS-2P	LW-2.5	-	-	CB-S3220
CSKPR	1616H -09N	●			16	7.5	16	100	21	20	-	0.4	CPS-2P	LW-2.5	-	-	CB-S3220
CSKPR	2020K -12N	●			20	8.5	20	125	28	25	-	0.8	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
	2525M -12N	●			25		25	150		32							
CSSP$^{R/L}$	1212F -09N	●		●	12	7.5	12	80	15	16	9	0.4	CPS-2P	LW-2.5	-	-	CB-S3220
	1616H -09N	●		●	16		16	100	16	20	13						
CSSP$^{R/L}$	2020K -12N	●		●	20	8.5	20	125	19	25	16	0.8	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
	2525M -12N	●		●	25		25	150		32	23						
CSDPN	2020K -12N		●		20	8.5	20	125	32	10	-	0.8	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
	2525M -12N		●		25		25	150		12.5							

* Chipbreaker is not included. Purchase separately.

● Applicable Inserts

Applications	Medium	Medium	Finishing-Medium	Cast Iron	Cast Iron	Non-ferrous Metals
Ref. to Page	B69	B69	B69	B69	B105	C29
Insert / Toolholder Description	G	Standard	$^{R/L}$	Without Chipbreaker	Ceramic	PCD
CSBPR...-09N	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-
CSKPR...-09N	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-
CSKPR...-12N	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..
CSSP$^{R/L}$...-09N	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-
CSSP$^{R/L}$...-12N	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..
CSDPN...-12N	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..

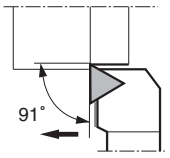
· CSKPR : Left-hand Insert for Right-hand Toolholder.
· CSSP$^{R/L}$: For External Turning, Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.
For Facing, Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Recommended Cutting Conditions E44

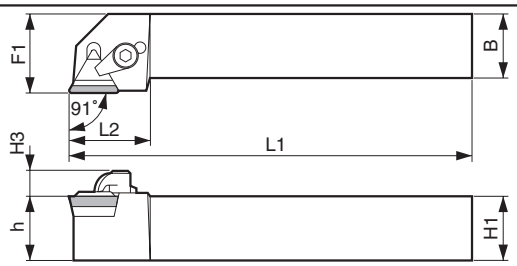
● : Std. Item

External Toolholders [TP□R / TP□N Insert]

CTGP (External)

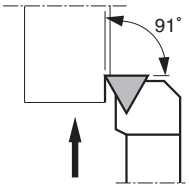


● Right-hand shown

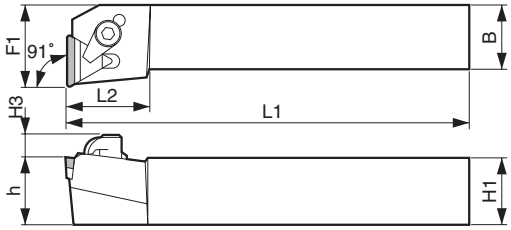


Side Rake Angle: +6°
Angle of Inclination: 0°

CTFP (Facing)

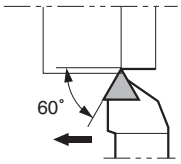


● Right-hand shown

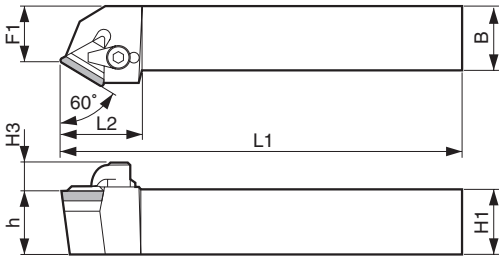


Side Rake Angle: +6°
Angle of Inclination: 0°

CTTP (External / Chamfering)



● Right-hand shown



Side Rake Angle: +6°
Angle of Inclination: 0°

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	*Chipbreaker
CTGP R/L	1212F -11N	●	●	12	8	12	80	18	16	0.4	CPS-2P	LW-2.5	-	-	CB-T2212
	1616H -11N	●	●	16		16	100		20						
CTGP R/L	2020K -16N	●	●	20	8.5	20	125	26	25	0.8	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
	2525M -16N	●	●	25		25	150		32						
CTFP R/L	1212F -11N	●	●	12	8	12	80	18	16	0.4	CPS-2P	LW-2.5	-	-	CB-T2212
	1616H -11N	●	●	16		16	100		20						
CTFP R/L	2020K -16N	●	●	20	8.5	20	125	22	25	0.8	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
	2525M -16N	●	●	25		25	150		32						
CTTP R/L	1212F -11N	●	●	12	8	12	80	22.5	9	0.4	CPS-2P	LW-2.5	-	-	CB-T2212
	1616H -11N	●		16		16	100		13						
CTTP R/L	2020K -16N	●		20	8.5	20	125	28	17	0.8	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
	2525M -16N	●	●	25		25	150		22						

* Chipbreaker is not included. Purchase separately.

● Applicable Inserts

Applications	Finishing	Finishing	Finishing-Medium	Medium	Medium	Finishing-Medium	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. to Page	B80	B80	B80	B80	B80	B81	B81	B105	C29	C18
Insert / Toolholder Description	GP	DP	HQ	G	Standard	R/L-□	Without Chipbreaker	Ceramic	PCD	CBN
CTGP R/L...-11N	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
CTGP R/L...-16N	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..
CTFP R/L...-11N	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
CTFP R/L...-16N	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..
CTTP R/L...-11N	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
CTTP R/L...-16N	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..

· CTFP R/L: Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Recommended Cutting Conditions E44

● : Std. Item

Recommended Cutting Conditions

Recommended Cutting Conditions - External Turning (Positive Insert)

[ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grade	Corner-R (rε)	Lower Limit - **Recommendation** - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
*P	Low Carbon Steel Low Carbon Alloy	HB ≤ 300	Precision Finishing	Continuous	F	PR1425	0.05	100 - **150** - 200	0.05 - **0.07** - 0.15	0.03 - **0.05** - 0.1
				Interruption		PR1425	0.2	80 - **120** - 160	0.05 - **0.1** - 0.2	0.03 - **0.1** - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1425	0.2	100 - **150** - 200	0.02 - **0.05** - 0.1	0.02 - **0.05** - 0.12
			Finishing	Continuous	GF	PR1425	0.2	100 - **140** - 180	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.2
				Interruption		PR1425	0.4	80 - **120** - 160	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.2
			Finishing-Medium	Continuous	GQ	PR1425	0.2	80 - **120** - 160	0.8 - **3.0** - 5.0	0.03 - **0.05** - 0.1
				Interruption		PR1425	0.4	60 - **100** - 140	0.8 - **2.0** - 3.0	0.03 - **0.05** - 0.1
			Low Feed & Large ap	Continuous	J, U	PR1425	0.2	80 - **100** - 140	0.5 - **2.0** - 3.5	0.02 - **0.05** - 0.1
	Medium Carbon Steel Medium Carbon Alloy	HB ≤ 330	Precision Finishing	Continuous	F	PR1425	0.05	100 - **150** - 200	0.05 - **0.07** - 0.15	0.03 - **0.05** - 0.1
				Interruption		PR1425	0.2	80 - **120** - 160	0.05 - **0.1** - 0.2	0.03 - **0.1** - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1425	0.2	100 - **150** - 200	0.02 - **0.05** - 0.1	0.02 - **0.05** - 0.12
			Finishing	Continuous	GF	PR1425	0.2	100 - **140** - 180	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.2
				Interruption		PR1425	0.4	80 - **120** - 160	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.2
			Finishing-Medium	Continuous	GQ	PR1425	0.2	80 - **120** - 160	0.8 - **3.0** - 5.0	0.03 - **0.05** - 0.1
				Interruption		PR1425	0.4	60 - **100** - 140	0.8 - **2.0** - 3.0	0.03 - **0.05** - 0.1
			Low Feed & Large ap	Continuous	J, U	PR1425	0.2	80 - **100** - 140	0.5 - **2.0** - 3.5	0.02 - **0.05** - 0.1
	High Carbon Alloy	HB ≤ 280	Precision Finishing	Continuous	F	PR1425	0.05	100 - **150** - 200	0.05 - **0.07** - 0.15	0.03 - **0.05** - 0.1
				Interruption		PR1425	0.2	80 - **120** - 160	0.05 - **0.1** - 0.2	0.03 - **0.1** - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1425	0.2	100 - **150** - 200	0.02 - **0.05** - 0.1	0.02 - **0.05** - 0.12
			Finishing	Continuous	GF	PR1425	0.2	100 - **140** - 180	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.2
				Interruption		PR1425	0.4	80 - **120** - 160	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.2
			Finishing-Medium	Continuous	GQ	PR1425	0.2	80 - **120** - 160	0.3 - **1.5** - 3.0	0.03 - **0.05** - 0.1
				Interruption		PR1425	0.4	60 - **100** - 140	0.3 - **1.0** - 2.0	0.03 - **0.05** - 0.1
			Low Feed & Large ap	Continuous	J, U	PR1425	0.2	80 - **100** - 140	0.5 - **2.0** - 3.5	0.02 - **0.05** - 0.1
M	Stainless Steel	HB ≤ 220	Finishing	Continuous	GF	PR1225	0.2	80 - **100** - 120	0.1 - **0.3** - 0.5	0.03 - **0.05** - 0.1
				Interruption		PR1535	0.4	60 - **80** - 100	0.3 - **0.5** - 1.0	0.05 - **0.1** - 0.15
			Medium	Continuous	GQ	PR1225	0.2	80 - **100** - 120	0.5 - **1.5** - 3.0	0.03 - **0.08** - 0.12
				Interruption		PR1535	0.4	60 - **80** - 100	0.5 - **1.0** - 2.0	0.05 - **0.1** - 0.15
	Stainless Steel	HB ≤ 300	Finishing	Continuous	GF	PR1225	0.2	40 - **60** - 80	0.1 - **0.3** - 0.5	0.03 - **0.05** - 0.1
				Interruption		PR1535	0.4	30 - **50** - 70	0.3 - **0.5** - 1.0	0.05 - **0.1** - 0.15
			Medium	Continuous	GQ	PR1225	0.2	40 - **60** - 80	0.5 - **1.0** - 2.0	0.03 - **0.08** - 0.12
				Interruption		PR1535	0.4	30 - **50** - 70	0.5 - **1.0** - 1.5	0.05 - **0.1** - 0.15
K	Gray Cast Iron	HB ≤ 250	Finishing	Continuous	Standard	CA4505	0.4	100 - **120** - 150	0.2 - **0.5** - 1.0	0.1 - **0.15** - 0.2
				Interruption		CA4505	0.4	80 - **100** - 120	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.15
			Medium	Continuous	Standard	CA4505	0.4	100 - **120** - 150	0.5 - **1.0** - 2.0	0.1 - **0.15** - 0.2
				Interruption		CA4505	0.8	80 - **100** - 120	0.5 - **1.0** - 2.0	0.05 - **0.1** - 0.15
	Nodular Cast Iron	HB ≤ 270	Finishing	Continuous	Standard	CA4515	0.4	80 - **100** - 120	0.2 - **0.5** - 1.0	0.1 - **0.15** - 0.2
				Interruption		CA4515	0.4	60 - **80** - 100	0.2 - **0.5** - 1.0	0.05 - **0.1** - 0.15
			Medium	Continuous	Standard	CA4515	0.4	80 - **100** - 120	0.5 - **1.0** - 2.0	0.1 - **0.15** - 0.2
				Interruption		CA4515	0.8	60 - **80** - 100	0.5 - **1.0** - 2.0	0.05 - **0.1** - 0.15
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys (Si10% or less) etc.	HB ≤ 100	High Speed Machining (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.2	150 - **250** - 350	0.05 - **0.1** - 0.3	0.05 - **0.1** - 0.15
			Finishing (Long Tool Life)	Continuous	F, FSF	PDL025	0.2	100 - **150** - 200	0.05 - **0.3** - 0.5	0.02 - **0.07** - 0.1
				Interruption		PDL025	0.4	100 - **150** - 200	0.05 - **0.3** - 0.5	0.02 - **0.07** - 0.1
			Finishing	Continuous	F, FSF	KW10	0.2	100 - **150** - 200	0.05 - **0.3** - 0.5	0.02 - **0.07** - 0.1
				Interruption		KW10	0.4	100 - **150** - 200	0.05 - **0.3** - 0.5	0.02 - **0.07** - 0.1
			Medium	Continuous	U, USF	KW10	0.2	100 - **150** - 200	0.2 - **0.5** - 1.5	0.03 - **0.1** - 0.2
				Interruption		KW10	0.4	100 - **150** - 200	0.2 - **0.5** - 1.5	0.03 - **0.1** - 0.2
S	Titanium Alloys	HB ≤ 400	Precision Finishing (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.2	100 - **120** - 150	0.05 - **0.1** - 0.3	0.03 - **0.07** - 0.1
				Interruption		KPD001	0.4	70 - **100** - 120	0.05 - **0.1** - 0.3	0.03 - **0.07** - 0.1
			Medium	Continuous	FSF, USF	KW10	0.4	30 - **50** - 70	0.1 - **0.5** - 1.0	0.03 - **0.1** - 0.2
				Interruption		KW10	0.4	30 - **50** - 70	0.1 - **0.5** - 1.0	0.03 - **0.1** - 0.2
	Heat-resistant Alloys	HB ≤ 350	Finishing	Continuous	F, U	KW10	0.4	10 - **30** - 50	0.1 - **0.3** - 0.5	0.03 - **0.05** - 0.1
				Interruption	Without Chipbreaker	KW10	0.8	10 - **30** - 50	0.2 - **0.5** - 0.7	0.03 - **0.05** - 0.1
			Finishing	Continuous	MQ	PR1310	0.4	40 - **60** - 80	0.1 - **0.3** - 0.5	0.03 - **0.05** - 0.1
				Interruption		PR1310	0.8	40 - **60** - 80	0.1 - **0.3** - 0.5	0.03 - **0.05** - 0.1
H	Hardened Steel Hard Materials	40 ~ 50 HRC	Finishing	Continuous	GK	PR1425	0.2	40 - **60** - 80	0.1 - **0.3** - 0.5	0.02 - **0.07** - 0.1
				Interruption		PR1425	0.4	40 - **60** - 80	0.1 - **0.3** - 0.5	0.02 - **0.07** - 0.1
		50 ~ 68 HRC	Finishing	Continuous	ME	KBN05M	0.2	80 - **120** - 150	0.1 - **0.3** - 0.5	0.02 - **0.07** - 0.1
				Interruption	MET	KBN05M	0.4	60 - **100** - 120	0.1 - **0.3** - 0.5	0.02 - **0.07** - 0.1

* For machining free-cutting steels, such as SUM, etc., use PR1005 at Vc=200m/min or less. For ap and f, refer to specs for low carbon steels.

Recommended Cutting Conditions - Back Turning

● **KTKF** E12

Workpiece Material		MEGACOAT NANO				MEGACOAT		Remarks
		PR1535		**PR1425**		**PR1225**		
		Grooving	Turning	Grooving	Turning	Grooving	Turning	
Carbon steel / Alloy steel	Vc (m/min)	☆60 ~ 150		★80 ~ 200		☆60 ~ 150		Coolant
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.15	0.01 ~ 0.03	0.02 ~ 0.15	0.01 ~ 0.03	0.02 ~ 0.15	
Stainless Steel	Vc (m/min)	★60 ~ 130		☆60 ~ 150		☆60 ~ 130		
	f (mm/rev)	0.01 ~ 0.02	0.02 ~ 0.1	0.01 ~ 0.02	0.02 ~ 0.1	0.01 ~ 0.02	0.02 ~ 0.1	

Workpiece Material		PVD Coated Carbide		Carbide		PCD		Remarks
		PR1025		**KW10**		**KPD001**		
		Grooving	Turning	Grooving	Turning	Grooving	Turning	
Carbon steel / Alloy steel	Vc (m/min)	☆60 ~ 150		-		-		Coolant
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.15	-		-		
Stainless Steel	Vc (m/min)	☆50 ~ 120		-		-		
	f (mm/rev)	0.01 ~ 0.02	0.02 ~ 0.1	-		-		
Cast Iron	Vc (m/min)	-		50 ~ 100		-		
	f (mm/rev)	-		0.01 ~ 0.02	0.02 ~ 0.15	-		
Aluminum	Vc (m/min)	-		200 ~ 450		200 ~ 500		
	f (mm/rev)	-		0.01 ~ 0.03	0.02 ~ 0.15	0.01 ~ 0.03	0.02 ~ 0.12	
Brass	Vc (m/min)	-		100 ~ 200		100 ~ 350		
	f (mm/rev)	-		0.01 ~ 0.05	0.02 ~ 0.2	0.01 ~ 0.05	0.02 ~ 0.15	

★: 1st Recommendation
☆: 2nd Recommendation

● **KTKF (GQ Chipbreaker)** E12

Workpiece Material		MEGACOAT NANO				MEGACOAT		Remarks
		PR1535		**PR1425**		**PR1225**		
		Grooving	Turning	Grooving	Turning	Grooving	Turning	
Carbon steel / Alloy steel	Vc (m/min)	☆60 ~ 150		★80 ~ 200		☆60 ~ 150		Coolant
	f (mm/rev)	0.01 ~ 0.04	0.02 ~ 0.15	0.01 ~ 0.04	0.02 ~ 0.15	0.01 ~ 0.04	0.02 ~ 0.15	
Stainless Steel	Vc (m/min)	★60 ~ 130		☆60 ~ 150		☆60 ~ 130		
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.1	0.01 ~ 0.03	0.02 ~ 0.1	0.01 ~ 0.03	0.02 ~ 0.1	

★: 1st Recommendation
☆: 2nd Recommendation

● **ABS15, ABW15, ABW23** E17~E19

Workpiece Material		MEGACOAT NANO		MEGACOAT		PVD Coated Carbide		Remarks
		PR1425		**PR1225**		**PR1025 (PR930)**		
		Grooving	Turning	Grooving	Turning	Grooving	Turning	
Carbon steel / Alloy steel	Vc (m/min)	★80 ~ 180		☆60 ~ 150		☆80 ~ 100		Coolant
	f (mm/rev)	0.02	0.02 ~ 0.07	0.02	0.02 ~ 0.07	0.02	0.02 ~ 0.07	
Stainless Steel	Vc (m/min)	☆40 ~ 130		★40 ~ 120		☆30 ~ 50		
	f (mm/rev)	0.02	0.02 ~ 0.05	0.02	0.02 ~ 0.05	0.02	0.02 ~ 0.05	

★: 1st Recommendation
☆: 2nd Recommendation

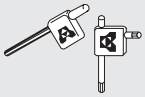
Workpiece Material		Carbide		Remarks
		KW10		
		Grooving	Turning	
Aluminum	Vc (m/min)	150 ~ 200		Coolant
	f (mm/rev)	0.02	0.02 ~ 0.10	
Brass	Vc (m/min)	100 ~ 160		
	f (mm/rev)	0.03	0.02 ~ 0.15	

Alternative Toolholder Reference Table for Small Tools (Back Clamp)

Insert Description	Conventional Toolholder					Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Anchor Pin	Spare Parts: Lock Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	Ref. to Page
ABS.. 40	AABSR0810K-40F	125	LPA-11	HSB4X8R	FH-2	-	-	No Alternative	-
	AABSR1010K-40F	125				AABSR1010JX-40F	120		E17
	AABSR1212M-40F	150	LPA-13			AABSR1212JX-40F	120		
	AABSR1616M-40F	150	LPA-17			AABSR1616JX-40F	120		
ABW.. 40	AABWR0810K-40F	125	LPA-11	HSB4X8R	FH-2	-	-	No Alternative	-
	AABWR1010K-40F	125				AABWR1010JX-40F	120		E18
	AABWR1212M-40F	150	LPA-13			AABWR1212JX-40F	120		
	AABWR1616M-40F	150	LPA-17			AABWR1616JX-40F	120		
ABW.. 50	AABWR0810K-50F	125	LPA-11	HSB4X8R	FH-2	-	-	No Alternative	-
	AABWR1010K-50F	125				AABWR1010JX-50F	120		E19
	AABWR1212M-50F	150	LPA-13			AABWR1212JX-50F	120		
	AABWR1616M-50F	150	LPA-17			AABWR1616JX-50F	120		
CC..	ACLC$^{R}_{L}$0810K-06F	125	LPF-11	HSB4X8R (Right-hand toolholder) HSB4X8L (Left-hand toolholder)	FH-2	SCLC$^{R}_{L}$0808F-06FF	120	Clamping system is different.	E23
	ACLC$^{R}_{L}$1010K-06F	125				ACLC$^{R}_{L}$1010JX-06FF	120		E22
	ACLC$^{R}_{L}$1010K-09F	125	LPF-13			ACLC$^{R}_{L}$1010JX-09FF	120		
	ACLC$^{R}_{L}$1212M-09F	150				ACLC$^{R}_{L}$1212JX-09FF	120		
	ACLC$^{R}_{L}$1616M-09F	150	LPF-17			ACLC$^{R}_{L}$1616JX-09FF	120		
DC..	ADJC$^{R}_{L}$0810K-07F	125	LPF-11	HSB4X8R (Right-hand toolholder) HSB4X8L (Left-hand toolholder)	FH-2	SDJC$^{R}_{L}$0808F-07FF	120	Clamping system is different.	E25
	ADJC$^{R}_{L}$1010K-07F	125				ADJC$^{R}_{L}$1010JX-07FF	120		E24
	ADJC$^{R}_{L}$1010K-11F	125	LPF-13			ADJC$^{R}_{L}$1010JX-11FF	120		
	ADJC$^{R}_{L}$1212M-11F	150				ADJC$^{R}_{L}$1212JX-11FF	120		
	ADJC$^{R}_{L}$1616M-11F	150	LPF-17			ADJC$^{R}_{L}$1616JX-11FF	120		
	ADNCR0810K-07F	125	LPF-11	HSB4X8R	FH-2	-	-	No Alternative	-
	ADNCR1010K-07F	125				SDNCN1010JX-07	120	Clamping system is different. Neutral	E27
	ADNCR1010K-11F	125	LPF-13			SDNCN1010JX-11	120		
	ADNCR1212M-11F	150				SDNCN1212JX-11	120		
	ADNCR1616M-11F	150	LPF-17			SDNCN1616JX-11	120		
VB..	AVJB$^{R}_{L}$1010K-11F	125	LPF-11	HSB4X8R (Right-hand toolholder) HSB4x8L (Left-hand toolholder)	FH-2	AVJB$^{R}_{L}$1010JX-11FF	120		E30
	AVJB$^{R}_{L}$1212M-11F	150	LPF-1113			AVJB$^{R}_{L}$1212JX-11FF	120		
	AVJB$^{R}_{L}$1616M-11F	150	LPF-1117			AVJB$^{R}_{L}$1616JX-11FF	120		
	AVVB$^{R}_{L}$1010K-11F	125	LPF-11	HSB4x8R (Right-hand toolholder) HSB4X8L (Left-hand toolholder)	FH-2	SVVBN1010JX-11	120	Clamping system is different. Neutral	E31
	AVVB$^{R}_{L}$1212M-11F	150	LPF-1113			SVVBN1212JX-11	120		
	AVVB$^{R}_{L}$1616M-11F	150	LPF-1117			SVVBN1616JX-11	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Small Tools (Screw Clamp)

Insert Description	Conventional Toolholder				Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	Ref. to Page
								
ABS.. 40	SABSR0810K-40F	125	SB-3080TR	FT-10	-	-	No Alternative	-
	SABSR1010K-40F	125			SABSR1010JX-40F	120		E17
	SABSR1212M-40F	150			SABSR1212JX-40F	120		
	SABSR1616M-40F	150			SABSR1616JX-40F	120		
ABW.. 40	SABWR0810K-40F	125	SB-3080TR	FT-10	-	-	No Alternative	-
	SABWR1010K-40F	125			SABWR1010JX-40F	120		E18
	SABWR1212M-40F	150			SABWR1212JX-40F	120		
	SABWR1616M-40F	150			SABWR1616JX-40F	120		
ABW.. 50	SABWR0810K-50F	125	SB-3080TR	FT-10	-	-	No Alternative	-
	SABWR1010K-50F	125			SABWR1010JX-50F	120		E19
	SABWR1212M-50F	150			SABWR1212JX-50F	120		
	SABWR1616M-50F	150			SABWR1616JX-50F	120		
CC..	SCAC(R/L)0808K-06	125	SB-2570TR	FT-8	SCLC(R/L)0808F-06FF	85	Cutting edge angle is different.	E23
	SCAC(R/L)1010K-06	125			SCLC(R/L)1010JX-06FF	120		
	SCAC(R/L)1010K-09	125	SB-4085TR	FT-15	SCLC(R/L)1010JX-09FF	120		
	SCAC(R/L)1212M-09	150			SCLC(R/L)1212JX-09FF	120		
	SCAC(R/L)1616M-09	150			SCLC(R/L)1616JX-09FF	120		
	SCACR1212F-09FF	85	SB-4085TR	FT-15	SCLCR1212JX-09FF	120		
	SCLC(R/L)0808E-06	70	SB-2570TR	FT-8	SCLC(R/L)0808F-06FF	85		
DC..	SDJC(R/L)0808F-07F	80	SB-2570TR	FT-8	SDJC(R/L)0808F-07FF	85		E25
	SDJC(R/L)1010F-07F	80			SDJC(R/L)1010JX-07FF	120		
	SDJC(R/L)1010F-11F	80	SB-4085TR	FT-15	SDJC(R/L)1010JX-11FF	120		
	SDJC(R/L)1212H-11F	100			SDJC(R/L)1212JX-11FF	120		
	SDJC(R/L)1616H-11F	100			SDJC(R/L)1616JX-11FF	120		
	SDLC(R/L)1010F-07FF	80	SB-2570TR	FT-8	SDLC(R/L)1010JX-07FF	120		E26
	SDLC(R/L)1212H-07FF	100			SDLC(R/L)1212F-07FF	85	Short length type	
					SDLC(R/L)1212JX-07FF	120		
	SDLC(R/L)1616H-07FF	100			SDLC(R/L)1616JX-07FF	120		
	SDLC(R/L)1212H-11FF	100	SB-4085TR	FT-15	SDLC(R/L)1212JX-11FF	120		
	SDLCL1616H-11FF	100			SDLCL1616JX-11FF	120		
	SDNC(R/L)1010F-07F	80	SB-2570TR	FT-8	SDNC(R/L)1010JX-07F	120		E27
	SDNC(R/L)1010F-11F	80	SB-4085TR	FT-15	SDNC(R/L)1010JX-07F	120	Insert size is different.	
					SDNCN1010JX-11	120	Neutral	
	SDNC(R/L)1212H-11F	100	SB-4085TR	FT-15	SDNCN1212F-11	85	Neutral Short length type	
					SDNCN1212JX-11	120	Neutral	
	SDNC(R/L)1616H-11F	100	SB-4085TR	FT-15	SDNCN1616JX-11	120	Neutral	
	SDNCN0808E-07	70	SB-2570TR	FT-8	SDNCN0808F-07	85		
	SDNCN1010F-07	80			SDNCN1010JX-07	120		
	SDNCN1212H-07	100			SDNCN1212JX-07	120		
	SDNCN1212H-11	100	SB-4085TR	FT-15	SDNCN1212F-11	85	Short length type	
					SDNCN1212JX-11	120		
	SDXC(R/L)1010F-07	80	SB-2570TR	FT-8	SDXC(R/L)1010JX-07	120		E26
	SDXC(R/L)1010F-11	80	SB-4085TR	FT-15	SDXC(R/L)1010JX-11	120		
	SDXC(R/L)1212H-11	100			SDXC(R/L)1212JX-11	120		
	SDXC(R/L)1616H-11	100			SDXC(R/L)1616JX-11	120		
DP..	SDLP(R/L)0808F-07F	80	SB-2570TR	FT-8	SDLP(R/L)0808F-07FF	85		E28
	SDLP(R/L)1010F-07F	80			SDLP(R/L)1010JX-07FF	120		
	SDLP(R/L)1010F-11F	80	SB-4085TR	FT-15	SDLP(R/L)1010JX-11FF	120		
	SDLP(R/L)1212H-11F	100			SDLP(R/L)1212JX-11FF	120		
	SDLP(R/L)1616H-11F	100			SDLP(R/L)1616JX-11FF	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Small Tools (Screw Clamp)

Insert Description	Conventional Toolholder				Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	Ref. to Page
VB..	SVJB$^{R/L}$1010F-11F	80	SB-2570TR	FT-8	SVJB$^{R/L}$1010JX-11FF	120		E30
	SVJB$^{R/L}$1212H-11F	100			SVJB$^{R/L}$1212JX-11FF	120		
	SVJB$^{R/L}$1616H-11F	100			SVJB$^{R/L}$1616JX-11FF	120		
	SVPB$^{R/L}$1010F-11	80	SB-2570TR	FT-8	SVPB$^{R/L}$1010JX-11	120		E31
	SVPB$^{R/L}$1212H-11	100			SVPB$^{R/L}$1212JX-11	120		
	SVPB$^{R/L}$1616H-11	100			SVPB$^{R/L}$1616JX-11	120		
	SVVBN1212H-11	100	SB-2570TR	FT-8	SVVBN1212JX-11	120		
VP..	SVLP$^{R/L}$1010F-08FF	80	SB-2050TR	FT-6	SVLP$^{R/L}$1010JX-08FF	120		E32
	SVLP$^{R/L}$1212H-08FF	100			SVLP$^{R/L}$1212F-08FF	85	Short length type	
					SVLP$^{R/L}$1212JX-08FF	120		
	SVLP$^{R/L}$1616H-08FF	100			SVLP$^{R/L}$1616JX-08FF	120		
	SVLP$^{R/L}$1010F-11F	80	SB-2570TR	FT-8	SVLP$^{R/L}$1010JX-08FF	120	Insert size is different.	
	SVLP$^{R/L}$1212H-11F	100			SVLP$^{R/L}$1212F-11FF	85	Short length type	
					SVLP$^{R/L}$1212JX-11FF	120		
	SVLP$^{R/L}$1616H-11F	100			SVLP$^{R/L}$1616JX-11FF	120		
	SVPPR1010F-11	80	SB-2570TR	FT-8	SVPBR1010JX-11	120	Insert relief angle is different.	E31
					SVPPR1010JX-11FF		Without Offset	E33
	SVPPR1212H-11	100			SVPBR1212JX-11	120	Insert relief angle is different.	E31
					SVPPR1212JX-11FF		Without Offset	E33
	SVPPR1616H-11	100			SVPBR1616JX-11	120	Insert relief angle is different.	E31
					SVPPR1616JX-11FF		Without Offset	E33
	SVPPL1616H-11	100	SB-2570TR	FT-8	SVPBL1616JX-11	120	Insert relief angle is different.	E31

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Small Tools (Screw Clamp)
Toolholders for Back Turning

Insert Description	Conventional Toolholder				Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	Ref. to Page
TKFB..	KTKF$^{R/L}$1010K-12	125	SB-4590TRWN	LTW-10S	KTKF$^{R/L}$1010JX-12	120		E12
	KTKF$^{R/L}$1212M-12	150			KTKF$^{R/L}$1212JX-12	120		
	KTKF$^{R/L}$1616M-12	150			KTKF$^{R/L}$1616JX-12	120		
	KTKF$^{R/L}$1010K-16	125			KTKF$^{R/L}$1010JX-16	120		
	KTKF$^{R/L}$1212M-16	150			KTKF$^{R/L}$1212JX-16	120		
	KTKF$^{R/L}$1616M-16	150			KTKF$^{R/L}$1616JX-16	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Boring

F

F1~F94

Product Introduction		**F2~F5**
Identification System / Product Lineup		**F6~F11**
Solid Tip-Bars for Micro Boring		**F12~F37**
EZ Bars	EZB-HP / EZB-ST / EZB-NB	F14
EZ Bars PLUS	S-SCLC / C-SCLC	F19
EZ Bars (Copying)	EZVB	F20
System Tip-Bars	VNB-S / VNB / VNBT / VNBX-S	F28
Twin-Bars	TWB / TWBT	F34
2-Edge Tip-Bars	HPB / HPBT	F36
Tip-Bars	PSB-S / PSBT-S → will be switched to EZB / HPBT	F37
Boring Bars for Positive Inserts		**F38~F53**
CC□□ Insert		F38
CP□□ Insert		F40
DC□□ Insert		F42
JC □□ Insert		F46
TC □□ Insert		F47
TB / TP□□ Insert		F48
VB / VC / VP□□ Insert		F52
WB / WP□□ Insert		F58
SP□□ Insert		F60
TP □□ Insert (without Hole)		F61
Boring Toolholders for Bearing Machining (Square Shank)		**F62**
AD Bars		**F63~F66**
CN□□ Insert		F63
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TN□□ Insert		F64
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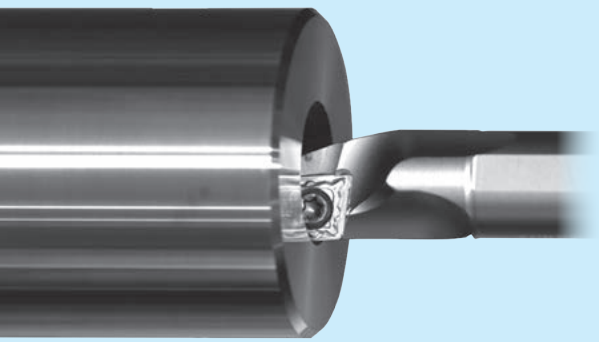
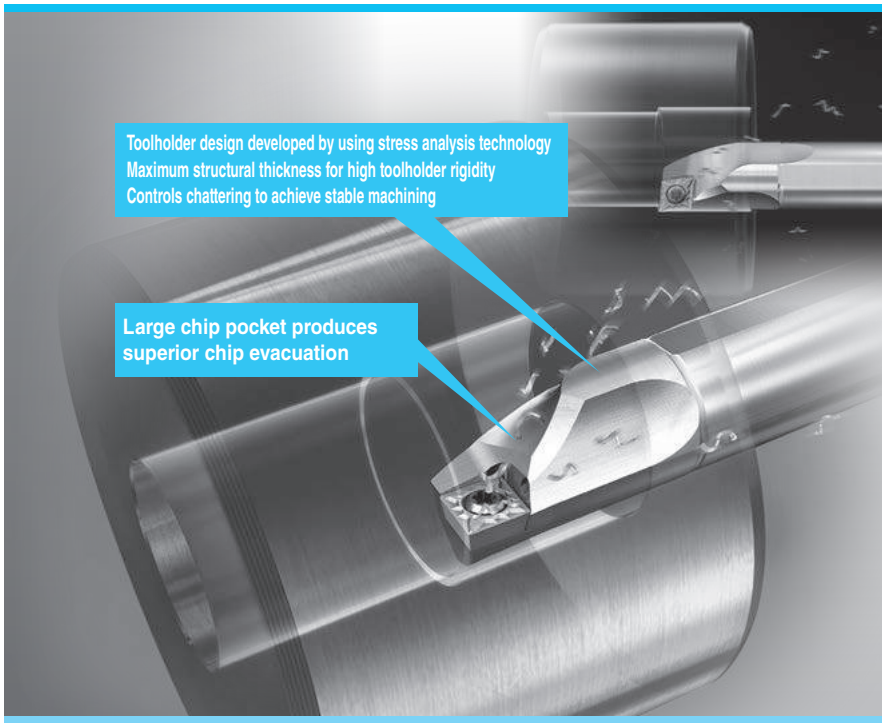
Boring Adapter (with coolant hole / anti-vibration damper system)		F66
Boring Bars for Negative Inserts		**F67~F78**
CN□□ Insert		F67
DN□□ Insert		F69
SN□□ Insert		F73
TN□□ Insert		F74
WN□□ Insert		F76
Boring Bars for Ceramic Tools		**F79~F80**
Boring Bars for Solid CBN Tools		**F81**
Sleeves		**F82~F86**
EZH-CT / EZH-HP / EZH-ST		F82
PH		F84
SHA / SH / SHC / SJS		F84
Assembly (AS) List / Former Parts List		**F87**
Alternative Toolholder Reference Table for Boring Bar		**F88~F91**
Recommended Cutting Conditions		**F92~F94**
Parts Compatibility of Lever Lock Toolholders		**R44**



Dynamic Bar

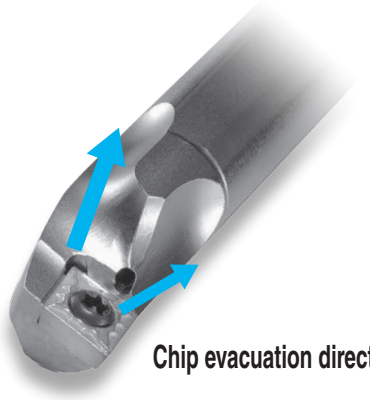


Dynamic design by using the latest computer simulation technology

Superior chip evacuation (External coolant)

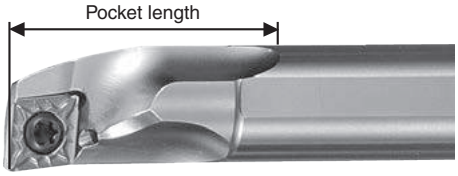
	Dynamic Bar	Competitor A	Competitor B
Inside the workpiece			

In the products of competitor A and B chips remain inside the workpiece, but chips from the Dynamic Bar are all evacuated from the workpiece.



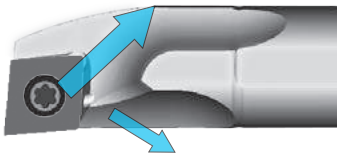
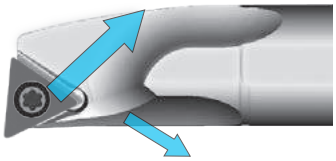
Chip evacuation direction

Comparison of pocket length



Description	Pocket length (mm)	
	Dynamic Bar	Competitor A
A16-SCLPR09-18 type	37	29
A20-SCLCR09-22 type	48	32

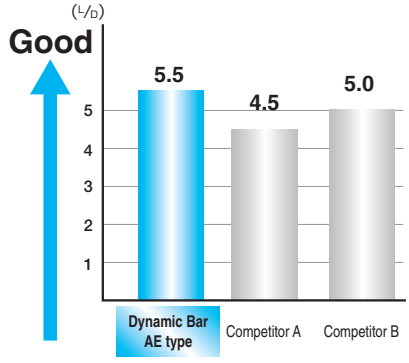
Chip evacuation direction

SCLC(P) type	STLB(P) type
	
Better evacuation by backward chip flow	

The Dynamic Bar achieves superior chip evacuation

High rigidity and chattering resistance are ensured by using a special alloy and with help of stress analysis technology.

Comparison of vibration tendency

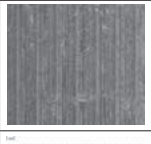
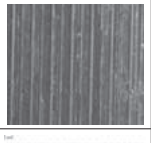
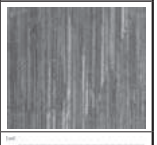
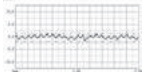
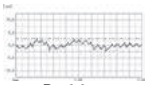
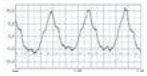
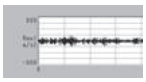
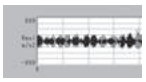
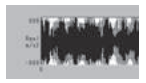


Maximum toolholder overhang length (L/D)

<Cutting Conditions>
SCM415
Vc=150m/min
ap=0.5mm
f=0.1mm/rev
S16-SCLPR09 type
CPMH090304L-Y

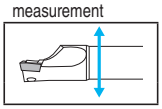
Comparison of surface finish

Vibration of the Dynamic Bar was minimal even at high cutting speeds, enabling stable machining.

	Dynamic Bar	Competitor A	Competitor B
Surface wall			
Surface Roughness	 Ra=0.4μm Rz=2.3μm	 Ra=0.6μm Rz=3.6μm	 Ra=3.4μm Rz=14.0μm
Oscillatory waveform			

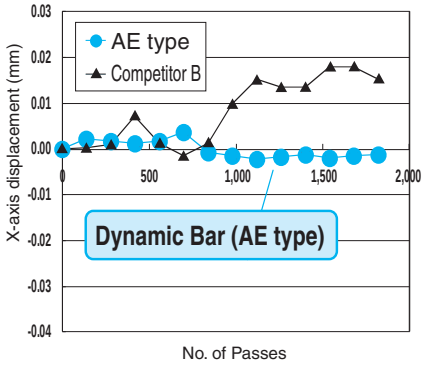
<Cutting Conditions>
SCM415
Vc=210m/min
ap=0.5mm
f=0.1mm/rev
A16Q-SCLPR09-18 type
CPMT090304XP (PV7020)
L/D=4
External coolant

Direction of vibration measurement



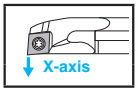
Cutting Point Precision

The AE Dynamic Bar maintains precise cutting edge positional accuracy through the use of a special alloy, thereby achieving high precision machining.



<Cutting Conditions>
SCM435
Vc=180m/min
ap=2mm
f=0.2mm/rev
S/A16Q-SCLPR09-18 type
CPMH090308(CA5525)
L/D=4
External coolant

Direction of measurement



Toolholder Lineup

·Excellent Bar (AE type)

Excellent Bar with coolant hole (internal coolant) (A··· AE) enables better chip evacuation.

·Steel Shank Bar

The steel shank bar (without coolant hole) provides superior cost performance

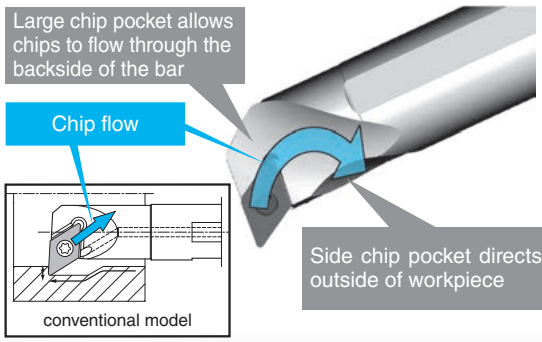
Advantages of Dynamic Bar SDUC

New design and concept focusing on chip evacuation

New design **Streamlined pocket enables an effective chip evacuation**

Large chip pocket allows chips to flow through the backside of the bar

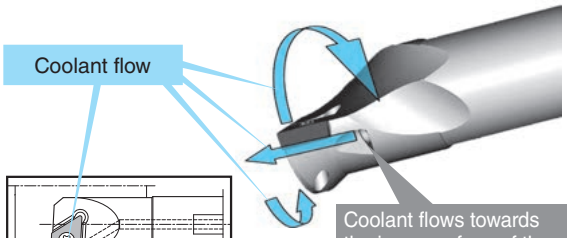
Chip flow



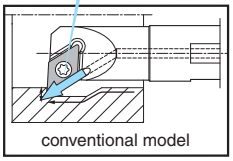
Side chip pocket directs chips outside of workpiece

New concept **Coolant flows toward the workpiece's inner surface**

Coolant flow



Coolant flows towards the inner surface of the workpiece enabling smooth chip evacuation

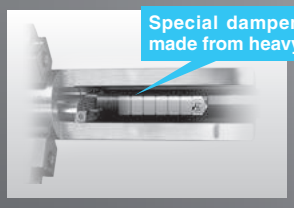


AD Bars Interchangeable Head Boring Bars with Anti-vibration Dampener System

F63

The AD (Advanced Dampener) system enables a maximum overhang of 6 times L/D.
Highly efficient machining: The anti-vibration dampener effect enables large cutting-depths and high feed rates. Applicable for a variety of machining conditions due to the interchangeable head design.

Special dampener system made from heavy metal

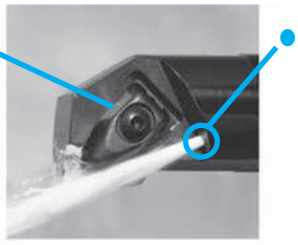


Double Clamp Boring Bars for Negative Inserts

Stable machining is realized in Double Clamp and Direction adjustment mechanism coolant hole.

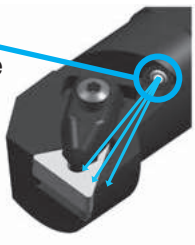
● Improved Clamping Rigidity

Firmly clamp the insert in two directions with one action. Along with improving the accuracy of the insert position, long tool life can be achieved.



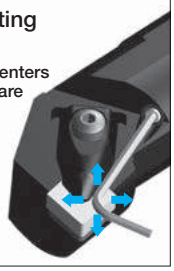
● Direction adjustment mechanism coolant hole

Discharge direction of coolant is adjustment flexible focusing on coolant to edge reliably builds up
Not applicable to high-pressure coolant



■ Nozzle setting

Wrench etc. that enters 2.5 or less holes are used, and adjust.

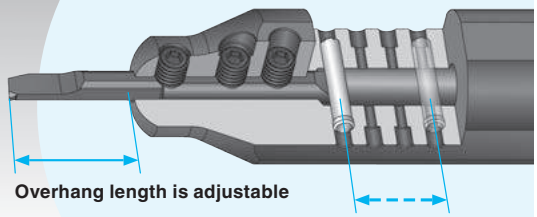


Kyocera's original EZ adjust structure

- Easy adjustment and high precision
- EZ Bars prevent deviation with high-rigidity clamping

Wide range of items applicable to various applications

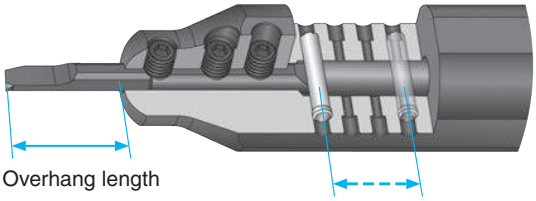
MEGACOAT PR1225 for stable machining and extended tool life



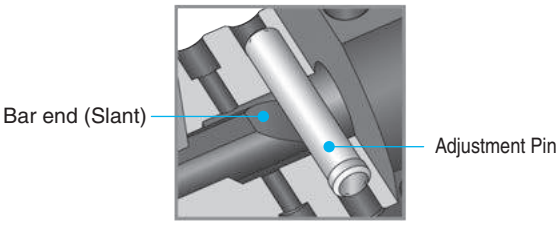
EZ adjust structure

Bar overhang is adjustable by replacing adjustment pin.
Internal coolant sleeve (EZH-CT) is available.

1 Easy adjustment and high precision



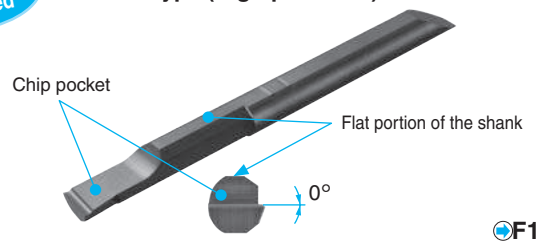
Excellent clamping force



Bar is firmly clamped on the slanted end by the Adjustment Pin

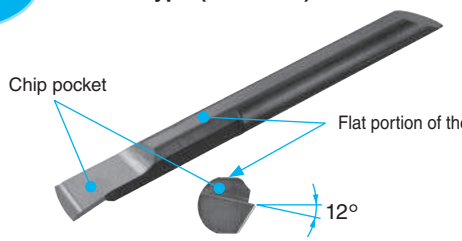
2 2 types of bars

Precision-oriented — **HP type (High precision)**



F14

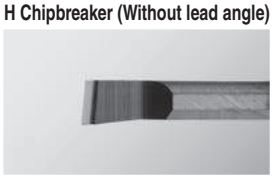
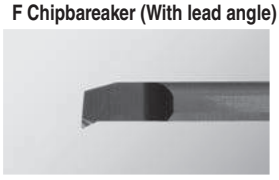
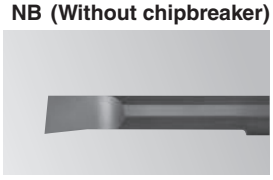
Cost-oriented — **ST type (Standard)**



F16

* Chip pocket angles are different.
* Even when using a same sleeve, the Min. Bore Dia. can be different depending on which bar to attach.

3 3 Chipbreakers for various applications

H Chipbreaker (Without lead angle)	F Chipbareaker (With lead angle)	NB (Without chipbreaker)
		
Tough edge (General purpose)	Sharp cutting (For finishing)	Non-ferrous Metals

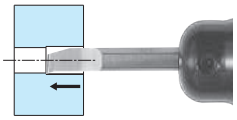
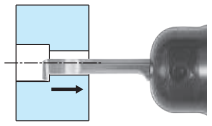
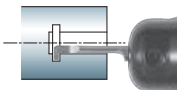
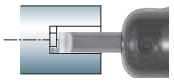
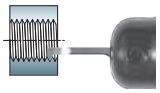
·2 types of corner-R for each chipbreaker
H Chipbreaker: 0.08mm, 0.15mm
F Chipbreaker: 0.05mm, 0.15mm
NB (Without Chipbreaker): 0.05mm(PR1225)
0.035mm(PCD·CBN)

* Lineup depend on description

Along with the solid type, EZVB (for Boring , Internal Facing and Copying) and indexable type "EZ Bar PLUS"are added to the lineup

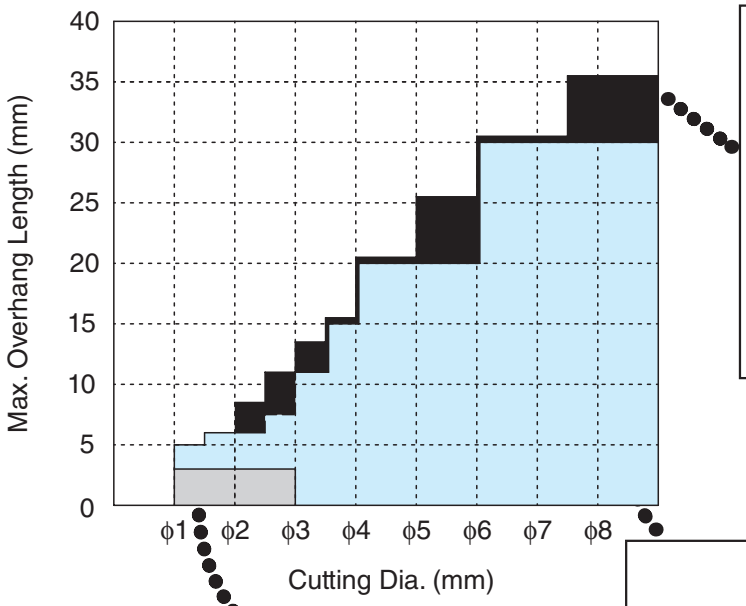
HP Type 2-Edge Tip-Bars

- Economically excellent 2-Edge
- Min. Bore Dia. Line Up from ϕ2.0 to Up
- Easy-to-Use Adjustable Overhang Length
- Integrated shank enables installation with standard sleeves
- Special sleeves for various machine types

Boring	Back Boring	Grooving	Face Grooving	Threading
				
HPB F36	**HPBT** F36	**HPG** G46	**HPFG** G71	**HPT** J28
Min. Bore Dia.: ϕ2~ϕ7 Corner-R(rε): 0.05	Min. Bore Dia.: ϕ4~ϕ5 Corner-R(rε): 0.05	Min. Bore Dia.: ϕ4~ϕ7 Edge Width: 1.0~2.0mm Depth: 1.0~2.0mm	Min. Face Groove Dia.: ϕ8 Edge Width: 1.0~3.0mm Depth: 2.0~3.0mm	Min. Pilot Hole Dia.: ϕ4.5~ϕ8 M : 0.75~1.5mm UN : 28~16TPI W : 24~18TPI Rc : 28~19TPI

●Guide for usage (Adjustable overhang type)

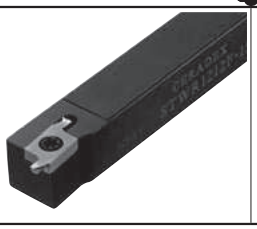
Solid Tip-Bars Type: Min. Bore Dia. ϕ1~



Easy adjustment and high precision

EZ Bars

F12



Twin-Bars F34~F35

SVN F30

Square Shank (Straight)

S...SVN F31

Round Shank (Standard)

SVNS F30

System Tip-Bars F28

Boring Bar Identification System (Round Shank)

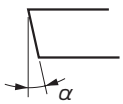
Shank Type	Bar Length	Clamping System	Insert Shape	Hand of Tool	Others
S Steel A Steel (with Coolant Hole) C Carbide E Carbide (with Coolant Hole)	F : 80 Q : 180 G : 90 R : 200 H : 100 S : 250 J : 110 T : 300 K : 125 U : 350 L : 140 V : 400 M : 150 W : 450 N : 160 Y : 500 P : 170 X : Special	C : Top Clamp M : Multi Lock P : Lock Pin Only or Lever Lock S : Screw Clamp W : Wedge Lock	C : 80° Rhombic D : 55° Rhombic J : 70° Rhombic R : Round S : 90° Square T : 60° Triangle V : 35° Rhombic W : 80° Trigon	R : Right-hand L : Left-hand	Manufacture's Option: Optional Mark or Number Example A(N):Dynamic Bar AE :Excellent Bar which is Dynamic Bar type E :Excellent Bar

S	12	M	–	S	C	L	P	R	09	–	16	
Shank Dia.				Cutting Edge Angle			Insert Relief Angle		Insert Size		Min. Bore Dia.	

Cutting Edge Angle:

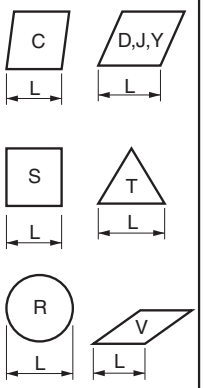
F	K	L	P
90°	75°	95°	117.5°
Q	**S**	**U**	**W**
107.5°	45°	93°	60°
Y	**X**	**Z**	
85°	110°	93°(95°)	

Insert Relief Angle:



B : 5°Positive
C : 7°Positive
D : 15°Positive
E : 20°Positive
N : 0°Negative
P : 11°Positive

Insert Size:

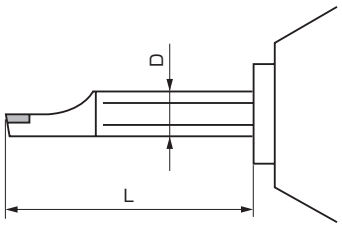


● **Anti-vibration interchangeable head mechanism Boring Bar "AD Bars"**

For the identification system for boring bars with interchangeable head, Ref. to page F63

Guide Line for Overhang Length of Boring Bar (Workpiece Material : S45C)

Overhang Length (L / D)	Shank Material
3	Steel
4	Steel (Dynamic Bar)
5	Excellent
5.5	Excellent (Dynamic Bar)
6	AD Bars (with Anti-vibration Dampener System)
7	Carbide



Carbide Shank Boring Bar

● Short Shank Series

Short Shank Types with length of 1/2 and 2/3 of standard type are available. (-1/2 or -2/3 is shown at the end of the description)
When installing on machines, no additional machining (to change toolholder length) is required.

Standard Size

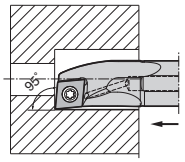
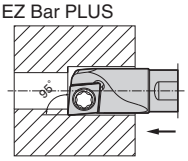
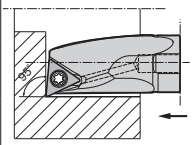
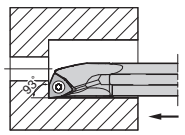
2/3 Size

1/2 Size

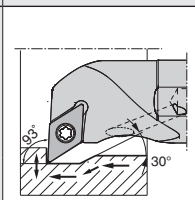
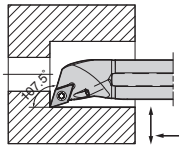
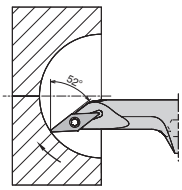
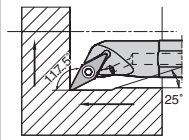
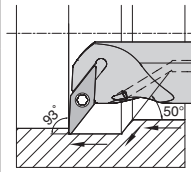
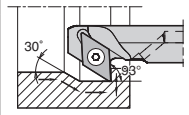
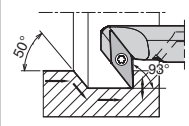
Solid Tip-Bars for Micro Boring

Applications	Solid Tip-Bars Type	Shape	Shank Type Max. Overhang Length (L/D)	Min. Bore Dia. ϕA 1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	Ref. to Page for Toolholders	Summary
Boring	**EZB-HP** EZ Bars → F14		Solid L/D=~5			●	●	●	●	●		●		●				F22~F27	
	NEW **EZB-HP-LT** EZ Bars (Long Type) → F15		Solid			●	●	●	●	●		●		●					
	EZB-ST EZ Bars → F16		Solid L/D=~5			●	●	●	●	●	●		●		●		●		
	EZB-NB EZ Bars (MEGACOAT) → F17		Solid L/D=~5			●	●	●	●	●	●		●		●		●		
	CBN **EZB-NB** EZ Bars PCD → F17		Solid L/D=~5					●		●		●		●		●			
	TWB Twin-Bars → F34		Solid	●	●	●	●	●										F34	
	TWBT Twin-Bars → F35		Solid	●	●	●	●	●										F35	
	VNB-S System Tip-Bars → F28		Solid	●	●	●	●	●	●	●								F30 F31	
	VNB System Tip-Bars → F29		Solid			●		●		●		●		●		●			
	VNBX-S System Tip-Bars → F32		Solid	●	●	●		●	●	●								F33	
	HPB 2-Edge Tip-Bars → F36		Solid L/D=~5			●		●		●		●		●		●		F26 F27	
	PSB-S Tip-Bars → F37		Solid L/D=~5			●		●		●		●		●		●		F84	
Back Boring	**VNBT** System Tip-Bars → F29		Solid							●		●						F30 F31	
	HPBT 2-Edge Tip-Bars → F36		Solid L/D=~5							●		●						F26 F27	
	PSBT-S Tip-Bars → F37		Solid L/D=~5							●		●						F84	
Copying	NEW **EZVB** EZ Bars → F20		Solid						●		●		●		●			F23~F27	

Dynamic Bar / EZ Bar PLUS

Applications	Overview Shape	Boring Bar Type	Shank Type / Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Min. Bore Dia. ϕA 5	6	7	8	10	12	13	14	16	18	20	22	23	25	26	27	30	31	32	34	40	50	Ref. to Page for Toolholders
Boring / Internal Facing		A...SCLC-AE	Excellent L/D=~5.5	●						●	●		●		●		●				●							F39
		S...SCLC-AE	Excellent L/D=~5.5		○	●	●	●	●																			
		S...SCLC-A	Steel L/D=~4		○					●	●		●		●		●				●							
		C...SCLC-A(N)	Carbide L/D=~7		○	●	●	●	●																			
		E...SCLC-A(N)	Carbide L/D=~7	●						●	●		●		●		●				●							
		A...SCLP-AE	Excellent L/D=~5.5	●							●		●	●	●		●				●							F41
		S...SCLP-A	Steel L/D=~4		○						●		●	●	●		●				●							
		E...SCLP-A(N)	Carbide L/D=~7	●							●		●	●	●		●				●							
	EZ Bar PLUS 	S...SCLC-EZ	Steel L/D=~3		○	●		●																			F19
		C...SCLC-EZ	Carbide L/D=~5		○	●		●																				
		A...STLP-AE	Excellent L/D=~5.5	●						●	●		●	●	●		●		●		●							F49
		S...STLB-AE			○				●																			
		S...STLB(P)-A	Steel L/D=~4		○				●	●	●		●	●	●		●				●							
		E...STLP-A(N)	Carbide L/D=~7	●						●	●		●	●	●		●		●		●							
		C...STLB-A(N)			○				●																			
		A...STLC-AE	Excellent L/D=~5.5	●						●	●		●		●		●											F47
		S...STLC-A	Steel L/D=~4		○					●	●		●		●		●											
Boring		S...SWUB-AE	Excellent L/D=~5.5		○		●	●	●																			F59
		A...SWUB(P)-AE	Excellent L/D=~5.5	●						●	●		●		●		●											
		S...SWUB(P)-A	Steel L/D=~4		○		●	●	●	●	●		●		●		●											
		C...SWUB-A(N)	Carbide L/D=~7		○		●	●	●																			
		E...SWUB(P)-A(N)	Carbide L/D=~7	●						●	●		●		●		●											

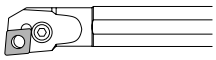
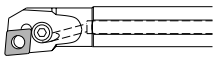
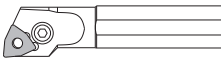
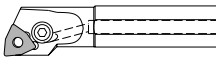
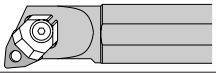
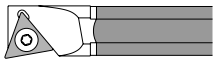
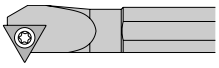
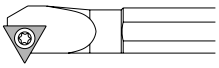
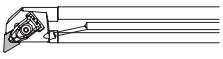
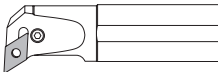
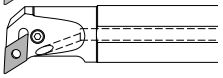
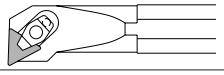
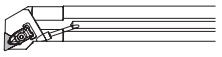
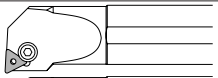
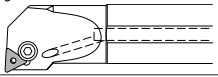
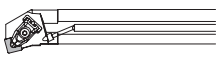
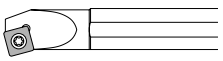
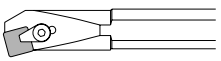
Dynamic Bar

Applications	Overview Shape	Boring Bar Type	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Min. Bore Dia. ϕA 5	6	7	8	10	12	13	14	16	18	20	22	23	25	26	27	30	31	32	34	40	50	Ref. to Page for Toolholders
Copying		A...SDUC-AE	Excellent L/D=~5.5	●									●	●		●		●			●			●				F43
		S...SDUC-A	Steel L/D=~4		○								●	●		●		●			●			●				
		E...SDUC-A	Carbide L/D=~7	●									●	●		●		●			●			●				
		A...SDQC-AE	Excellent L/D=~5.5	●							●			●		●			●			●						F44
		S...SDQC-A	Steel L/D=~4		○						●			●		●			●			●						
		E...SDQC-A	Carbide L/D=~7	●							●			●		●			●			●						
		A...SVJB(C)-AE	Excellent L/D=~5.5	●										●		●			●			●				●	●	F52
		A...SVJP-AE		●										●														
		S...SVJB(C)-A	Steel L/D=~4		○									●		●			●			●				●	●	
		S...SVJP-A			○									●														
		A...SVPC(B)-AE	Excellent L/D=~5.5	●									●		●		●			●			●			●		F54
		S...SVPC(B)-A	Steel L/D=~4		○								●		●		●			●			●			●		
		E...SVPC(B)-A	Carbide L/D=~7	●									●		●		●			●			●					
		A...SVUB(C)-AE	Excellent L/D=~5.5	●										●		●			●						●	●		F57
		S...SVUB(C)-A	Steel L/D=~4		○									●		●			●						●	●		
		E...SVUB(C)-A	Carbide L/D=~7	●											●				●			29			●			
Back Copying		A...SDZC-AE	Excellent L/D=~5.5	●									●	●		●		●			●			●				F45
		S...SDZC-A	Steel L/D=~4		○								●	●		●		●			●			●				
		E...SDZC-A	Carbide L/D=~7	●									●	●		●		●			●							
		A...SVZB(C)-AE	Excellent L/D=~5.5	●										●		●			●						●	●		F57
		S...SVZB(C)-A	Steel L/D=~4		○									●		●			●						●	●		

For Min. Bore Dia. ϕA, the figure under ● may be applied depending on the toolholder type.

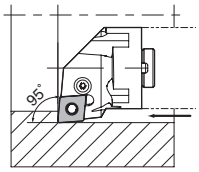
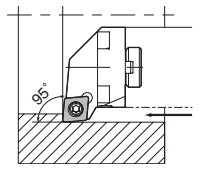
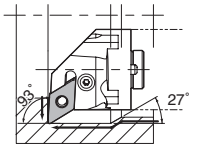
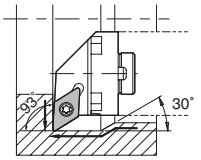
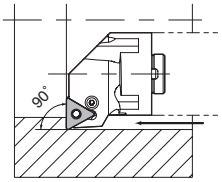
Product Lineup

Boring Bars

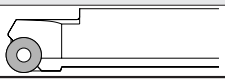
Applications	Boring Bar Type	Shape	Shank Type / Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Insert Type	Min. Bore Dia. ϕA 5	6	7	8	10	12	14	16	18	20	25	30	32	40	50	63	Ref. to Page for Toolholders
Boring / Internal Facing	NEW A···DCLN12		Steel L/D=~3	●		Negative													●	●	●		F67
	S···PCLN○○		Steel L/D=~3		○	Negative										●	● 27		●	●	●		F68
	A···PCLN09		Steel L/D=~3	●		Negative										●	● 27		●				
	NEW A···DWLN08		Steel L/D=~3	●		Negative													●	●	●		F77
	S···PWLN○○		Steel L/D=~3		○	Negative										●	● 27		●	●	●		F76 F78
	A···PWLN06		Steel L/D=~3	●		Negative										●	● 27		●				F76
	S···WWLN08-E		Excellent L/D=~5		○	Negative											● 28		● 34	●			F78
	C···STXP(B)		Carbide L/D=~7		○	Positive			● 7.5	● 9	● 11												F51
	C···SJLC		Carbide L/D=~7		○	Positive	● 5.5																F46
Copying	S···STWP-E		Excellent L/D=~5		○	Positive						●		●		●	●		●				F50
	S···STWP		Steel L/D=~3		○	Positive						●		●		●	●						
	NEW A···DDUN15		Steel L/D=~3	●		Negative														●	●	●	F70
	S···PDUN11		Steel L/D=~3		○	Negative											● 27		●	●			F69
	A···PDUN11		Steel L/D=~3	●		Negative											● 27		●	●			
	S···PDUN15		Steel L/D=~3		○	Negative													●	● 44	● 54		F71
	S···PDQN15		Steel L/D=~3		○	Negative													●	● 44	● 54		F71
Back Copying	C···STZB		Carbide L/D=~7		○	Positive				● 8.5													F51
	C···SJZC		Carbide L/D=~7		○	Positive		● 6.5															F46
	S···PDZN15		Steel L/D=~3		○	Negative													●	● 44	● 54		F71
Boring	S···CTUP		Steel L/D=~3		○	Positive								●		●	● 27		● 34	● 43	●		F61
	NEW A···DTFN○○		Steel L/D=~3	●		Negative													●	●	●		F74
	S···PTUN○○		Steel L/D=~3		○	Negative										●	●	●	●	●	●		F75
	A···PTUN11		Steel L/D=~3	●		Negative										●	●		●				
	NEW A···DSKN12		Steel L/D=~3	●		Negative													●	●	●		F73
	S···SSKP		Steel L/D=~3		○	Positive										●	●						F60
	S···CSKP		Steel L/D=~3		○	Positive										●	● 27		● 34	● 43			

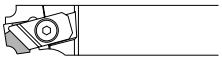
For Min. Bore Dia. ϕA, the figure under ● may be applied depending on the toolholder type.

AD Bars Interchangeable Head Boring Bars with Anti-vibration Dampener System

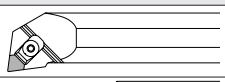
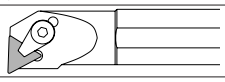
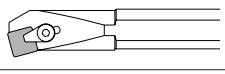
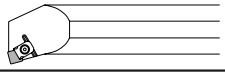
Applications	Boring Bar Type	Shape	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Insert Type	Min. Bore Dia. ϕA 7	8	10	12	14	16	18	20	25	30	32	40	43	50	63	Ref. to Page for Toolholders
Boring / Internal Facing	HA···PCLN12		Anti-vibration Dampener System L/D=~5.5	●		Negative												●		●	●	F63
	HA···SCLC09		Anti-vibration Dampener System L/D=~6	●		Positive												●				F65
Copying	HA···PDUN15		Anti-vibration Dampener System L/D=~6	●		Negative													●	●	●	F64
	HA···SDUC11		Anti-vibration Dampener System L/D=~6	●		Positive												●				F65
Boring	HA···PTFN16		Anti-vibration Dampener System L/D=~6	●		Negative												●		●	●	F64

Boring Toolholders for Bearing Machining (Square Shank)

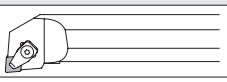
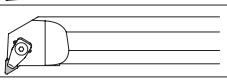
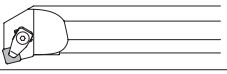
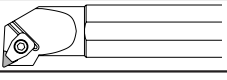
Applications	Boring Bar Type	Shape	Min. Bore Dia. ϕA 20	25	30	32	40	50	Ref. to Page for Toolholders
Boring	SRCP-B		●			●			F62

Applications	Boring Bar Type	Shape	Min. Bore Dia. ϕA 20	25	30	32	40	50	Ref. to Page for Toolholders
Round-Chamfering	CBSN-B		●						F62

Boring Bars for Ceramic / Solid CBN Tools (L/D=~3)

Applications	Boring Bar Type	Shape	Min. Bore Dia. ϕA 16	18	20	25	30	32	40	50	Ref. to Page for Toolholders
Boring / Internal Facing	S···CELN									●	F79
Boring	S···CTUP		●		●	● 27		● 34	● 43	●	F61
	S···CSKP				●	● 27		● 34	● 43		F60
	S···CSKN									●	F79

For Min. Bore Dia. ϕA, the figure under ● may be applied depending on the toolholder type.

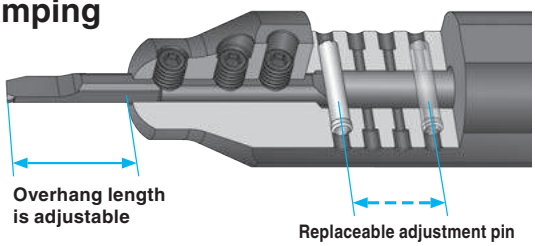
Applications	Boring Bar Type	Shape	Min. Bore Dia. ϕA 20	25	30	32	40	50	Ref. to Page for Toolholders
Boring / Internal Facing	S···CCLN-GX						●	●	F80
Boring / Copying	S···CDUN-GX						●	●	F80
Boring	S···CSKN-GX						●	●	F80
Boring / Internal Facing	S···CCLN-A						●		F81
Boring	S···CTUN-A				●				F81

Kyocera's original EZ adjust structure

- Easy adjustment and high precision
- EZ Bars prevent deviation with high-rigidity clamping

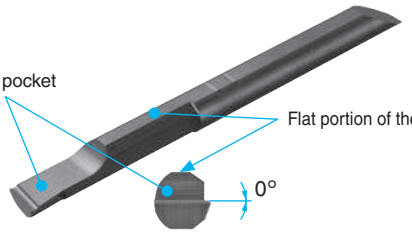
Wide range of items applicable to various applications

Kyocera's original EZ adjust structure



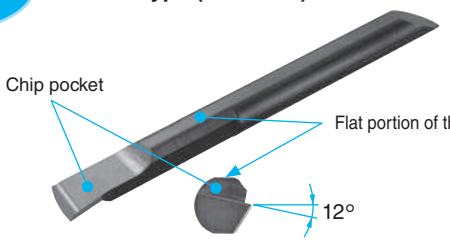
2 types of bars

Precision-oriented — **HP type (High precision)**



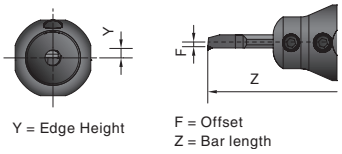
F14

Cost-oriented — **ST type (Standard)**



F16

● Bar Tolerance

Bar setting image	Bar Tolerance	Offset (F)	Overall length (Z)	Edge Height (Y)	Min. Bore Dia.
 Y = Edge Height; F = Offset; Z = Bar length	Precision-oriented HP type (High precision)	±0.025mm	±0.05mm	+0.05/0mm	Same as Shank Dia.
	Cost-oriented ST type (Standard)	±0.06mm	±0.1mm	+0.06/0mm	Not same as Shank Dia.

* Ref. to page of “Dimension” for details.

Lineup expansion Along with the solid type, indexable type "EZ Bar PLUS" is newly added

3 types of sleeve (EZH-CT , EZH-HP , EZH-ST)

EZH-CT

High precision , with coolant hole (Adjustable)

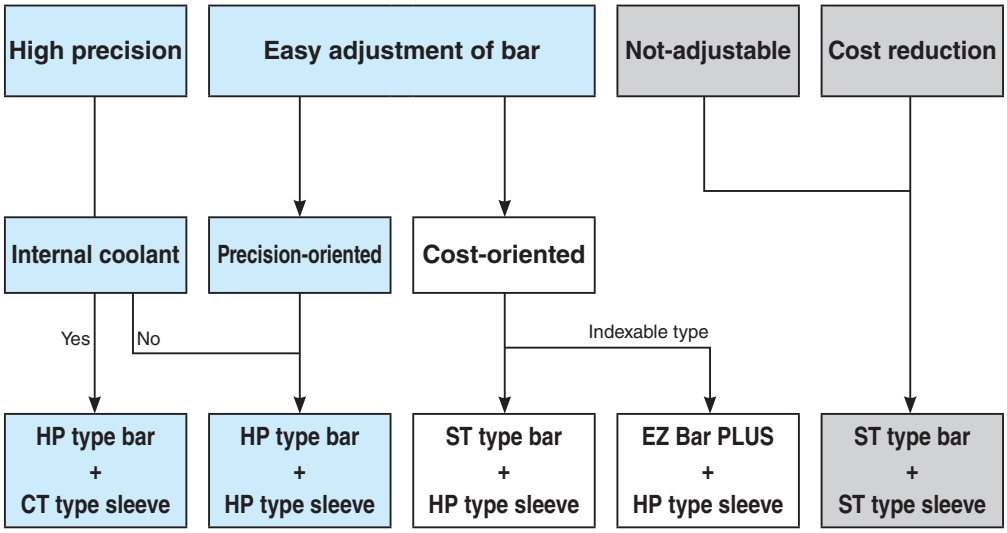
EZH-HP

Overhang length is adjustable (Adjustable)

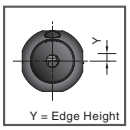
EZH-ST

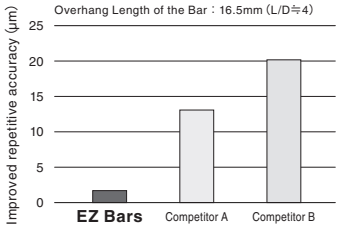
Not-adjustable

How to select bars and sleeves for each application



·Excellent repeat accuracy by the combination of HP bar + CT / HP sleeve

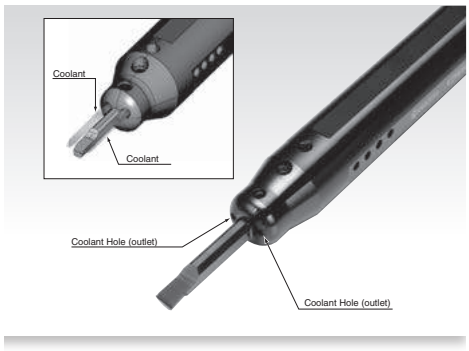




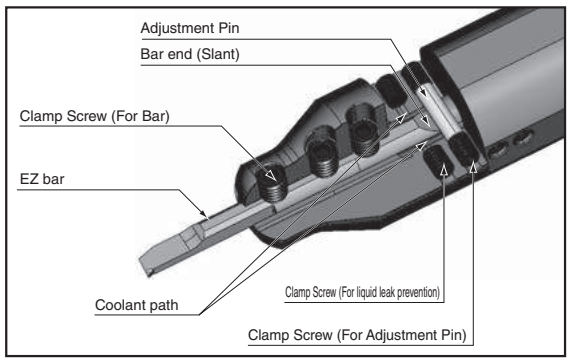
EZH-CT type (high precision / with coolant hole) is added in the EZH sleeve lineup

Kyocera's unique EZ adjust structure and internal coolant system improve dimensional accuracy and surface

Coolant discharge system of EZH-CT



Structure of EZH-CT



How to fix EZ Bars (EZH-CT sleeve)

How to use adjustment pin and prevent liquid leak (Fig.1)

(1) Put the adjustment pin into the hole according to the overhang length. Push it into the sleeve, using the wrench (LW-1.5).
(2) Tighten the clamp screw for the adjustment pin "HS3x4P" using the wrench "LW-1.5" from the both sides of the sleeve.
(3) Put the clamp screws "HS3x4P" into the holes for liquid leak prevention, using the wrench "LW-1.5" and fix them from the both sides of the sleeve.

How to fix bar (Fig.2)

(1) With the chip pocket upward, set the bar into the sleeve.
Press the slant of the end of the bar with the adjustment pin.
Make sure that the bar does not move (Fig.3)
(2)Tighten the clamp screw with wrench (LW-2) and fix the bar.
(Use LW-1.5 if shank dia. is 3mm or less)

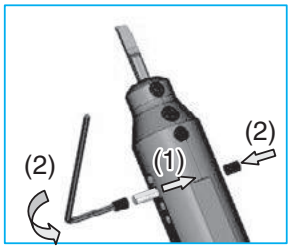


Fig.1 How to use adjustment pin

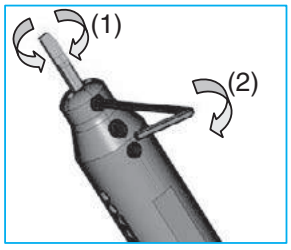


Fig.2 How to fix bar

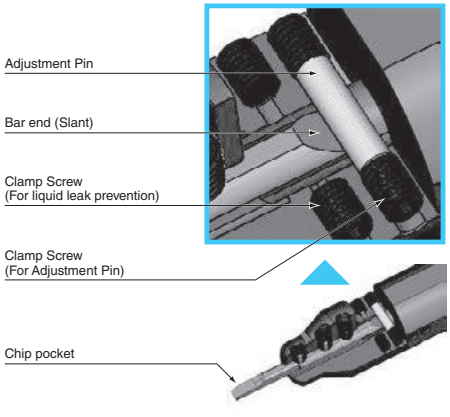
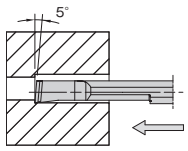
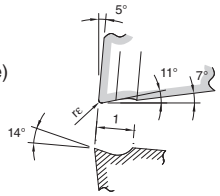


Fig.3 Fixed bar

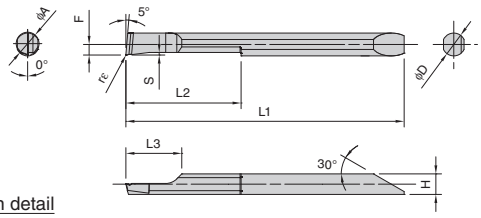
EZB-HP (Boring)

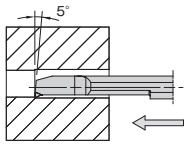


H Chipbreaker
- Without lead angle
- Tough edge (General purpose)
- Right-hand shown

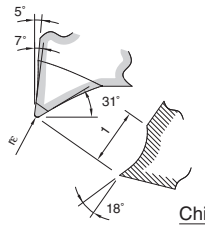


Chipbreaker in detail

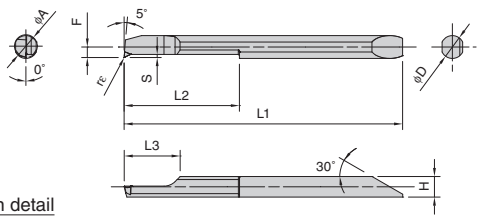




F Chipbreaker
- With lead angle
- Sharp cutting (For finishing)
- Right-hand shown



Chipbreaker in detail



EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Grades		Applicable Sleeves
											MEGACOAT	Carbide	
		φA	φD	H	L1	L2	L3	F	S	rε	PR1225	NEW GW05	F22~F27
EZBR	020020HP-008H	2	2	1.8	32	8	4.9	0.85	0.25	0.08±0.015	●	●	EZH020…
	025025HP-008H	2.5	2.5	2.3	35	10.5	4.9	1.1	0.25	0.08±0.015	●		EZH025…
	025025HP-015H									0.15±0.02	●		
	030030HP-008H	3	3	2.7	38.9	13	6.9	1.35	0.3	0.08±0.015	●	●	EZH030…
	030030HP-015H									0.15±0.02	●		
	035035HP-008H	3.5	3.5	3.2	41.9	15	6.9	1.6	0.4	0.08±0.015	●		EZH035…
	035035HP-015H									0.15±0.02	●		
	040040HP-008H	4	4	3.6	48.8	20	9.8	1.85	0.4	0.08±0.015	●	●	EZH040…
	040040HP-015H									0.15±0.02	●		
	050050HP-008H	5	5	4.6	58.1	25	9.8	2.35	0.5	0.08±0.015	●	●	EZH050…
	050050HP-015H									0.15±0.02	●		
	060060HP-008H	6	6	5.6	66.1	30	11.8	2.85	0.6	0.08±0.015	●	●	EZH060…
	060060HP-015H									0.15±0.02	●		
EZBR	020020HP-005F	2	2	1.8	32	8	4.9	0.85	0.25	0.05±0.01	●		EZH020…
	025025HP-005F	2.5	2.5	2.3	35	10.5	4.9	1.1	0.3	0.05±0.01	●		EZH025…
	025025HP-015F									0.15±0.02	●		
	030030HP-005F	3	3	2.7	38.9	13	6.9	1.35	0.4	0.05±0.01	●		EZH030…
	030030HP-015F									0.15±0.02	●		
	035035HP-005F	3.5	3.5	3.2	41.9	15	6.9	1.6	0.5	0.05±0.01	●		EZH035…
	035035HP-015F									0.15±0.02	●		
	040040HP-005F	4	4	3.6	48.8	20	9.8	1.85	0.5	0.05±0.01	●		EZH040…
	040040HP-015F									0.15±0.02	●		
	050050HP-005F	5	5	4.6	58.1	25	9.8	2.35	0.7	0.05±0.01	●		EZH050…
	050050HP-015F									0.15±0.02	●		
	060060HP-005F	6	6	5.6	66.1	30	11.8	2.85	0.9	0.05±0.01	●		EZH060…
	060060HP-015F									0.15±0.02	●		

Tolerance: Offset ±0.025mm (of the reference pin), overall length ±0.05mm, edge height +0.05/0mm

Recommended Cutting Conditions F18

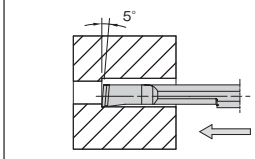
EZ Bars Identification System

EZ	B	R	020	020	HP	–	008	H
Symbol of EZ Bars	Applications	Insert Hand	Min. Bore Dia.	Shank Dia.	Symbol of Precision		Corner-R(rε)	Name of Chipbreaker
	B: Boring Bars	R: Right-hand	020: 2mm 025: 2.5mm ⋮	020: 2mm 025: 2.5mm ⋮	HP: High Precision ST: Standard		008: 0.08mm 015: 0.15mm ⋮	H: Without lead angle F: With lead angle NB: Without chipbreaker

● : Std. Item

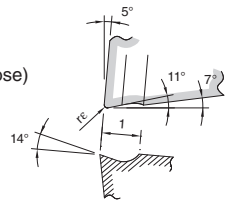
EZ Bars are sold in 1 piece boxes

EZB-HP (Boring, Long Type)

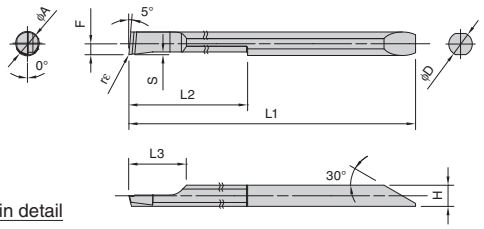


H Chipbreaker
- Without lead angle
- Tough edge (General purpose)

- Right-hand shown



Chipbreaker in detail



EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)												Grades	Applicable Sleeves
								*Overhang Length							MEGACOAT	
		ϕA	ϕD	H	L1	L2	L3	No.1	No.2	No.3	No.4	F	S	rε	PR1225	F22~F27
EZBR	020020HP-008H-LT	2	2	1.8	36	12	4.9	12.5	8.5	-	-	0.85	0.25	0.08±0.015	●	EZH020…
	025025HP-008H-LT	2.5	2.5	2.3	39.5	15		15.5	11.5	-	-	1.1			●	EZH025…
	030030HP-008H-LT	3	3	2.7	47.9	18	6.9	*22.5*	18.5	14.5	-	1.35	0.3		●	EZH030…
	035035HP-008H-LT	3.5	3.5	3.2	51.9	21		*25.5*	21.5	17.5	-	1.6	0.4		●	EZH035…
	040040HP-008H-LT	4	4	3.6	60.8	28	9.8	*32.5*	28.5	24.5	20.5	1.85			●	EZH040…
	050050HP-008H-LT	5	5	4.6	73.1	35		*40.5*	35.5	30.5	25.5	2.35	0.5		●	EZH050…
	060060HP-008H-LT	6	6	5.6	83.1	42	11.8	*47.5*	42.5	37.5	32.5	2.85	0.6		●	EZH060…

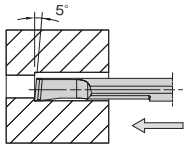
*In case of overhang length mentioned in italics, modified insert is required

Recommended Cutting Conditions F18

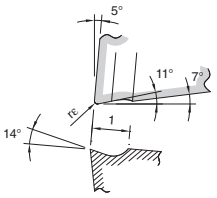
● : Std. Item

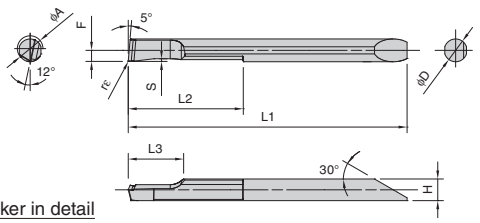
EZ Bars are sold in 1 piece boxes

EZB-ST (Boring)



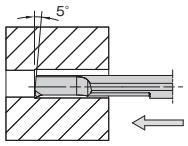
H Chipbreaker
- Without lead angle
- Tough edge (General purpose)



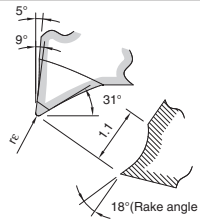


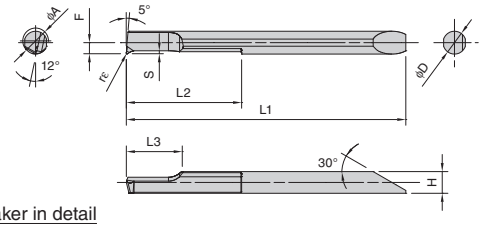
- Right-hand shown

Chipbreaker in detail



F Chipbreaker
- With lead angle
- Sharp cutting (For finishing)





- Right-hand shown

Chipbreaker in detail

EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Grades	Applicable Sleeves
											MEGACOAT	F22~F27
		ϕA	ϕD	H	L1	L2	L3	F	S	rε	PR1225	
EZBR	020017ST-008H	2	1.7	1.5	27.3	7	4.7	0.79	0.19	0.08±0.015	●	EZH017…
	025020ST-008H	2.5	2	1.82	32	8	4.8	0.94	0.16	0.08±0.015	●	EZH020…
	025020ST-015H									0.15±0.02	●	
	030025ST-008H	3	2.5	2.3	35	10.5	4.8	1.19	0.15	0.08±0.015	●	EZH025…
	030025ST-015H									0.15±0.02	●	
	035030ST-008H	3.5	3	2.8	39	13	6.8	1.44	0.18	0.08±0.015	●	EZH030…
	035030ST-015H									0.15±0.02	●	
	040035ST-008H	4	3.5	3.3	42	15	6.7	1.69	0.24	0.08±0.015	●	EZH035…
	040035ST-015H									0.15±0.02	●	
	045040ST-008H	4.5	4	3.8	49	20	9.7	1.94	0.27	0.08±0.015	●	EZH040…
	045040ST-015H									0.15±0.02	●	
	055050ST-008H	5.5	5	4.8	58.2	25	9.7	2.44	0.33	0.08±0.015	●	EZH050…
	055050ST-015H									0.15±0.02	●	
	065060ST-008H	6.5	6	5.8	66.2	30	11.8	2.94	0.38	0.08±0.015	●	EZH060…
	065060ST-015H									0.15±0.02	●	
	075070ST-008H	7.5	7	6.8	74.2	35	11.7	3.44	0.44	0.08±0.015	●	EZH070…
	075070ST-015H									0.15±0.02	●	
EZBR	020017ST-005F	2	1.7	1.5	27.3	7	4.7	0.79	0.2	0.05±0.01	●	EZH017…
	025020ST-005F	2.5	2	1.82	32	8	4.8	0.94	0.16	0.05±0.01	●	EZH020…
	025020ST-015F									0.15±0.02	●	
	030025ST-005F	3	2.5	2.3	35	10.5	4.8	1.19	0.2	0.05±0.01	●	EZH025…
	030025ST-015F									0.15±0.02	●	
	035030ST-005F	3.5	3	2.8	39	13	6.8	1.44	0.26	0.05±0.01	●	EZH030…
	035030ST-015F									0.15±0.02	●	
	040035ST-005F	4	3.5	3.3	42	15	6.7	1.69	0.33	0.05±0.01	●	EZH035…
	040035ST-015F									0.15±0.02	●	
	045040ST-005F	4.5	4	3.8	49	20	9.7	1.94	0.31	0.05±0.01	●	EZH040…
	045040ST-015F									0.15±0.02	●	
	055050ST-005F	5.5	5	4.8	58.2	25	9.7	2.44	0.45	0.05±0.01	●	EZH050…
	055050ST-015F									0.15±0.02	●	
	065060ST-005F	6.5	6	5.8	66.2	30	11.7	2.94	0.59	0.05±0.01	●	EZH060…
	065060ST-015F									0.15±0.02	●	
	075070ST-005F	7.5	7	6.8	74.2	35	11.7	3.44	0.65	0.05±0.01	●	EZH070…
	075070ST-015F									0.15±0.02	●	

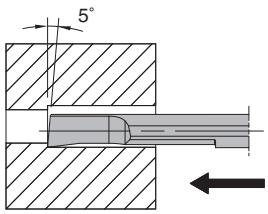
Tolerance: Offset ±0.06mm , overall length ±0.1mm, edge height +0.06/0mm

Recommended Cutting Conditions F18

● : Std. Item

EZ Bars are sold in 1 piece boxes

EZB-NB (Boring)



<PR1225>

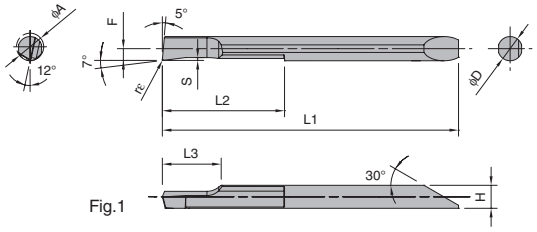
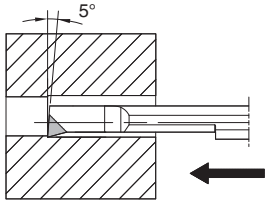


Fig.1

・Right-hand shown



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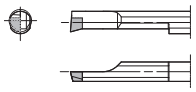


Fig.2 EZBR030 type

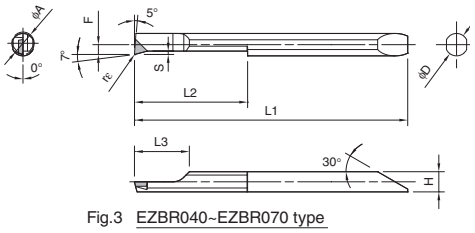


Fig.3 EZBR040~EZBR070 type

・Right-hand shown

EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Drawing	Grades			Applicable Sleeves F22~F27
												MEGACOAT	MEGA CBN	PCD	
		φA	φD	H	L1	L2	L3	F	S	rε		PR1225	KBN05M	KPD001	
EZBR	020017-005NB	2	1.7	1.5	27.3	7	4.7	0.79	0.2	±0.015 0.05	Fig.1	●			EZH017…
	025020-005NB	2.5	2	1.82	32	8	4.8	0.94	0.16			●			EZH020…
	030025-005NB	3	2.5	2.3	35	10.5	4.8	1.19	0.16			●			EZH025…
	035030-005NB	3.5	3	2.8	39	13	6.8	1.44	0.19			●			EZH030…
	040035-005NB	4	3.5	3.3	42	15	6.7	1.69	0.25			●			EZH035…
	045040-005NB	4.5	4	3.8	49	20	9.7	1.94	0.28			●			EZH040…
	055050-005NB	5.5	5	4.8	58.2	25	9.7	2.44	0.33			●			EZH050…
	065060-005NB	6.5	6	5.8	66.2	30	11.7	2.94	0.39			●			EZH060…
	075070-005NB	7.5	7	6.8	74.2	35	11.7	3.44	0.45			●			EZH070…
EZBR	030030-003NB	3	3	2.6	38.8	13	6.8	1.25	0.3	±0.015 0.035	Fig.2		●		EZH030…
	040040-003NB	4	4	3.6	48.8	20	9.8	1.75	0.5		Fig.3		●		EZH040…
	050050-003NB	5	5	4.6	58.1	25	9.8	2.25					●		EZH050…
	060060-003NB	6	6	5.6	66.1	30	11.8	2.75					●		EZH060…
	070070-003NB	7	7	6.6	74.1	35	11.8	3.25					●		EZH070…
EZBR	040040-003NB	4	4	3.6	48.8	20	9.8	1.75	0.5	±0.015 0.035	Fig.3			●	EZH040…
	050050-003NB	5	5	4.6	58.1	25	9.8	2.25						●	EZH050…
	060060-003NB	6	6	5.6	66.1	30	11.8	2.75						●	EZH060…
	070070-003NB	7	7	6.6	74.1	35	11.8	3.25						●	EZH070…

Recommended Cutting Conditions F18

Edge Preparation

Grades	Edge Preparation	Remarks
PR1225	Sharp Edge	-
KBN05M	T00815	0.08mmx15° Chamfered Cutting Edge
KPD001	Sharp Edge	-

● : Std. Item

EZ Bars are sold in 1 piece boxes

◆ Recommended Cutting Conditions

● H Chipbreaker (EZB-HP··H type / EZB-ST··H type)

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)		EZB020/025 type		EZB030/035 type		EZB040/045 type		EZB050/055/060/065/075 type		Remarks
	MEGACOAT	Carbide	ap(mm), f(mm/rev)								
	PR1225	**GW05**	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	-	~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	30~80	-	~0.2	~0.02	~0.3	~0.03	~0.35	~0.05	~0.4	~0.07	
Non-ferrous Metals	-	~100	~0.3	~0.05	~0.4	~0.06	~0.45	~0.1	~0.5	~0.15	

● H Chipbreaker [EZB-HP··H-LT type (Long type)]

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)	EZB020/025/030/035 type		EZB040/050/060 type		Remarks
	MEGACOAT	ap(mm), f(mm/rev)				
	PR1225	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~60	~0.3	~0.05	~0.4	~0.1	Coolant
Stainless Steel	20~40	~0.25	~0.05	~0.3	~0.07	

● F Chipbreaker (EZB-HP··F type / EZB-ST··F type)

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)	EZB020/025 type		EZB030/035 type		EZB040/045 type		EZB050/055/060/065/075 type		Remarks
	MEGACOAT	ap(mm), f(mm/rev)								
	PR1225	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	~0.2	~0.03	~0.2	~0.05	~0.3	~0.07	~0.3	~0.07	Coolant
Stainless Steel	30~80	~0.2	~0.02	~0.2	~0.03	~0.25	~0.05	~0.25	~0.05	

● NB (Without chipbreaker)

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)	EZB020/025 type		EZB030/035 type		EZB040/045 type		EZB050/055/060/065/075 type		Remarks
	MEGACOAT	ap(mm), f(mm/rev)								
	PR1225	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	30~80	~0.2	~0.02	~0.3	~0.03	~0.35	~0.05	~0.4	~0.07	
Non-ferrous Metals	60~100	~0.3	~0.05	~0.4	~0.06	~0.45	~0.07	~0.5	~0.1	

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)		EZB030 type		EZB040/045 type		EZB050/060/070 type		Remarks
	MEGACOAT CBN	PCD	ap(mm), f(mm/rev)						
	KBN05M	**KPD001**	ap	f	ap	f	ap	f	
Non-ferrous Metals	-	~300	-	-	~0.45	~0.1	~0.5	~0.15	Coolant
Hard Materials	~100	-	~0.07	~0.03	~0.10	~0.05	~0.15	~0.07	

■ Compatibility of EZ Bars

EZ Bars are compatible with conventional Tip-Bars.

Sleeves \ Insert	**EZB···HP**	**EZB···ST/NB**	**HPB···**(Conventional)
EZH···CT/HP	✓	✓	✓ *1 *2 (Compatible)
EZH···ST	✓	✓	✓ *1 (Compatible)
PSH··· (Discontinued Description)	✓ *1 (Compatible)	✓ *1 (Compatible)	✓

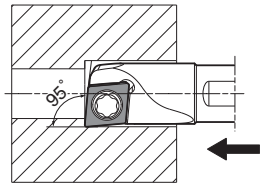
*1 Some diameter types of conventional Tip-Bars are incompatible.

*2 Use them without Adjustment Pins. Overhang length of bar is not adjustable.

EZ Bar PLUS (Indexable boring bar)

S-SCLC-EZ

Max. Overhang Length L/D=~3



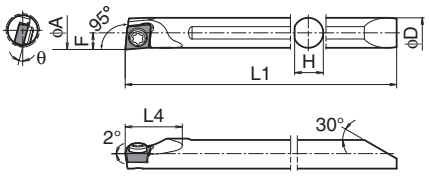


Fig.1

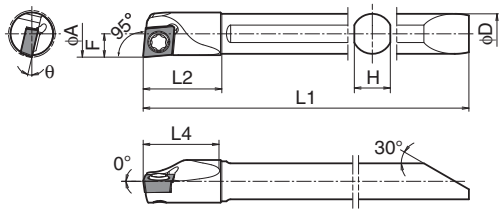


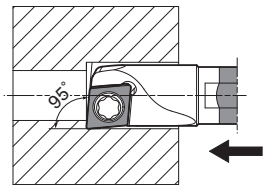
Fig.2

・Right-hand shown

Left-hand Insert for Right-hand Toolholder.

C-SCLC-EZ

Max. Overhang Length L/D=~5



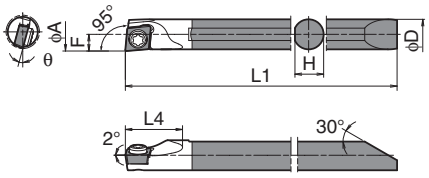


Fig.3

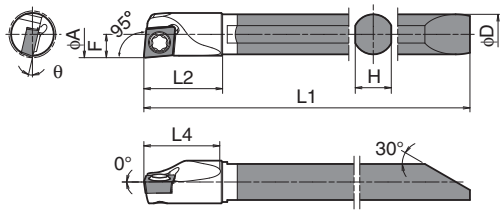


Fig.4

・Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description		Std.	Min. Bore Dia.	Dimension (mm)							θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts		Applicable Sleeves ➡F25
		R	φA	φD	H	L1	L2	L3	L4	F					Clamp Screw	Wrench	
Steel	S045X-SCLCR03-050EZ	●	5	4.5	4.3	42.4	-	-	8.5	2.5	15°	0.2	No	Fig.1	SB-1635TR	FT-6	EZH045…
	S060X-SCLCR04-070EZ	●	7	6	5.4	53.9	11.8		11.5	3.5	13°			Fig.2	SB-2035TR		EZH060…
Carbide	C045X-SCLCR03-050EZ	●	5	4.5	4.3	51.4	-		8.5	2.5	15°			Fig.3	SB-1635TR		EZH045…
	C060X-SCLCR04-070EZ	●	7	6	5.4	65.9	11.8		11.5	3.5	13°			Fig.4	SB-2035TR		EZH060…

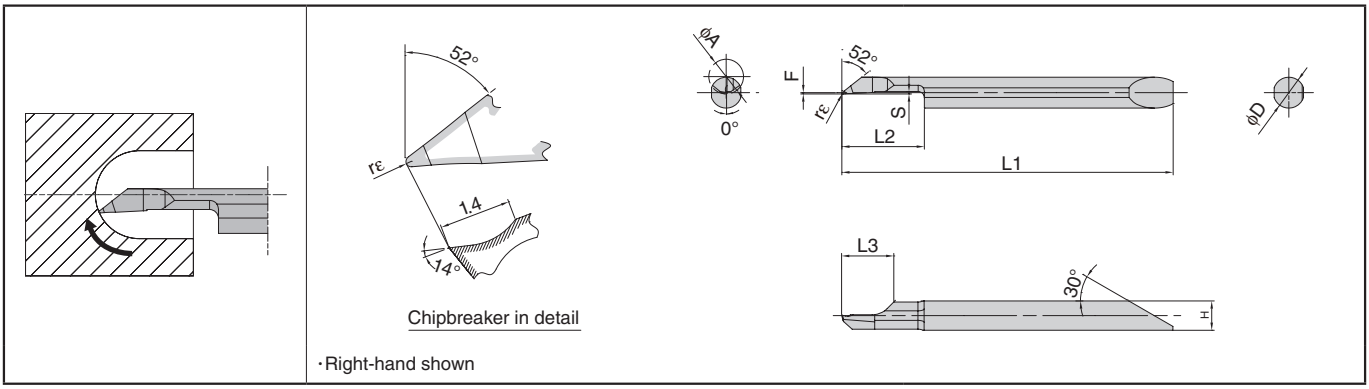
Applicable Inserts

Applications	Minute ap	Finishing	Finishing / Precision	Non-ferrous Metals	Hard Materials
Ref. to Page	B49	B52	B51	C24	C14
Insert / Toolholder Description	CF	L-F	L-FSF	PCD	CBN
----SCLCR03----	CCGT0301..	CCGT0301..	CCET0301..	-	CCMW0301..
----SCLCR04----	CCGT0401..	CCGT0401..	CCET0401..	CCGW0401..	CCMW0401..

Recommended Cutting Conditions ➡ F93~F94

● : Std. Item

EZVB (Boring / Internal Facing / Copying) NEW



Chipbreaker in detail

・Right-hand shown

EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Grades MEGACOAT	Applicable Sleeves F23~F27
		ϕA	ϕD	H	L1	L2	L3	F	S	rε	PR1225	
EZVBR	035030-010	3.5	3	2.8	38	8	5.8	0.17	0.22	0.1±0.015	●	EZH030…
	045040-010	4.5	4	3.8	43	10	6.8	0.17	0.26	0.1±0.015	●	EZH040…
	055050-010	5.5	5	4.8	50.2	12	7.7	0.17	0.29	0.1±0.015	●	EZH050…
	065060-010	6.5	6	5.8	55.2	14	8.6	0.17	0.32	0.1±0.015	●	EZH060…

Recommended Cutting Conditions

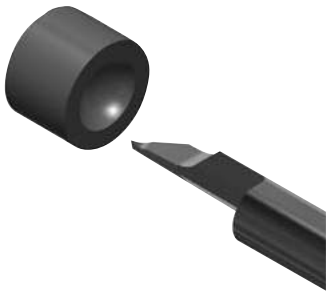
Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)	EZVB035 type		EZVB045 type		EZVB055/065 type		Remarks
	MEGACOAT	ap (mm), f (mm/rev)						
	PR1225	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	~0.05	~0.04	~0.07	~0.07	~0.1	~0.07	Coolant
Stainless Steel	30~80	~0.03	~0.03	~0.05	~0.05	~0.07	~0.05	

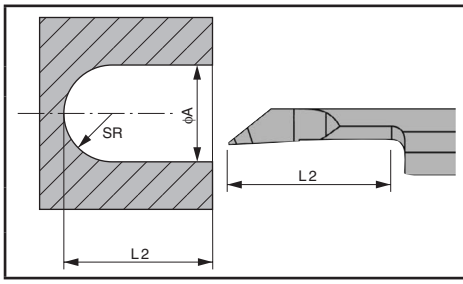
EZ Bars are sold in 1 piece boxes

● : Std. Item

Application of EZVB

1. Application Range



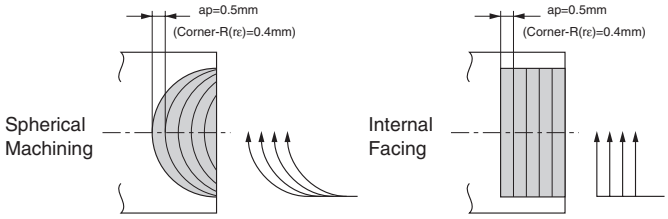


(mm)

Description		Min. Bore Dia. ϕA	SR	L2
EZVBR	035030-010	3.5	1.75	8
	045040-010	4.5	2.25	10
	055050-010	5.5	2.75	12
	065060-010	6.5	3.25	14

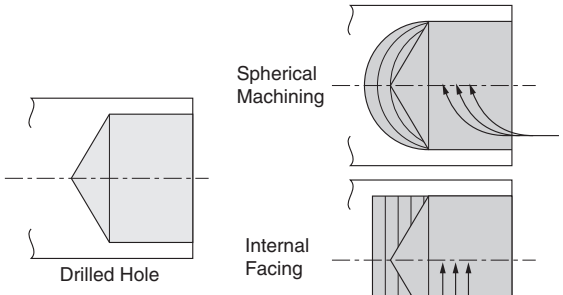
2. Application

Case with No Existing Hole



(Note) f shall be under 0.05mm/rev at internal facing.

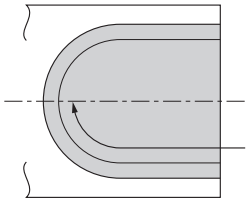
Case with Drilled Hole



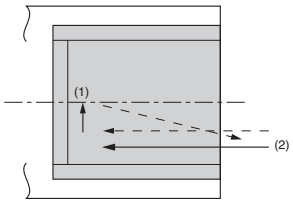
(Note) f shall be under 0.05mm/rev at internal facing.

Finishing

Spherical Machining

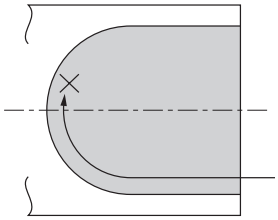


Internal Facing

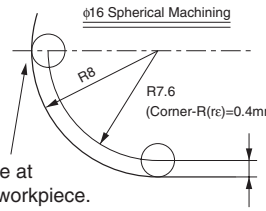


Machining Process
(1) Finish the internal face first.
(2) Next, finish the internal diameter.

3. Caution

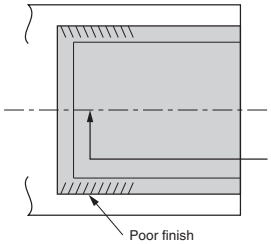


When machining past the center of the workpiece, insert may break.



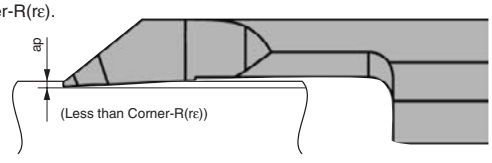
Fix the insert edge at the center of the workpiece.

Adjust the machining program to radius minus the value of Corner-R(rε).



This type of machining is possible, but the chips might scratch the surface.

For internal profiling, ap should be less than the value of Corner-R(rε).



[Burrs may occur, if ap is bigger than Corner-R(rε)]

EZH-CT sleeve

Adjustable with Coolant Hole

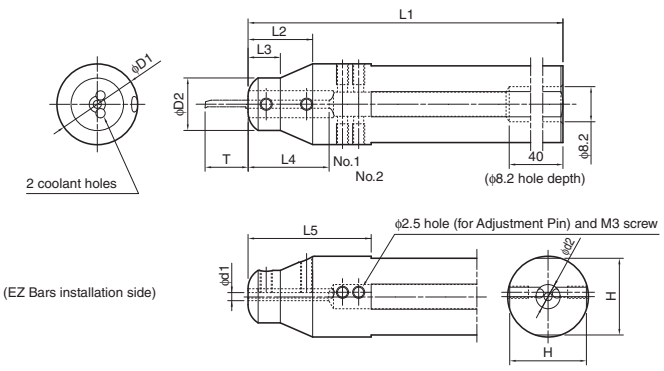


Fig.1

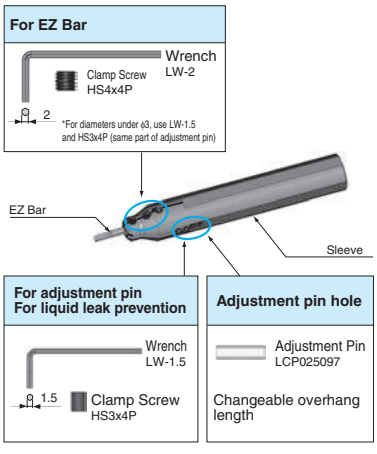
Sleeve Dimensions

Description		Std.	Dimension (mm)										Overhang Length of the Bar*2T(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars F14~F17 J24
			ϕd1	ϕD1	ϕD2	ϕd2	H	L1	L2	L3	*1L4	L5	No.1	No.2	No.3	No.4		
EZH	01719CT-120	●	1.7	19.05	13	6	18	120	16	8	16	30.5	7.5	3.5	-	-	Fig.1	EZBR…017…
	01720CT-120	●		20			19	120										
	01722CT-135	●		22			21	135				41.5						
	01725.0CT-135	●		25			24	135				30.5						
	01725.4CT-120	●		25.4			24.4	120										
EZH	02019CT-120	●	2	19.05	13	6	18	120	16	8	20	30.5	8.5	4.5	-	-	Fig.1	EZBR…020… *3 HPBR/L0202-…
	02020CT-120	●		20			19	120										
	02022CT-135	●		22			21	135				41.5						
	02025.0CT-135	●		25			24	135				30.5						
	02025.4CT-120	●		25.4			24.4	120										
EZH	02519CT-120	●	2.5	19.05	13	6	18	120	16	8	20	30.5	11	7	-	-	Fig.1	EZBR…025… EZTR…025-…
	02520CT-120	●		20			19	120										
	02522CT-135	●		22			21	135				41.5						
	02525.0CT-135	●		25			24	135				30.5						
	02525.4CT-120	●		25.4			24.4	120										

*1. L4 shows ϕd1 length.
*2. Dimension T shows Overhang length of the EZB Bar when attached to sleeve.
*3. Use them without Adjustment Pins. Overhang length of bar is not adjustable.
· Choose sleeves (ϕd1) to meet with ϕD dimension of bar.
· ϕ8.2 hole on the sleeve end is prepared hole for Rc1/8 threading. Please modify by additional processing if necessary. The body hardness is 42HRC.

Spare Parts Description (EZH-CTSleeves)

Description		Spare Parts				
		Adjustment Pin	Clamp Screw (for adjustment pin)	Wrench	Clamp Screw (for bar)	Wrench
EZH	017...CT-..	LCP025097	HS3×4P (for adjustment pin and liquid leak prevention)	LW-1.5 Tightening Torque 1N·m	HS3×4P	LW-1.5 Tightening Torque 1N·m
	020...CT-..					
	025...CT-..					
	030...CT-..					
EZH	035...CT-..	LCP025097	HS3×4P (for adjustment pin and liquid leak prevention)	LW-1.5 Tightening Torque 1N·m	HS4×4P (for bar)	LW-2 Tightening Torque 2N·m
	040...CT-..					
	050...CT-..					
	060...CT-..					
	070...CT-..					



1) If shank dia. is ϕ2.5mm or less, Use clamp screw (HS3x4P)

For adjustment pin	2 pcs
For liquid leak prevention	2 pcs
For EZ Bar	2 pcs

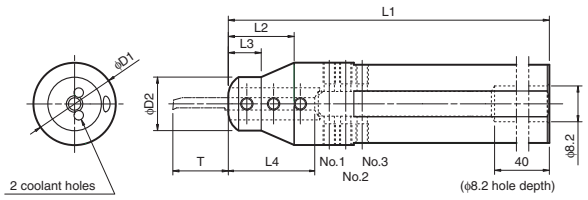
2) If shank dia. is ϕ3mm, Use clamp screw (HS3x4P)

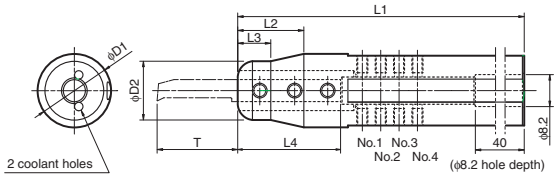
For adjustment pin	2 pcs
For liquid leak prevention	4 pcs
For EZ Bar	3 pcs

● : Std. Item

EZH-CT sleeve

Adjustable with Coolant Hole





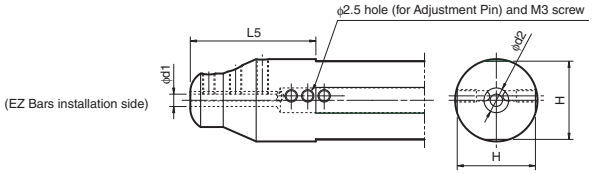
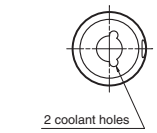


Fig.2



EZH07..CT coolant hole shape is as shown on the figure above.

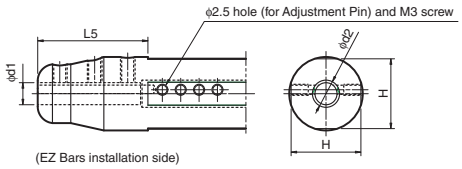


Fig.3

Sleeve Dimensions

Description		Std.	Dimension (mm)										Overhang Length of the Bar*2T(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars / EZ Bar PLUS ➡ F14~F17 F19,F20 ➡ G43,G68 ➡ J24
			ϕd1	ϕD1	ϕD2	ϕd2	H	L1	L2	L3	*1L4	L5	No.1	No.2	No.3	No.4		
EZH	03019CT-120	●	3	19.05	13	6	18	120	16	8	21	30.5	13.5	9.5	5.5	-	Fig.2	EZBR…030… EZVBR035030-… EZGR…030-… EZTR…030-… *3HPB用0303-…
	03020CT-120	●		20			19	120										
	03022CT-135	●		22			21	135				41.5						
	03025.0CT-135	●		25			24	135				30.5						
	03025.4CT-120	●		25.4			24.4	120										
EZH	03519CT-120	●	3.5	19.05	13	6	18	120	16	8	21	31.1	15.5	11.5	7.5	-	Fig.2	EZBR…035… EZTR…035-…
	03520CT-120	●		20			19	120										
	03522CT-135	●		22			21	135				41.5						
	03525.0CT-135	●		25			24	135				31.1						
	03525.4CT-120	●		25.4			24.4	120										
EZH	04019CT-120	●	4	19.05	13	6	18	120	16	8	22	32.7	20.5	16.5	12.5	8.5	Fig.3	EZBR…040… EZVBR045040-… EZGR…040-… EZFGR…040-… EZTR…040-… *3HP…04-…
	04020CT-120	●		20			19	120										
	04022CT-135	●		22			21	135				41.5						
	04025.0CT-135	●		25			24	135				32.7						
	04025.4CT-120	●		25.4			24.4	120										
EZH	05019CT-120	●	5	19.05	16	6	18	120	18	9	26	30.0	25.5	20.5	15.5	10.5	Fig.3	EZBR…050… EZVBR055050-… EZGR…050-… EZFGR…050-… EZTR…050-… *3HP…05-…
	05020CT-120	●		20			19	120										
	05022CT-135	●		22			21	135				44.0						
	05025.0CT-135	●		25			24	135				30.0						
	05025.4CT-120	●		25.4			24.4	120										
EZH	06019CT-120	●	6	19.05	16	7.4	18	120	18	9	28	30.0	30.5 (18.5)	25.5 (13.5)	20.5 (–)	15.5 (–)	Fig.3	EZBR…060… EZVBR065060-… EZGR…060-… EZTR…060-… _060X-…-070EZ *3HP…0606-…
	06020CT-120	●		20			19	120										
	06022CT-135	●		22			21	135				41.5						
	06025.0CT-135	●		25			24	135				30.0						
	06025.4CT-120	●		25.4			24.4	120										
EZH	07019CT-120	●	7	19.05	16	7.4	18	120	18	9	29	30.0	35.5	30.5	25.5	20.5	Fig.3	EZBR…070… EZGR…070-… EZFGR…070-… EZTR…070-… *3HP…07-…
	07020CT-120	●		20			19	120										
	07022CT-135	●		22			21	135				44.0						
	07025.0CT-135	●		25			24	135				30.0						
	07025.4CT-120	●		25.4			24.4	120										

*1. L4 shows ϕd1 length.
*2. Dimension T shows Overhang length of the EZB Bar when attached to sleeve. ( ) value indicates the overhang length when installed the steel boring bar (EZ Bar PLUS).
*3. Use them without Adjustment Pins. Overhang length of bar is not adjustable.
· Choose sleeves (ϕd1) to meet with ϕD dimension of bar.
· ϕ8.2 hole on the sleeve end is prepared hole for Rc1/8 threading. Please modify by additional processing if necessary. The body hardness is 42HRC.

For how to fix EZ Bars (EZH-CT sleeve), please refer to F13.

● : Std. Item

EZH-HP sleeve

Adjustable

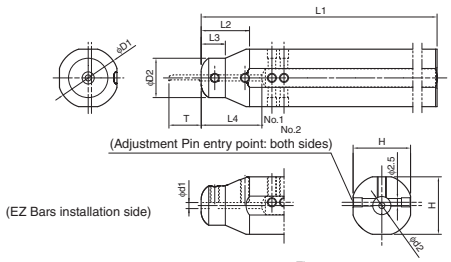


Fig.1

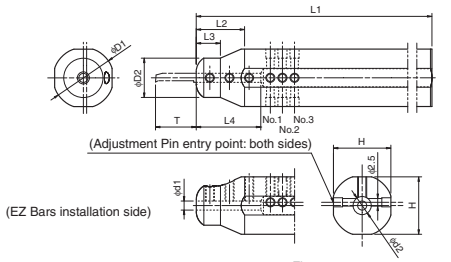


Fig.2

Description		Std.	Dimension (mm)								Overhang Length of the Bar*2T(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars F14~F17,F20 G43,G68 J24
			ϕd1	ϕD1	ϕD2	ϕd2	H	L1	L2	L3	*1L4	No.1	No.2	No.3	No.4	
EZH	01716HP-100	●	1.7	16	13	6	15	100	16	8	16	7.5	3.5	-	-	Fig.1	EZBR…017…
	01719HP-120	●		19.05			18	120								
	01720HP-120	●		20			19	120								
	01722HP-135	●		22			21	135								
	01725.0HP-135	●		25			24	135								
	01725.4HP-120	●		25.4			24.4	120								
EZH	02016HP-100	●	2	16	13	6	15	100	16	8	20	8.5	4.5	-	-	Fig.1	EZBR…020… *3 HPBR/L0202-…
	02019HP-120	●		19.05			18	120								
	02020HP-120	●		20			19	120								
	02022HP-135	●		22			21	135								
	02025.0HP-135	●		25			24	135								
	02025.4HP-120	●		25.4			24.4	120								
EZH	02516HP-100	●	2.5	16	13	6	15	100	16	8	20	11	7	-	-	Fig.1	EZBR…0 25… EZTR…025-…
	02519HP-120	●		19.05			18	120								
	02520HP-120	●		20			19	120								
	02522HP-135	●		22			21	135								
	02525.0HP-135	●		25			24	135								
	02525.4HP-120	●		25.4			24.4	120								
EZH	03016HP-100	●	3	16	13	6	15	100	16	8	21	13.5	9.5	5.5	-	Fig.2	EZBR…030… EZVBR035030-… EZGR…030-… EZTR…030-… *3 HPBR/L0303-…
	03019HP-120	●		19.05			18	120								
	03020HP-120	●		20			19	120								
	03022HP-135	●		22			21	135								
	03025.0HP-135	●		25			24	135								
	03025.4HP-120	●		25.4			24.4	120								
EZH	03516HP-100	●	3.5	16	13	6	15	100	16	8	22	15.5	11.5	7.5	-	Fig.2	EZBR…035… EZTR…035-…
	03519HP-120	●		19.05			18	120								
	03520HP-120	●		20			19	120								
	03522HP-135	●		22			21	135								
	03525.0HP-135	●		25			24	135								
	03525.4HP-120	●		25.4			24.4	120								
EZH	04016HP-100	●	4	16	13	6	15	100	16	8	24	20.5	16.5	12.5	8.5	Fig.4	EZBR…040… EZVBR045040-… EZGR…040-… EZFGR…040-… EZTR…040-… *3 HP…04-…
	04019HP-120	●		19.05			18	120								
	04020HP-120	●		20			19	120								
	04022HP-135	●		22			21	135								
	04025.0HP-135	●		25			24	135								
	04025.4HP-120	●		25.4			24.4	120								

*1. L4 shows ϕd1 length.
*2. Dimension T shows Overhang length of the EZB Bar when attached to sleeve.
*3. Use them without Adjustment Pins. Overhang length of bar is not adjustable.
· Choose sleeves (ϕd1) to meet with ϕD dimension of bar.

Spare Parts Description (for EZH-HP Sleeves)

Description		Spare Parts: Adjustment Pin	Clamp Screw (for adjustment pin)	Wrench	Clamp Screw (for bar)	Wrench	Applicable EZ Bars EZ Bar PLUS	
EZH	017…HP-..	LCP025140	HS3×4P (for both Adjustment Pin and Bar)	LW-1.5 Tightening Torque 1N·m	HS3×4P	LW-1.5 Tightening Torque 1N·m	EZBR…017…	
	020…HP-..						EZBR…020…	
	025…HP-..						EZBR…025…	EZ_R…025-…
	030…HP-..						EZBR…030…	EZ_R…030-…
EZH	035…HP-..	LCP025140	HS3×4P	LW-1.5 Tightening Torque 1N·m	HS4×4P	LW-2 Tightening Torque 2N·m	EZBR…035…	EZ_R…035-…
	040…HP-..						EZBR…040…	EZ_R…040-…
	045…HP-..						_045X-…-050EZ	
	050…HP-..						EZBR…050…	EZ_R…050-…
	060…HP-..						EZBR…060… _060X-…-070EZ	EZ_R…060-…
	070…HP-..						EZBR…070…	EZ_R…070-…

● : Std. Item

EZH-HP sleeve

Adjustable

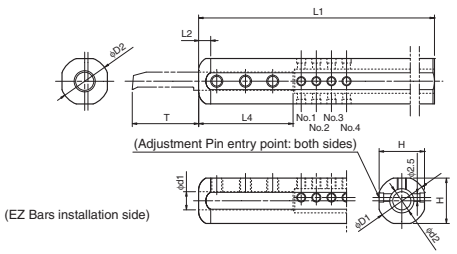


Fig.3

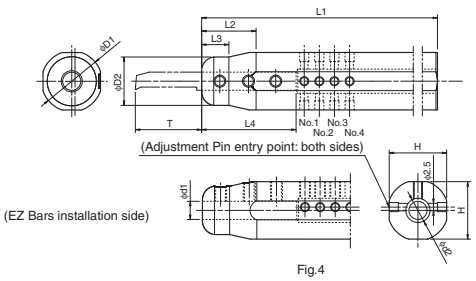


Fig.4

Description		Std.	Dimension (mm)									Overhang Length of the Bar*2T(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars EZ Bar PLUS ➡ F14~F17 F19,F20 ➡ G43,G68 ➡ J24
			φd1	φD1	φD2	φd2	H	L1	L2	L3	*1L4	No.1	No.2	No.3	No.4		
EZH	04516HP-100	●	4.5	16	16	6	15	100	18	9	25.3	23 (14)	18.5 (9.5)	14 (-)	9.5 (-)	Fig.3	_045X-...050EZ
	04519HP-120	●		19.05			18	120								Fig.4	
	04520HP-120	●		20			19	120									
	04522HP-135	●		22			21	135									
	04525.0HP-135	●		25			24	135									
	04525.4HP-120	●		25.4			24.4	120									
EZH	05016HP-100	●	5	16	16	6	15	100	18	9	29	25.5	20.5	15.5	10.5	Fig.3	EZBR…050… EZVBR055050-… EZGR…050-… EZFGR…050-… EZTR…050-… *3HP…05-…
	05019HP-120	●		19.05			18	120								Fig.4	
	05020HP-120	●		20			19	120									
	05022HP-135	●		22			21	135									
	05025.0HP-135	●		25			24	135									
	05025.4HP-120	●		25.4			24.4	120									
EZH	06016HP-100	●	6	16	16	8	15	100	18	9	31	30.5 (18.5)	25.5 (13.5)	20.5 (-)	15.5 (-)	Fig.3	EZBR…060… EZVBR065060-… EZGR…060-… EZTR…060-… _060X-…-070EZ *3HP…0606-…
	06019HP-120	●		19.05			18	120								Fig.4	
	06020HP-120	●		20			19	120									
	06022HP-135	●		22			21	135									
	06025.0HP-135	●		25			24	135									
	06025.4HP-120	●		25.4			24.4	120									
EZH	07016HP-100	●	7	16	16	8	15	100	18	9	33	35.5	30.5	25.5	20.5	Fig.3	EZBR…070… EZGR…070-… EZFGR…070-… EZTR…070-… *3HP…07-…
	07019HP-120	●		19.05			18	120								Fig.4	
	07020HP-120	●		20			19	120									
	07022HP-135	●		22			21	135									
	07025.0HP-135	●		25			24	135									
	07025.4HP-120	●		25.4			24.4	120									

*1. L4 shows φd1 length.
*2. Dimension T shows Overhang length of the EZB Bar when attached to sleeve. ( ) value indicates the overhang length when installed the steel boring bar (EZ Bar PLUS).
*3. Use them without Adjustment Pins. Overhang length of bar is not adjustable.
· Choose sleeves (φd1) to meet with φD dimension of bar.

Sleeve Identification System

EZ	H	017	16	HP	-	100
Symbol of EZ Bars	Applications	Shank Dia. of EZ Bars	Sleeve Shank Dia.	Symbol of Precision		Overall length of sleeve
	H: Sleeve	017: 1.7mm, 025: 2.5mm…	16: 16mm, 25.4: 25.4mm…	CT: High precision, with coolant hole		100: 100mm, 120: 120mm…
				HP: High Precision	ST: Standard	

How to fix EZ Bars

■ How to use adjustment pin (Fig.5)
(1) Put the adjustment pin into the hole.
(2) Push it into the sleeve, using the wrench (LW-1.5).
(3) Tightening the clamp screw (HS3X4P) with wrench (LW-1.5) to fix the adjustment pin.

■ How to fix bar (Fig.6)
(1) With the chip pocket upward, set the bar into the sleeve. Press the slant of the end of the bar with the adjustment pin. Make sure that the bar does not move (Fig.7)
(2) Tighten the clamp screw with wrench (LW-2) and fix the bar. (Use LW-1.5 if shank dia.is 3mm or less)

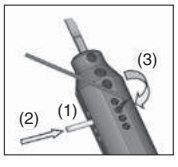


Fig.5
How to use adjustment pin

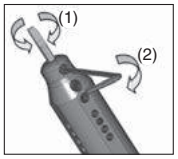


Fig.6
How to fix bar

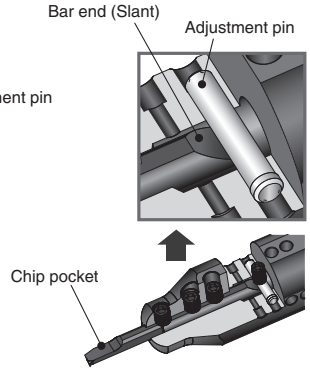
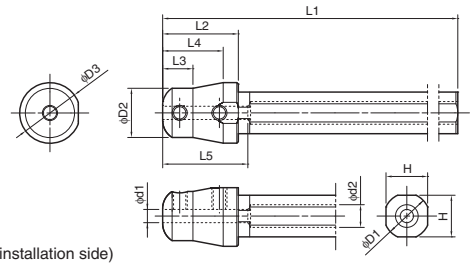


Fig.7: Fixed bar

● : Std. Item

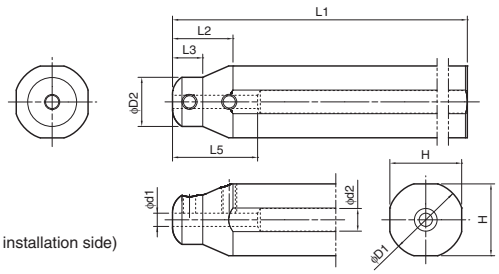
EZH-ST sleeve

Not-adjustable



(EZ Bars installation side)

Fig.1



(EZ Bars installation side)

Fig.2

Description		Std.	Dimension (mm)											Drawing	Applicable Bars F14~F17,F20,F36 G43,G46,G68,G71 J24,J28
			ϕd1	ϕD1	ϕD2	ϕD3	ϕd2	H	L1	L2	L3	L4	*L5		
EZH	01712ST-80	●	1.7	12	13	16	6	11	80	20	8	16	16	Fig.1	EZBR…017…
	01716ST-100	●		16		-		15	100	16		-		Fig.2	
	01719ST-120	●		19.05				18	120						
	01720ST-120	●		20				19	120						
	01722ST-135	●		22				21	135						
	01725.0ST-135	●		25				24	135						
	01725.4ST-120	●		25.4				24.4	120						
EZH	02012ST-80	●	2	12	13	16	6	11	80	20	8	16	20	Fig.1	EZBR…020… HPB$^{R}_{L}$0202-…
	02016ST-100	●		16		-		15	100	16		-		Fig.2	
	02019ST-120	●		19.05				18	120						
	02020ST-120	●		20				19	120						
	02022ST-135	●		22				21	135						
	02025.0ST-135	●		25				24	135						
	02025.4ST-120	●		25.4				24.4	120						
EZH	02512ST-80	●	2.5	12	13	16	6	11	80	20	8	16	20	Fig.1	EZBR…025… EZTR…025-…
	02516ST-100	●		16		-		15	100	16		-		Fig.2	
	02519ST-120	●		19.05				18	120						
	02520ST-120	●		20				19	120						
	02522ST-135	●		22				21	135						
	02525.0ST-135	●		25				24	135						
	02525.4ST-120	●		25.4				24.4	120						
EZH	03012ST-80	●	3	12	13	16	6	11	80	20	8	16	21	Fig.1	EZBR…030… EZVBR035030-… EZGR…030-… EZTR…030-… HPB$^{R}_{L}$0303-…
	03016ST-100	●		16		-		15	100	16		-		Fig.2	
	03019ST-120	●		19.05				18	120						
	03020ST-120	●		20				19	120						
	03022ST-135	●		22				21	135						
	03025.0ST-135	●		25				24	135						
	03025.4ST-120	●		25.4				24.4	120						
EZH	03512ST-80	●	3.5	12	13	16	6	11	80	20	8	16	22	Fig.1	EZBR…035… EZTR…035-…
	03516ST-100	●		16		-		15	100	16		-		Fig.2	
	03519ST-120	●		19.05				18	120						
	03520ST-120	●		20				19	120						
	03522ST-135	●		22				21	135						
	03525.0ST-135	●		25				24	135						
	03525.4ST-120	●		25.4				24.4	120						
EZH	04012ST-80	●	4	12	13	16	6	11	80	20	8	16	24	Fig.1	EZBR…040… EZVBR045040-… EZGR…040-… EZFGR…040-… EZTR…040-… HP…04-…
	04016ST-100	●		16		-		15	100	16		-		Fig.2	
	04019ST-120	●		19.05				18	120						
	04020ST-120	●		20				19	120						
	04022ST-135	●		22				21	135						
	04025.0ST-135	●		25				24	135						
	04025.4ST-120	●		25.4				24.4	120						

*L5 shows ϕd1 length
· Choose sleeves (ϕd1) to meet with ϕD dimension of bar.
· Adjustment Pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT / HP sleeves.

● : Std. Item

EZH-ST sleeve

Not-adjustable

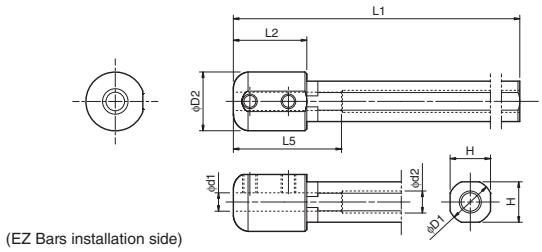


Fig.3

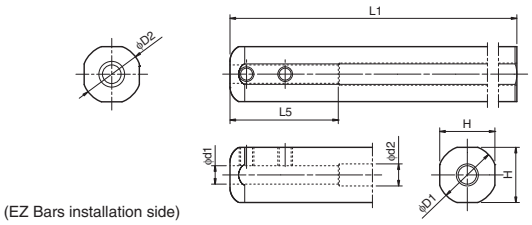


Fig.4

Description		Std.	Dimension (mm)											Drawing	Applicable Bars F14-F17,F19,F20,F36 G43,G46,G68,G71 J24,J28
			ϕd1	ϕD1	ϕD2	ϕD3	ϕd2	H	L1	L2	L3	L4	*L5		
EZH	05012ST-80	●	5	12	16	-	6	11	80	20	-	-	29	Fig.3	EZBR…050… EZVBR055050-… EZGR…050-… EZFGR…050-… EZTR…050-… HP…05-…
	05016ST-100	●		16				15	100	-				Fig.4	
	05019ST-120	●		19.05				18	120	18	9			Fig.2	
	05020ST-120	●		20				19	120						
	05022ST-135	●		22				21	135						
	05025.0ST-135	●		25				24	135						
	05025.4ST-120	●		25.4				24.4	120						
EZH	06012ST-80	●	6	12	16	-	8	11	80	20	-	-	31	Fig.3	EZBR…060… EZVBR065060-… EZGR…060-… EZTR…060-… _060X-…-070EZ HP…0606-…
	06016ST-100	●		16				15	100	-				Fig.4	
	06019ST-120	●		19.05				18	120	18	9			Fig.2	
	06020ST-120	●		20				19	120						
	06022ST-135	●		22				21	135						
	06025.0ST-135	●		25				24	135						
	06025.4ST-120	●		25.4				24.4	120						
EZH	07012ST-80	●	7	12	16	-	8	11	80	20	-	-	33	Fig.3	EZBR…070… EZGR…070-… EZFGR…070-… EZTR…070-… HP…07-…
	07016ST-100	●		16				15	100	-				Fig.4	
	07019ST-120	●		19.05				18	120	18	9			Fig.2	
	07020ST-120	●		20				19	120						
	07022ST-135	●		22				21	135						
	07025.0ST-135	●		25				24	135						
	07025.4ST-120	●		25.4				24.4	120						

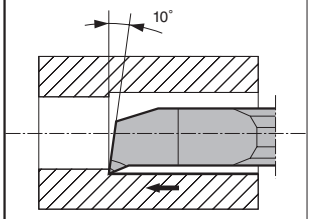
*L5 shows ϕd1 length
· Choose sleeves (ϕd1) to meet with ϕD dimension of bar.
· Adjustment Pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT / HP sleeves.

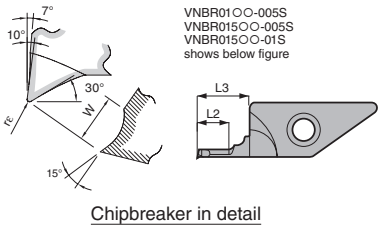
Spare Parts Description (for EZH-ST Sleeves)

Description		Spare Parts		Applicable EZ Bars		EZ Bar PLUS	2-Edge Tip-Bars
		Clamp Screw	Wrench	EZB-HP EZB-HP-LT EZB-ST EZB-NB	EZG EZFG EZT EZVB	S-SCLC C-SCLC	HP
EZH	017...ST-..	HS3×4P	LW-1.5 Tightening Torque 1N·m	EZBR…017…	-	-	-
	020...ST-..			EZBR…020…			HPB$^{R}_{L}$0202-…
	025...ST-..			EZBR…025…	EZTR…025-…	-	-
	030...ST-..			EZBR…030…	EZ_R…030-…	-	HPB$^{R}_{L}$0303-…
EZH	035...ST-..	HS4×4P	LW-2 Tightening Torque 2N·m	EZBR…035…	EZTR…035-…	-	-
	040...ST-..			EZBR…040…	EZ_R…040-…	-	HP…04-…
	050...ST-..			EZBR…050…	EZ_R…050-…	-	HP…05-…
	060...ST-..			EZBR…060…	EZ_R…060-…	_060X-…-070EZ	HP…0606-…
	070...ST-..			EZBR…070…	EZ_R…070-…	-	HP…07-…

● : Std. Item

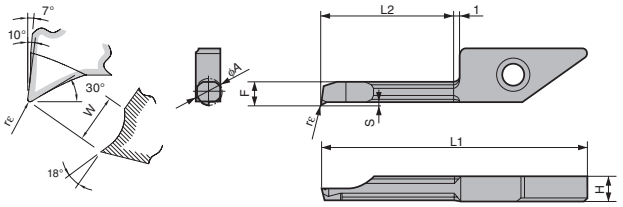
VNB-S (Boring) [Corner-R(rε) :Minus tolerance]





VNBR01○○-005S
VNBR015○○-005S
VNBR015○○-01S
shows below figure

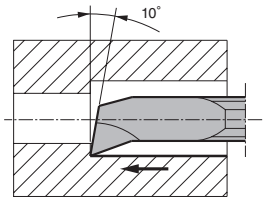
Chipbreaker in detail

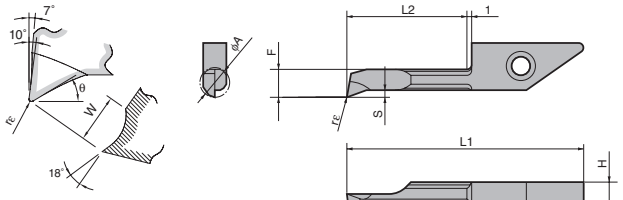


Chipbreaker in detail

・Right-hand shown

VNB (Boring)





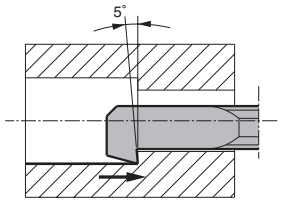
Chipbreaker in detail

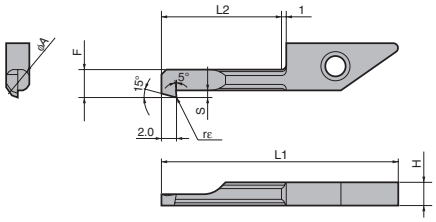
・Right-hand shown

–NB Type (without Chipbreaker) Top Shape

Top Shape	Grades
	Coated Carbide Carbide
	PCD

VNBT (Back Boring)





・Right-hand shown

Insert Dimensions (VNB-S)

Description		Min. Bore Dia.	Dimension (mm)								Grades				
											MEGA COAT	PVD Coated Carbide	Carbide	PCD	
		ϕA	H	L1	L2	L3	F	S	rε	W	PR1225	PR930	KW10	KPD001	KPD010
VNBR	0103-005S	1.0	3.9	26.5	3	7	0.85	0.2	+0 -0.02 0.05	0.7	●	●			
	0105-005S				5						●	●			
	01503-005S	1.5			3		1.3				●	●			
	01505-005S				5						●	●			
	0206-005S	2.0			6	-	1.8	0.25		0.8	●	●			
	025075-005S	2.5		28.1	7.5		2.1	0.4			●	●			
	0311-005S	3.0		30.8	11		2.6	0.4			●	●			
	03515-005S	3.5		34.8	15		3.0	0.5			●	●			
	0411-005S	4.0		30.8	11		3.5	0.5			●	●			
	0420-005S			39.8	20						●	●			
VNBR	01503-01S	1.5	3.9	26.5	3	7	1.3	0.2	+0 -0.03 0.1	0.7	●	●			
	01505-01S				5						●	●			
	0206-01S	2.0			6	-	1.8	0.25		0.8	●	●			
	025075-01S	2.5		28.1	7.5		2.1	0.4			●	●			
	0311-01S	3.0		30.8	11		2.6	0.4			●	●			
	03515-01S	3.5		34.8	15		3.0	0.5			●	●			
	0411-01S	4.0		30.8	11		3.5	0.5			●	●			
	0420-01S			39.8	20						●	●			
VNBR	0411-02S	4.0	3.9	30.8	11	-	3.5	0.5	+0 -0.04 0.2	0.8	●	●			
	0420-02S			39.8	20						●	●			

Recommended Cutting Conditions F92

● : Std. Item

System Tip-Bars are sold in 5 piece boxes

● **Insert Dimensions (VNB / VNB-NB / VNBT)**

Description		Min. Bore Dia.	Dimension (mm)								Grades				
											MEGA COAT	PVD Coated Carbide	Carbide	PCD	
		ϕA	H	L1	L2	F	S	rε	W	θ	PR1225	PR930	KW10	KPD001	KPD010
VNBR	0206-003	2	3.9	26.5	6	1.8	0.25	0.03	1.2	24°	●	●	●		
	0311-003	3		30.8	11	2.6	0.4		1.8		●	●	●		
	0411-003	4				3.5	0.5		2.7	23°	●	●	●		
	0420-003			39.8	20						●	●	●		
	0511-003	5		30.8	11	4.5	0.7		3.0		●	●	●		
	0520-003			39.8	20						●	●	●		
	0620-003	6				5.3	1.0			24°	●	●	●		
	0630-003			49.8	30						●	●	●		
	0720-003	7		39.8	20	6.2	1.0					●	●		
	0730-003			49.8	30							●	●		
VNBR	0206-01	2	3.9	26.5	6	1.8	0.25	0.1	1.2	24°	●	●	●		
	0311-01	3		30.8	11	2.6	0.4		1.8		●	●	●		
	0411-01	4				3.5	0.5		2.7	23°	●	●	●		
	0420-01			39.8	20						●	●	●		
	0511-01	5		30.8	11	4.5	0.7		3.0		●	●	●		
	0520-01			39.8	20						●	●	●		
	0620-01	6				5.3	1.0			24°	●	●	●		
	0630-01			49.8	30						●	●			
	0720-01	7		39.8	20	6.2	1.0					●	●		
	0730-01			49.8	30							●			
VNBR	0206-02	2	3.9	26.5	6	1.8	0.25	0.2	1.2	24°	●	●	●		
	0311-02	3		30.8	11	2.6	0.4		1.8		●	●	●		
	0411-02	4				3.5	0.5		2.7	23°	●	●	●		
	0420-02			39.8	20						●	●	●		
	0511-02	5		30.8	11	4.5	0.7		3.0		●	●	●		
	0520-02			39.8	20						●	●	●		
	0620-02	6				5.3	1.0			24°	●	●	●		
	0630-02			49.8	30						●	●	●		
	0720-02	7		39.8	20	6.2	1.0				●	●	●		
	0730-02			49.8	30						●	●	●		
VNBR	0206-003NB	2	3.9	26.5	6	1.8	0.25	0.03	-	15°		●	●		
	0311-003NB	3		30.8	11	2.6	0.4					●	●		
	0411-003NB	4				3.5	0.5					●	●		
	0420-003NB			39.8	20							●	●		
	0511-003NB	5		30.8	11	4.5	0.7					●	●		
	0520-003NB			39.8	20							●	●		
	0620-003NB	6				5.3	1.0					●	●		
	0630-003NB			49.8	30							●	●		
	0720-003NB	7		39.8	20	6.2	1.0					●	●		
	0730-003NB			49.8	30							●	●		
VNBR	0206-02NB	2	3.9	26.5	6	1.8	0.25	0.2	-	15°			●		
	0311-02NB	3		30.8	11	2.6	0.4						●		
	0411-02NB	4				3.5	0.5						●	●	●
	0420-02NB			39.8	20								●	●	●
	0511-02NB	5		30.8	11	4.5	0.7						●	●	●
	0520-02NB			39.8	20								●	●	●
	0620-02NB	6				5.3	1.0						●	●	●
	0630-02NB			49.8	30								●	●	●
	0720-02NB	7		39.8	20	6.2	1.0						●	●	●
	0730-02NB			49.8	30								●	●	●
VNBTR	0411-003	4	3.9	30.8	11	3.6	1.0	0.03	-	-		●	●		
	0420-003			39.8	20							●			
	0511-003	5		30.8	11	4.6	1.3					●	●		
	0520-003			39.8	20							●			
VNBTR	0411-01	4	3.9	30.8	11	3.6	1.0	0.1	-	-	●	●	●		
	0420-01			39.8	20						●	●			
	0511-01	5		30.8	11	4.6	1.3				●	●	●		
	0520-01			39.8	20						●	●			

Recommended Cutting Conditions F92

● : Std. Item

System Tip-Bars are sold in 5 piece boxes

SVN-N (without side stopper)

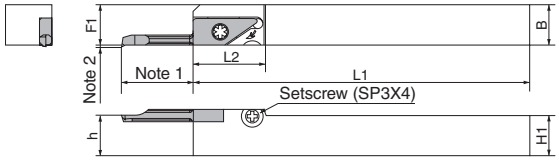


Fig.1 (SVN-N)

・Right-hand shown

SVNS-N (without side stopper / without setscrew)

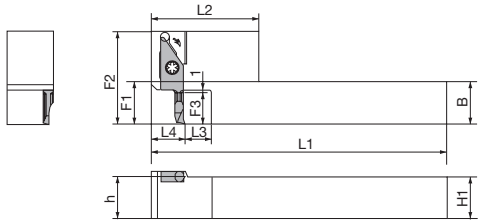
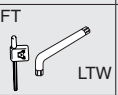


Fig.2 (SVNS-N)

Right-hand Insert for Right-hand Toolholder.

Note 1 & Note 2: For insert dimensions, ref. to page **F28~F29**

Toolholder Dimensions

Description		Std.	Dimension (mm)									Drawing	Spare Parts			Applicable Inserts
			H1=h	B	L1	L2	L3	L4	F1	F2	F3		Clamp Screw	Wrench	Setscrew	➔F28~F29 ➔G45 ➔G70 ➔J30
																
SVNR	**1010H-12N**	●	10	10	100	22	-	-	10	-	-	Fig.1	SB-3080TR	FT-10	SP3X4	**VNBR....-...**
	1212K-12N	●	12	12					12							**VNBTR....-...**
	1616K-12N	●	16	16	125				16							**VNGR....-..**
	2020K-12N	●	20	20					20							**VNFGR....-..**
	2525M-12N	●	25	25	150				25							**VNTR...-..**
SVNSR	**1010K-12-06N**	●	10	10	125	45	10	12	10	29	6	Fig.2	SB-3080TR	LTW-10S	-	**(VNBR..06-...)***
	1010K-12-11N	●	10	10	125		10	12	10	33	11					**(VNBR..11-...)* (VNBTR..11-...)* (VNGR....-11)* (VNTR...-11)***
	1212M-12-06N	●	12	12	150		10	12	12	29	6					**(VNBR..06-...)***
	1212M-12-11N	●	12	12	150		10	12	12	33	11					**(VNBR..11-...)* (VNBTR..11-...)* (VNGR....-11)* (VNTR...-11)***
	1212M-12-20N	●	12	12	150		10	13	12	42	20					**(VNBR..20-...)* (VNBTR..20-...)* (VNGR....-20)***
	1616M-12-06N	●	16	16	150		16	12	16	29	6					**(VNBR..06-...)***
	1616M-12-11N	●	16	16	150		16	12	16	33	11					**(VNBR..11-...)* (VNBTR..11-...)* (VNGR....-11)* (VNTR...-11)***
	1616M-12-20N	●	16	16	150		16	13	16	42	20					**(VNBR..20-...)* (VNBTR..20-...)* (VNGR....-20)***

1. SVN-N / S···SVN-N / S···SVN-SN (without side stopper) retains high index accuracy by easy restraint.
2. SVN-N (without side stopper) has a setscrew SP3X4. Changing the setscrew SP3X4 to a screw HS3X4 (sold separately) enables the toolholder to be used as a binding effect toolholder similar to the side stopper toolholder.

* All system Tip-Bars Inserts are used with a SVNSR-N Toolholders. However, when setting the cutting edge at the face level of the toolholder as shown in Fig. 2, use the insert shown in ( ).
In these cases, the F3 dimension of the toolholders corresponds to the L2 dimension of the insert.

Spare Parts (Optional)

Screw side stopper	Wrench
HS3×4	LW-1.5

● : Std. Item

S…SVN-N Round Shank (Straight, without side stopper)

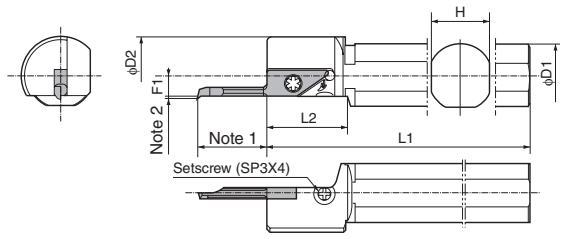


Fig.1 (S…SVN-N)

S···SVN-SN Round Shank (Straight, without side stopper)

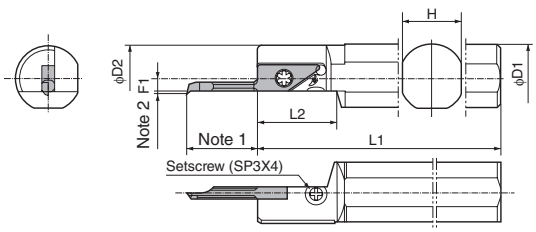


Fig.2 (S…SVN-SN)

・Right-hand shown

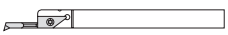
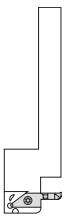
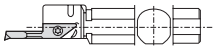
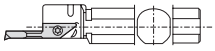
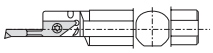
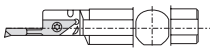
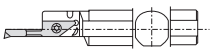
Right-hand Insert for Right-hand Toolholder.

Note 1 & Note 2: For insert dimensions, ref. to page **F28**-**F29**

Toolholder Dimensions

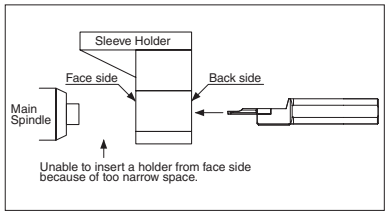
Description	Std.	Dimension (mm) φD1	φD2	H	L1	L2	F1		Drawing	Spare Parts: Clamp Screw	Wrench	Screw side stopper	Setscrew	Wrench	Applicable Inserts
S12F-SVNR12N	●	12	20	11	80	23	4		Fig.1	SB-3080TR	FT-10	-	SP3X4	-	→F28~F29 →G45 →G70 →J30
S14G-SVNR12N	●	14	20	13	90										
S16H-SVNR12N	●	16	24	15	100		6								
S19H-SVNR12N	●	19.05	24	17	100	24									
S19N-SVNR12N	●				160										
S20H-SVNR12N	●	20	24	18	100										
S25H-SVNR12N	●	25.4	30	23	100										
S25Q-SVNR12N	●				180										
S19H-SVNR12SN	●	19.05	18.5	17	100	23	4		Fig.2	SB-3080TR	FT-10	-	SP3X4	-	
S20H-SVNR12SN	●	20	19.5	18											
S22K-SVNR12SN	●	22	21.5	20	125										
S25.0G-SVNR12SN	●	25	24.5	23	90										

Selection of System Tip-Bars

Gang-Type (Horizontal)	Gang-Type	Gang-Type (Front Loading Sleeve Type)	Gang-Type (Back Loading Sleeve Type)
Square Shank (Straight) 	Square Shank (L-shape) 	Square Shank	Square Shank
Round Shank (Standard) 		Round Shank (Standard) 	Round Shank (Standard)
Round Shank (Straight) 		Round Shank (Straight) 	Round Shank (Straight) 

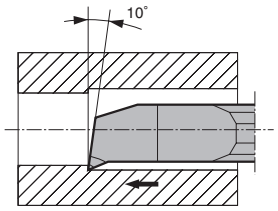
Q: There are standard types (head dia. is larger than shank) and straight types for round shanks.
What is each one used for?

A: The straight type is used when it cannot be inserted from the face side of the sleeve holder and can be inserted only from the back side due to space limitation (Refer to Fig. below).
On the other hand, the standard type should be installed when it can be inserted from the face side, and the head end is used for positioning as stopper.

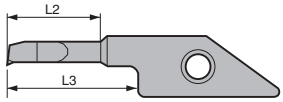


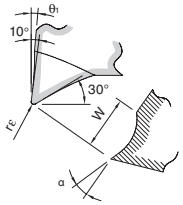
● : Std. Item

VNBX-S (Boring) [Corner-R(rε) : Minus tolerance]

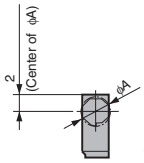


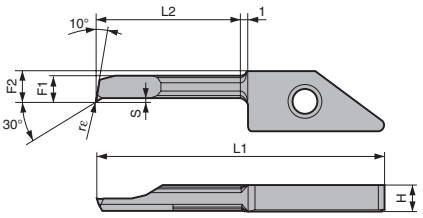
VNBXR0103type
VNBXR0105type
VNBXR01503type
VNBXR01505type
VNBXR03516type
shows below figure





Chipbreaker in detail





・Right-hand shown

Insert Dimensions (VNBX-S)

Description		Min. Bore Dia.	Dimension (mm)											Grades		
														PVD Coated Carbide		
		φA	H	L1	L2	L3	F1	F2	S	rε	W	θ1	α	PR930		
VNBXR	0103-005S	1.0	3.9	26.5	3	7	0.85	2.95	0.2	+0 -0.02 0.05	0.7	7°	15°	●		
	0105-005S				5									●		
	01503-005S	1.5			3		1.3							●		
	01505-005S				5									●		
	0206-005S	2.0			6	-	1.8	3	0.25		0.8	8°	18°	●		
	0311-005S	3.0		30.8	11		2.6	3.5	0.4					●		
	03511-005S	3.5					3.1	3.75	0.45					●		
	03516-005S			39.8	16	21								●		
	0411-005S	4.0		30.8	11	-	3.5	4	0.5					●		
	0420-005S			39.8	20									●		
VNBXR	01503-01S	1.5	3.9	26.5	3	7	1.3	2.95	0.2	+0 -0.03 0.1	0.7	7°	15°	●		
	01505-01S				5									●		
	0206-01S	2.0			6	-	1.8	3	0.25		0.8	8°	18°	●		
	0311-01S	3.0		30.8	11		2.6	3.5	0.4					●		
	03511-01S	3.5					3.1	3.75	0.45					●		
	03516-01S			39.8	16	21								●		
	0411-01S	4.0		30.8	11	-	3.5	4	0.5					●		
	0420-01S			39.8	20									●		
VNBXR	0411-02S	4.0	3.9	30.8	11	-	3.5	4	0.5	+0 -0.04 0.2	0.8	8°	18°	●		
	0420-02S			39.8	20									●		

Recommended Cutting Conditions F92

Attachment toolholder for VNBX-S System Tip-Bars

1. There are three different types of attachment toolholder for the VNBX-S System Tip-Bars (Ref. to Page **F33**).
   (1) SVNS-XN Type (without Side Stopper)
   (2) S···SVN-XN Type (without Side Stopper)
   (3) S···SVN-SXN Type (without Side Stopper)
2. Above toolholders assure high index accuracy by easy restraint.
3. Setscrews (SP3x4) are attached. Toolholders without Side Stopper can be used as a binding effect toolholder when removing the clamp screws and inserting screws (HS3x4: sold separately) with a wrench (LW-1.5: sold separately).

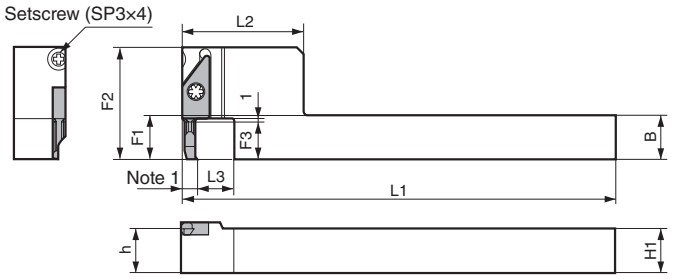
Spare Parts (Optional)

Screw (Side Stopper)	Wrench
HS3×4	LW-1.5

System Tip-Bars are sold in 5 piece boxes

● : Std. Item

SVNS-XN (Square Shank: L-shape)



・Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Note 1: The dimension of Note 1 is same size as the applicable insert (VNBX) F2 dimension.

Toolholder Dimensions (L-shape square shank applicable to gang tool post)

Description		Std.	Dimension (mm)									Spare Parts			*Applicable Inserts ➡ F32
			H1=h	B	L1	L2	L3	F1	F2	F3		Clamp Screw	Wrench	Setscrew	
SVNSR	1010K-12-06XN	●	10	10	125	45	10	10	29	6		SB-3080TR	LTW-10S	SP3X4	(VNBXR02..)
	1010K-12-11XN	●							33	11					(VNBXR..11..)
	1212M-12-06XN	●	12	12	150		10	12	29	6					(VNBXR02..)
	1212M-12-11XN	●							33	11					(VNBXR..11..)
	1212M-12-20XN	●							42	20					(VNBXR0420..)
	1616M-12-06XN	●	16	16			16	16	29	6					(VNBXR02..)
	1616M-12-11XN	●							33	11					(VNBXR..11..)
	1616M-12-20XN	●							42	20					(VNBXR0420..)

* All VNBXR Inserts can be attached to a SVNS-XN Toolholder. However, when setting the cutting edge at the face level of the toolholder as shown in Fig., use the insert shown in ( ).

S…SVN-XN (Round Shank: Standard type)

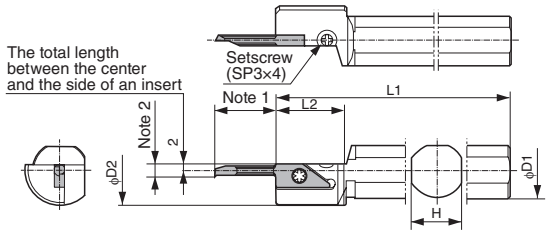


Fig.1 (S…SVN-XN)

S…SVN-SXN (Round Shank: Straight type)

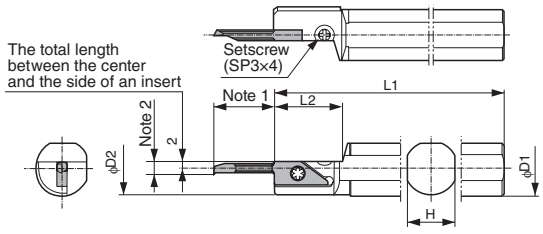


Fig.2 (S…SVN-SXN)

・Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Note 1: The dimension of Note 1 shows the applicable insert (VNBX) L2 dimension +1 mm.
Note 2: The dimension of Note 1 is same size as the applicable insert (VNBX) F2 dimension.

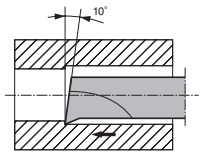
Toolholder Dimensions (Holder center axis core and insert center are coaxial type)

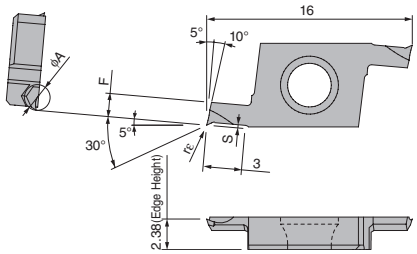
Description		Std.	Dimension (mm)								Drawing	Spare Parts			Applicable Inserts ➡ F32
			ϕD1	ϕD2	H	L1	L2					Clamp Screw	Wrench	Setscrew	
S12F	-SVNR12XN	●	12	20	11	80	23				Fig.1	SB-3080TR	FT-10	SP3X4	VNBXR...
S14G	-SVNR12XN	●	14		13	90									
S16H	-SVNR12XN	●	16	24	15	100	24								
S19H	-SVNR12XN	●	19.05		17										
S19N	-SVNR12XN	●				160									
S20H	-SVNR12XN	●	20		18	100									
S25H	-SVNR12XN	●	25.4	30	23										
S25Q	-SVNR12XN	●				180									
S19H	-SVNR12SXN	●	19.05	18.5	17	100	23				Fig.2	SB-3080TR	FT-10	SP3X4	VNBXR...
S20H	-SVNR12SXN	●	20	19.5	18										
S22K	-SVNR12SXN	●	22	21.5	20	125									
S25.0G	-SVNR12SXN	●	25	24.5	23	90									

*Reminder of applicable insert.

● : Std. Item

TWB (Micro Boring: Horizontal type) [Corner-R(rε) Tolerance: +0/–0.02mm, +0/–0.03mm]





·Right-hand shown

Description		Min. Bore Dia.	Dimension (mm)			Grades	
						PVD Coated Carbide	
		φA	F	S	rε	PR1025	
TWBR	01003-005	1.0	0.85	0.2	+0 -0.02 0.05	●	
	01503-005	1.5	1.30			●	
	02003-005	2.0	1.75	0.25		●	
	02503-005	2.5	2.10	0.3		●	
	03003-005	3.0	2.40	0.4		●	
TWBR	01503-010	1.5	1.30	0.2	+0 -0.03 0.1	●	
	02003-010	2.0	1.75	0.25		●	
	02503-010	2.5	2.10	0.3		●	
	03003-010	3.0	2.40	0.4		●	

STW (Square Shank for Horizontal type insert)

(For Left-hand toolholders for grooving, please ref. to page **G72**.)

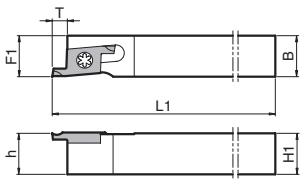


Fig.1

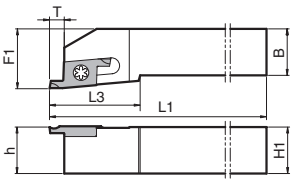


Fig.2

·Right-hand shown

Right-hand Insert for Right-hand Toolholder, (Left-hand Insert for Left-hand Toolholder.)

Toolholder Dimensions

Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	L3	F1	F2	T		Clamp Screw	Wrench	
														➔ F34
STWR	1212F-15	●	12	12	85	-	-	12	-	3	Fig.1	SB-3080TR	LTW-10S	TWBR○○○○○-○○○
	1212K-15	●	12	12				12						
	1616K-15	●	16	16	125			16						
	2020K-15	●	20	20			25	25			Fig.2			
	2525M-15	●	25	25	150			32						

S..-STW (Round Shank for Horizontal type insert)

(For Left-hand toolholders for grooving, please ref. to page **G72**.)

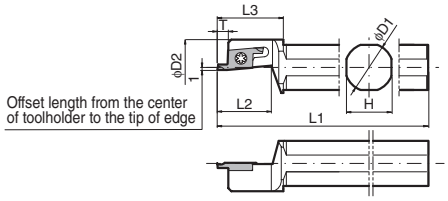


Fig.1

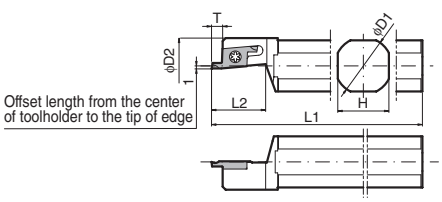


Fig.2

·Right-hand shown

Right-hand Insert for Right-hand Toolholder, (Left-hand Insert for Left-hand Toolholder.)

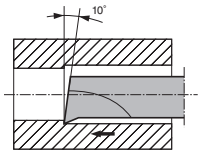
Toolholder Dimensions

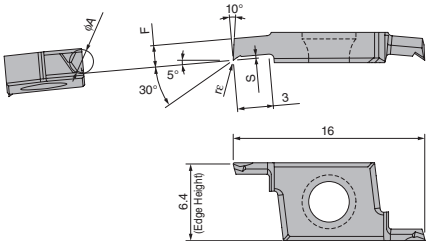
Description		Std.	Dimension (mm)							Drawing	Spare Parts		Applicable Inserts
			φD1	φD2	H	L1	L2	L3	T		Clamp Screw	Wrench	
													➔ F34
S12F-	STWR15	●	12	20	11	80	18	22	3	Fig.1	SB-3080TR	LTW-10S	TWBR○○○○○-○○○
S14H-	STWR15	●	14		13	100							
S15F-	STWR15	●	15.875		15	85							
S16F-	STWR15	●	16										
S19G-	STWR15	●	19.05	18.5	17	90		-	3	Fig.2			
S19K-	STWR15	●				120							
S20G-	STWR15	●	20	19.5	18	90							
S20K-	STWR15	●				120							
S22K-	STWR15	●	22	21.5	20	125	22						
S25.0J-	STWR15	●	25	24.5	23	110							
S25K-	STWR15	●	25.4	25	23	120							

● : Std. Item

Twin-Bars are sold in 5 piece boxes

TWBT (Micro Boring: Vertical type) [Corner-R(rε) Tolerance: +0/–0.02mm, +0/–0.03mm]

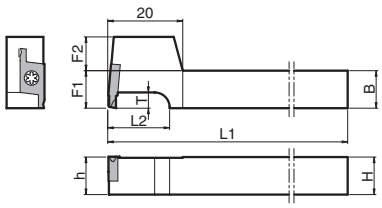




·Right-hand shown

Description		Min. Bore Dia.	Dimension (mm)			Grades	
						PVD Coated Carbide	
		ϕA	F	S	rε	PR1025	
TWBTR	01003-005	1.0	0.85	0.2	+0 -0.02 0.05	●	
	01503-005	1.5	1.30			●	
	02003-005	2.0	1.75	0.25		●	
	02503-005	2.5	2.10	0.3		●	
	03003-005	3.0	2.30	0.4		●	
TWBTR	01503-010	1.5	1.30	0.2	+0 -0.03 0.1	●	
	02003-010	2.0	1.75	0.25		●	
	02503-010	2.5	2.10	0.3		●	
	03003-010	3.0	2.30	0.4		●	

STWS (Square shank for Vertical type insert: L-shape type)



·Right-hand shown

Toolholder Dimensions

Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	L3	F1	F2	T		Clamp Screw	Wrench	F35 G73
STWSR	1010JX-15T	●	10	10	120	16	-	10	9	3	-	SB-3080TR	LTW-10S	TWBTR○○○○○-○○○ TWFGTR○○○
	1212JX-15T	●	12	12				12	7					
	1616JX-15T	●	16	16		20		16	3					
STWSR	1010F-15T	●	10	10	85	16	-	10	9					
	1212F-15T	●	12	12				12	7					

Recommended Cutting Conditions (TWB / TWBT)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)	TWBR01003 type TWBR01503 type TWBTR01003 type TWBTR01503 type		TWBR02003 type TWBR02503 type TWBR03003 type TWBTR02003 type TWBTR02503 type TWBTR03003 type		Remarks
	PVD Coated Carbide	ap(mm), f(mm/rev)				
	PR1025	ap	f	ap	f	
Carbon Steel Alloy Steel	★ 30~100	~0.1	~0.01	~0.2	~0.03	Coolant
Stainless Steel	★ 30~80	~0.1	~0.01	~0.2	~0.02	

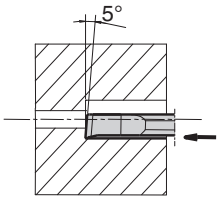
★ :1st Recommendation

● : Std. Item

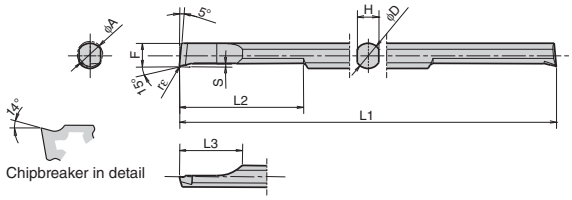
Twin-Bars are sold in 5 piece boxes

2-Edge Tip-Bars HPB / HPBT

HPB (Boring)

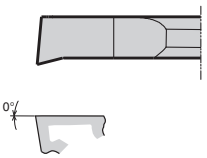


Ref. to Page for Applicable Sleeve ➡ **F26,F27**

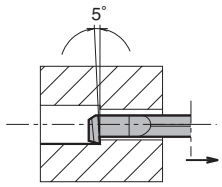


・Right-hand shown

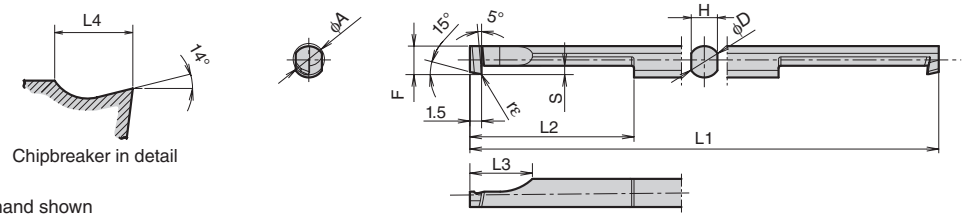
NB Type (without Chipbreaker)
Top Shape



HPBT (Back Boring)



Ref. to Page for Applicable Sleeve ➡ **F26,F27**



Chipbreaker in detail

・Right-hand shown

Tip-Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Grades			
											PVD Coated Carbide		Carbide	
		ϕA	ϕD	H	L1	L2	L3	F	S	rε	PR930		KW10	
											R	L	R	L
HPB R/L	0202-005	2	2	1.7	50	10	5	1.75	0.25	0.05 +0 -0.02	●	●	●	
	0303-005	3	3	2.5		15	7	2.7	0.3		●	●	●	
	0404-005	4	4	3.35	60	20	10	3.65	0.5		●	●	●	
	0505-005	5	5	4.3	70	25	12	4.55			●	●	●	
	0606-005	6	6	5.2				5.5			●	●	●	
	0707-005	7	7	6.2	80			6.45			●	●	●	
HPBR	0202-005NB	2	2	1.7	50	10	5	1.75	0.25	0.05 +0 -0.02	●		●	
	0303-005NB	3	3	2.5		15	7	2.7	0.3		●		●	
	0404-005NB	4	4	3.35	60	20	10	3.65	0.5		●		●	
	0505-005NB	5	5	4.3	70	25	12	4.55			●		●	
	0606-005NB	6	6	5.2				5.5			●		●	
	0707-005NB	7	7	6.2	80			6.45			●		●	
HPBT R/L	0404-005	4	4	3.35	60	21	8	3.65	1.0	0.05 +0 -0.02	●	□	●	
	0505-005	5	5	4.3	70	26		4.55	1.3		●	□	●	

Description Table for Tip-Bars and Applicable Sleeves

Tip-Bars Description		Applicable Sleeves ➡ F26,F27	
HPB R/L	0202-…	EZH	02…
	0303-…		03…
	0404-…		04…
	0505-…		05…
	0606-…		06…
	0707-…		07…
HPBT R/L	0404-…	EZH	04…
	0505-…		05…

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		HPB02 type		HPB03 type		HPB04 type HPBT04 type		HPB05/06/07 type HPBT05 type		Remarks
	PVD Coated Carbide	Carbide	ap(mm), f(mm/rev)								
	PR930	KW10	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	★ 30~100	-	~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	★ 30~80	-	~0.3	~0.02	~0.4	~0.03	~0.45	~0.05	~0.5	~0.07	
Non-ferrous Metals	-	★ 30~100	~0.3	~0.05	~0.4	~0.06	~0.45	~0.1	~0.5	~0.15	

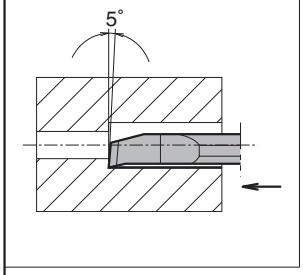
★ : 1st Recommendation

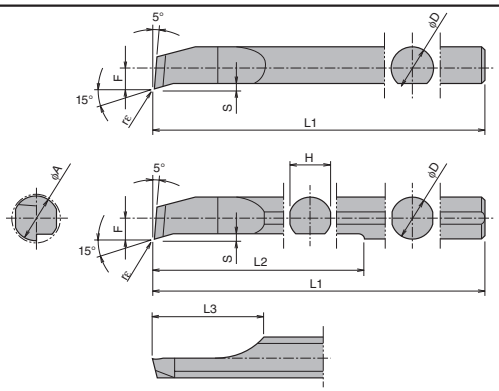
● : Std. Item. □ : Deleted from the next catalogue

Tip-Bars are sold in 1 piece boxes

PSB-S (Boring) <Adjustable Overhang Length>

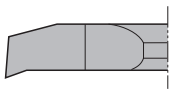
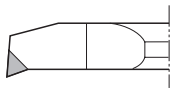
This insert will be switched to **EZB** type (EZ Bars, ref. to page F14~)





Ref. to Page for Applicable Sleeve F84

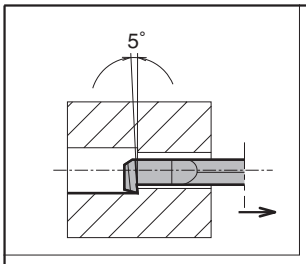
PSB$^{R}_{L}$0202 type
PSB$^{R}_{L}$0303 type
shows left figure

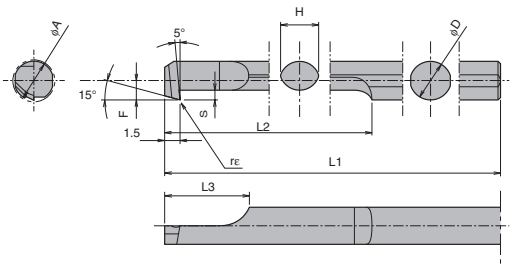
–NBS Type (without Chipbreaker) Top Shape	
Top Shape	Grades
	Coated Carbide Carbide
	CBN PCD

· Right-hand shown

PSBT-S (Back Boring) <Adjustable Overhang Length>

This insert will be switched to **HPBT** type (2-Edge, ref. to page F36)





Ref. to Page for Applicable Sleeve F84

· Right-hand shown

Tip-Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Grades											
											PVD Coated Carbide		Carbide		CBN				PCD			
		φA	φD	H	L1	L2	L3	F	S	rε	PR930		KW10		KBN510		KBN525		KPD001		KPD010	
											R	L	R	L	R	L	R	L	R	L	R	L
PSB$^{R}_{L}$	0202-50S	2	1.8	-	50	-	5	0.9	0.25	0.05	○	○	○	□								
	0303-50S	3	2.8				7	1.4	0.3		○	○	○	○								
	0404-60S	4	3.8	3.6	60	30	10	1.9	0.5		○	○	○	○								
	0505-70S	5	4.8	4.4	70	40	12	2.4			○	○	○	○								
	0606-70S	6	5.8	5.2		45		2.9			○	○	○	○								
	0707-80S	7	6.8	6.2	80	50		3.4			○	○	○	○								
PSB$^{R}_{L}$	0202-50NBS	2	1.8	-	50	-	5	0.9	0.25	0.05	○		○									
	0303-50NBS	3	2.8				7	1.4	0.3		○		○		○		○					
	0404-60NBS	4	3.8	3.6	60	30	10	1.9	0.5		○		○		○		○		○		○	
	0505-70NBS	5	4.8	4.4	70	40	12	2.4			○		○		○		○		○		○	○
	0606-70NBS	6	5.8	5.2		45		2.9			○		○		○		○		○		○	
	0707-80NBS	7	6.8	6.2	80	50		3.4			○		○		○		○		○		○	
PSBT$^{R}_{L}$	0415-60S	4	3.8	3.6	60	20	8	1.9	1.0	0.05	○	□	○									
	0515-70S	5	4.8	4.6	70			2.4	1.3		○	○	○									

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						PSB02 type		PSB03 type		PSB04 PSBT04 type		PSB05 PSB06 PSB07 PSBT05 type		Remarks
	PVD Coated Carbide		Carbide	CBN	PCD		ap(mm), f(mm/rev)								
	PR915	PR930	KW10	KBN510 KBN525	KPD001	KPD010	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel		★ 30~100					~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel		★ 30~80					~0.3	~0.02	~0.4	~0.03	~0.45	~0.05	~0.5	~0.07	
Non-ferrous Metals			☆ ~100		★ ~300	☆ ~300	~.3	~0.05	~0.4	~0.06	~0.45	~0.1	~0.5	~0.15	
Hard Materials				★ ~100			-	-	~0.07	~0.03	~0.10	~0.05	~0.15	~0.07	

★ : 1st Recommendation ☆ : 2nd Recommendation

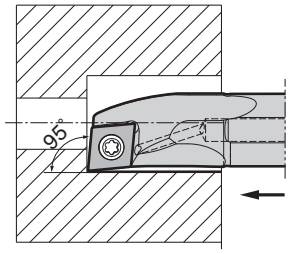
○ : Check Availability
□ : Deleted from the next catalogue

Tip-Bars are sold in 1 piece boxes

Dynamic Bar [CC□□ Insert]

A / S-SCLC-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



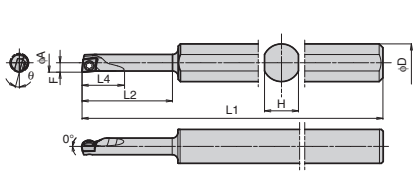


Fig.1

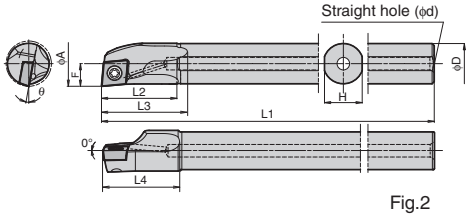


Fig.2

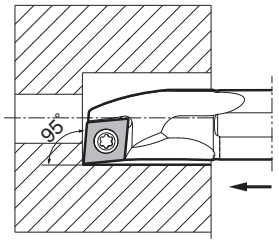
Shank Dia. φD	Straight hole Dia.φd
φ8	φ2.5
φ10	φ3
φ12	φ4
φ16	φ5
φ20	
φ25	

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SCLC-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



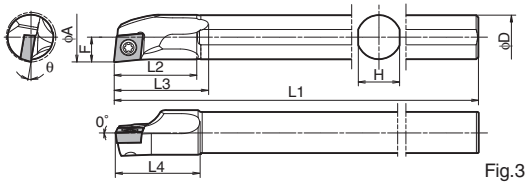


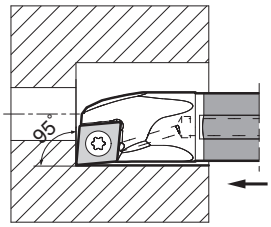
Fig.3

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C / E-SCLC-A(N) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



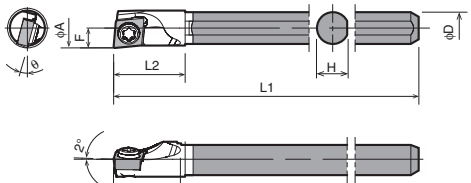


Fig.4

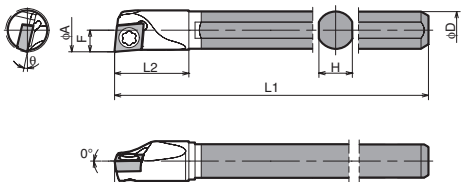


Fig.5

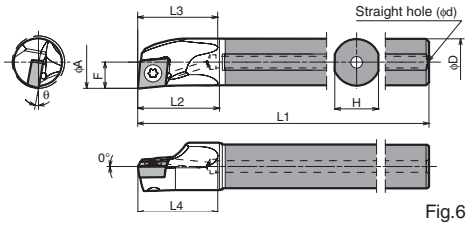


Fig.6

Shank Dia. φD	Straight hole Dia.φd
φ8	φ3
φ10	
φ12	φ4
φ16	
φ20	φ6
φ25	

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

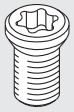
Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Medium	Finishing-Medium	Finishing	Finishing / Precision
Ref. to Page	**B49**	**B49**	**B50**	**B50**	**B50**	**B50**	**B50,B51**	**B49,B50**	**B52**	**B51**
Insert / Toolholder Description	**CF**	**GF**	**WP(Wiper)**	**PP**	**GK**	**HQ**	**Standard**	**GQ**	**R/L-F**	**R/L-FSF**
----SCLCR/L03----	CCGT0301..	-	-	-	-	-	-	-	CCGT0301..	CCET0301..
----SCLCR/L04----	CCGT0401..	-	-	-	-	-	-	-	CCGT0401..	CCET0401..
----SCLCR/L06----	-	CCGT0602..	CCMT0602..	CCMT0602..	CCMT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	-
----SCLCR/L09----	-	CCGT09T3..	CCMT09T3..	CCMT09T3..	CCMT09T3..	CCMT09T3..	CCGT09T3.. CCMT09T3..	CCGT09T3..	-	-

Applications	Low Feed	Low Feed / Precision	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials		
Ref. to Page	**B53,B54**	**B53**	**B51**	**B55**	**B55**	**B55**	**C24**	**C14**		
Insert / Toolholder Description	**(E/F)R/L-U**	**FR/L-USF**	**MQ**	Without chipbreaker	**AH**	**A3**	**PCD**	**CBN**		
----SCLCR/L03----	-	-	-	-	-	-	-	CCMW0301..		
----SCLCR/L04----	-	-	-	-	-	-	CCGW0401..	CCMW0401..		
----SCLCR/L06----	CCGT0602..	CCET0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..		
----SCLCR/L09----	CCGT09T3..	CCET09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..		

Recommended Cutting Conditions ➔ F93~F94
Applicable Sleeves ➔ F83~F86

● Toolholder Dimensions

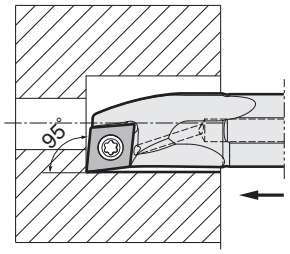
	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L3	L4	F	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
																	
Excellent Bar	**S10H-SCLCR/L03-05AE**	●	●	5	10	9	100	24	-	11	2.5	15°	0.2	No	Fig.1	SB-1635TR	FT-6
	S10H-SCLCR/L03-06AE	●	●	6				28		13	3	13°					
	S10H-SCLCR/L04-07AE	●	●	7				32		15	3.5					SB-2035TR	
	S10H-SCLCR/L04-08AE	●	●	8				37			4	11°					
	A08X-SCLCR/L06-10AE	●	●	10	8	7	120	16	20	17	5	14°	0.4	Yes	Fig.2	SB-2545TR	FT-8
	A10L-SCLCR/L06-12AE	●	●	12	10	9	140	20	25	21	6	12°					
	A12M-SCLCR/L06-14AE	●	●	14	12	11	150	24	30	25	7	10°					
	A16Q-SCLCR/L09-18AE	●	●	18	16	15	180	30	34	31	9					SB-4065TR	FT-15
	A20R-SCLCR/L09-22AE	●	●	22	20	19	200	36	49	37	11	8°					
	A25S-SCLCR/L09-27AE	●	●	27	25	24	250	46	55	46	13.5	6°					
Steel	**S08X-SCLCR/L06-10A**	●	●	10	8	7	120	16	20	17	5	14°	0.4	No	Fig.3	SB-2545TR	FT-8
	S10L-SCLCR/L06-12A	●	●	12	10	9	140	20	25	21	6	12°					
	S12M-SCLCR/L06-14A	●	●	14	12	11	150	24	30	25	7	10°					
	S16Q-SCLCR/L09-18A	●	●	18	16	15	180	30	34	31	9					SB-4065TR	FT-15
	S20R-SCLCR/L09-22A	●	●	22	20	19	200	36	49	37	11	8°					
	S25S-SCLCR/L09-27A	●	●	27	25	24	250	46	55	46	13.5	6°					
Carbide	**C04G-SCLCR/L03-05AN**	●	●	5	4	3.8	90	7	-	7	2.5	15°	0.2	No	Fig.4	SB-1635TR	FT-6
	C05H-SCLCR/L03-06AN	●	●	6	5	4.4	100	9		10	3	13°			Fig.5		
	C06J-SCLCR/L04-07AN	●	●	7	6	5.4	110	10		11	3.5					SB-2035TR	
	C07K-SCLCR/L04-08AN	●	●	8	7	6.4	125	11		12	4	11°					
	C04G-SCLCR/L03-05A	□	□	5	4	3.8	90	9	-	8	2.5	15°	0.2	No	Fig.4	SB-1635TR	FT-6
	C05H-SCLCR/L03-06A	□	□	6	5	4.4	100	11		11	3	13°			Fig.5		
	C06J-SCLCR/L04-07A	□	□	7	6	5.4	110	12		12	3.5					SB-2035TR	
	C07K-SCLCR/L04-08A	□	□	8	7	6.4	125	13		13	4	11°					
	E08L-SCLCR/L06-10AN	●	●	10	8	7	140	14	15	15	5	14°	0.4	Yes	Fig.6	SB-2545TR	FT-8
	E08L-SCLCR06-10AN2/3	●					90										
	E10N-SCLCR/L06-12AN	●	●	12	10	9	160	18	19	19	6	12°					
	E10N-SCLCR06-12AN2/3	●					105										
	E08L-SCLCR/L06-10A	□	□	10	8	7	140	16	15	15	5	14°	0.4	Yes	Fig.6		
	E08L-SCLCR06-10A-2/3	□					90										
	E10N-SCLCR/L06-12A	□	□	12	10	9	160	20	19	19	6	12°					
	E10N-SCLCR06-12A-2/3	□					105										
	E12Q-SCLCR/L06-14A	●	●	14	12	11	180	23	22	22	7	10°					
	E12Q-SCLCR 06-14A-2/3	●					120										
	E16X-SCLCR/L 09-18A	●	●	18	16	15	220	28	27	27	9					SB-4065TR	FT-15
	E16X-SCLCR 09-18A-2/3	●					145										
	E20S-SCLCR/L 09-22A	●	●	22	20	19	250	32	31	31	11	8°					
	E20S-SCLCR 09-22A-2/3	●					165										
	E25T-SCLCR/L 09-27A	●	●	27	25	24	300	38	37	37	13.5	6°					
	E25T-SCLCR 09-27A-2/3	●					200										

● :Std. Item
□ :Deleted from the next catalogue

Dynamic Bar [CP□□ Insert]

A-SCLP-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



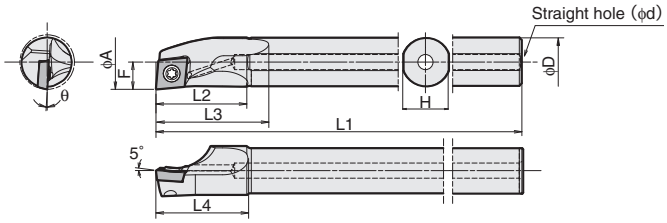


Fig.1

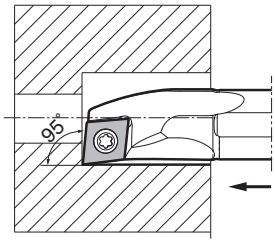
Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	ϕ5
ϕ20	
ϕ25	

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SCLP-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



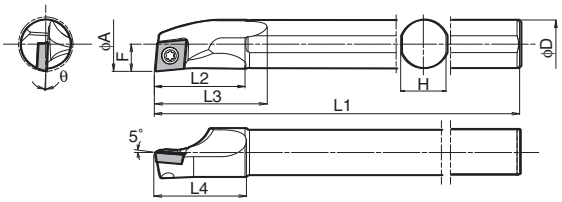


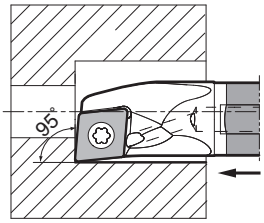
Fig.2

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SCLP-A(N) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



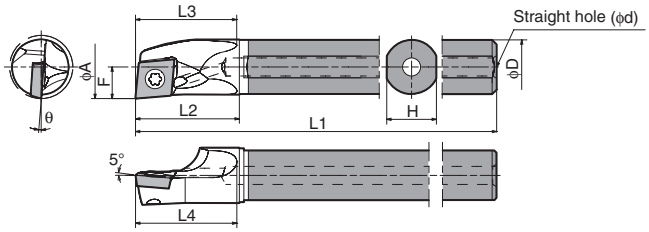


Fig.3

Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	
ϕ20	ϕ6
ϕ25	

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L3	L4	F	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	**A10L-SCLP$^{R}_{L}$08-12AE**	●	●	12	10	9	140	20	25	20	6	5°	0.4	Yes	Fig.1	SB-3060TR	FT-10
	A12M-SCLP$^{R}_{L}$08-14AE	●	●	14	12	11	150	24	29	24	7	4°					
	A12M-SCLP$^{R}_{L}$09-16AE	●	●	16					31		8					SB-4065TR	FT-15
	A16Q-SCLP$^{R}_{L}$09-18AE	●	●	18	16	15	180	30	37	30	9	3.5°					
	A20R-SCLP$^{R}_{L}$09-22AE	●	●	22	20	19	200	36	47	37	11	2°					
	A25S-SCLP$^{R}_{L}$09-27AE	●	●	27	25	24	250	46	55	46	13.5	0°					
Steel	**S10L-SCLP$^{R}_{L}$08-12A**	●	●	12	10	9	140	20	25	20	6	5°	0.4	No	Fig.2	SB-3060TR	FT-10
	S12M-SCLP$^{R}_{L}$08-14A	●	●	14	12	11	150	24	29	24	7	4°					
	S12M-SCLP$^{R}_{L}$09-16A	●	●	16					31		8					SB-4065TR	FT-15
	S16Q-SCLP$^{R}_{L}$09-18A	●	●	18	16	15	180	30	37	30	9	3.5°					
	S20R-SCLP$^{R}_{L}$09-22A	●	●	22	20	19	200	36	47	37	11	2°					
	S25S-SCLP$^{R}_{L}$09-27A	●	●	27	25	24	250	46	55	46	13.5	0°					
Carbide	**E10N-SCLP$^{R}_{L}$08-12AN**	●	●	12	10	9	160	18	19	19	6	5°	0.4	Yes	Fig.3	SB-3060TR	FT-10
	E10N-SCLPR08-12AN2/3	●					105										
	E10N-SCLPR08-12AN1/2	●					80										
	E10N-SCLP$^{R}_{L}$08-12A	□	□				160	20									
	E10N-SCLPR08-12A-2/3	□					105										
	E10N-SCLPR08-12A-1/2	□					80										
	E12Q-SCLP$^{R}_{L}$08-14A	●	●	14	12	11	180	23	22	22	7	4°					
	E12Q-SCLPR 08-14A-2/3	●					120										
	E12Q-SCLPR 08-14A-1/2	●					90										
	E12Q-SCLP$^{R}_{L}$09-16A	●	●	16	12	11	180	23	22	22	8	5°				SB-4065TR	FT-15
	E12Q-SCLPR 09-16A-2/3	●					120										
	E12Q-SCLPR 09-16A-1/2	●					90										
	E16X-SCLP$^{R}_{L}$ 09-18A	●	●	18	16	15	220	28	27	27	9	3.5°					
	E16X-SCLPR 09-18A-2/3	●					145										
	E16X-SCLPR 09-18A-1/2	●					110										
	E20S-SCLP$^{R}_{L}$ 09-22A	●	●	22	20	19	250	32	31	31	11	2°					
	E20S-SCLPR 09-22A-2/3	●					165										
	E20S-SCLPR 09-22A-1/2	●					125										
	E25T-SCLP$^{R}_{L}$ 09-27A	●	●	27	25	24	300	38	37	37	13.5	0°					
	E25T-SCLPR 09-27A-2/3	●					200										

Applicable Inserts

Applications	Finishing	Finishing	Finishing-Medium	Medium	Finishing-Medium	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. to Page	**B56**	**B56**	**B56**	**B56**	**B56**	**B56**	**B56**	**B56**	**C25**	**C14**
Insert / Toolholder Description	**PP**	**GP**	**HQ**	**Standard**	$^{R}_{L}$**-Y**	**XP**	**XQ**	**Without chipbreaker**	**PCD**	**CBN**
----SCLP$^{R}_{L}$08----	CPMT0802..	CPMT0802..	CPMH0802..	CPMH0802..	CPMH0802..	CPMT0802..	-	CPMB0802..	CPMH0802..	CPGB0802..
----SCLP$^{R}_{L}$09----	CPMT0903..	CPMT0903..	CPMH0903..	CPMH0903..	CPMH0903..	CPMT0903..	CPMT0903..	CPMB0903..	CPMH0903..	CPGB0903..

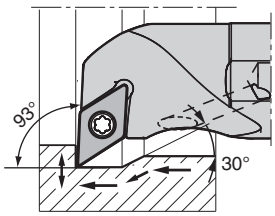
Recommended Cutting Conditions ➔ **F93~F94**
Applicable Sleeves ➔ **F84~F86**

● :Std. Item
□ :Deleted from the next catalogue

Dynamic Bar [DC□□ Insert]

A-SDUC-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5



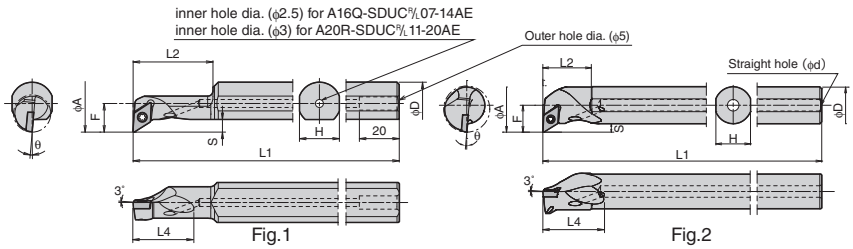


Fig.1 Fig.2

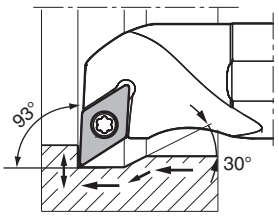
Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	ϕ5
ϕ20	
ϕ25	

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SDUC-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



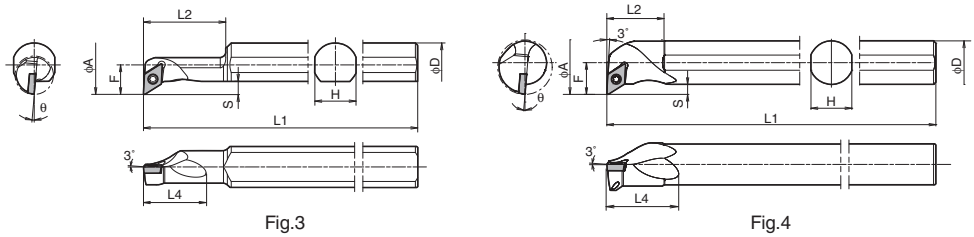


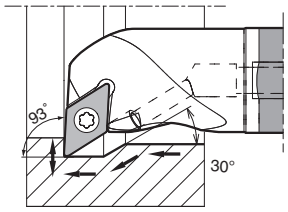
Fig.3 Fig.4

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SDUC-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



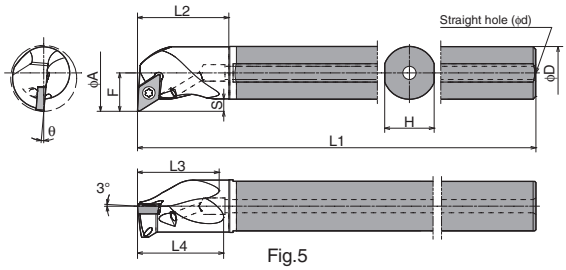


Fig.5

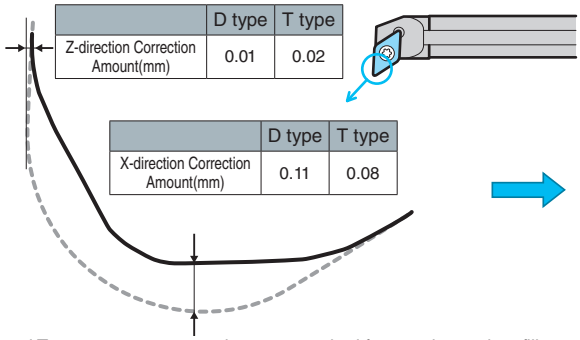
Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	
ϕ20	ϕ6
ϕ25	

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

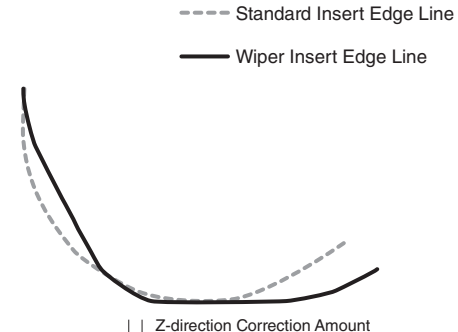
WP Chipbreaker Edge Position Offset Adjustment

For D type and T type, cutting edge offsets are required.

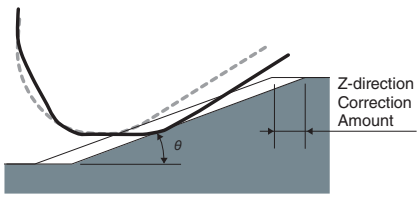


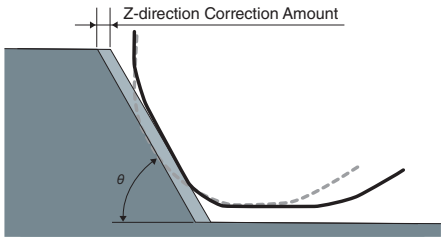
	D type	T type
Z-direction Correction Amount(mm)	0.01	0.02

	D type	T type
X-direction Correction Amount(mm)	0.11	0.08



For D type and T type, program corrections are required for ramping and profiling.





Ramping Angle θ	0°	5°	10°	15°	20°	25°
Z-direction Correction Amount(mm) D type	0	-0.14	-0.15	-0.16	-0.16	-0.17

Profiling Angle θ	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°
Z-direction Correction Amount(mm) D type	0.00	0.07	0.06	0.04	0.03	0.02	0.01	0.00	-	-	-
Z-direction Correction Amount(mm) T type	0.00	0.07	0.06	0.05	0.05	0.04	0.03	0.02	0.01	0.01	0.00

Profiling Angle θ	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
Z-direction Correction Amount(mm) D type	-0.01	-0.02	-0.03	-0.04	-0.05	-0.05	-0.04	-0.03	-0.02	-0.01	0.00
Z-direction Correction Amount(mm) T type	-	-	-	-0.01	-0.02	-0.03	-0.04	-0.03	-0.02	-0.01	0.00

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L3	L4	F	S	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SDUC$^{R}_{L}$07-14AE	●	●	14	10	9	140	19	-	20	8.7	3.3	5°	0.4	Yes	Fig.2	SB-2560TR	FT-8
	A16Q-SDUC$^{R}_{L}$07-14AE	●	●		16	15	180	28		23	10.8	4.4				Fig.1		
	A12M-SDUC$^{R}_{L}$07-16AE	●	●	16	12	11	150	21		24	9.7	3.3				Fig.2		
	A16Q-SDUC$^{R}_{L}$07-20AE	●	●	20	16	15	180			26	11.7							
	A20R-SDUC$^{R}_{L}$11-20AE	●	●		20	19	200	48		30	15.6	6.1				Fig.1	SB-4065TR	FT-15
	A16Q-SDUC$^{R}_{L}$11-23AE	●	●	23	16	15	180	21		31	14.5					Fig.2		
	A20R-SDUC$^{R}_{L}$11-27AE	●	●	27	20	19	200	23		36	16.5							
	A25S-SDUC$^{R}_{L}$11-32AE	●	●	32	25	24	250	24		39	19							
Steel	S10L-SDUC$^{R}_{L}$07-14A	●	●	14	10	9	140	19	-	20	8.7	3.3	5°	0.4	No	Fig.4	SB-2560TR	FT-8
	S16Q-SDUC$^{R}_{L}$07-14A	●	●		16	15	180	28		23	10.8	4.4				Fig.3		
	S12M-SDUC$^{R}_{L}$07-16A	●	●	16	12	11	150	21		24	9.7	3.3				Fig.4		
	S16Q-SDUC$^{R}_{L}$07-20A	●	●	20	16	15	180			26	11.7							
	S20R-SDUC$^{R}_{L}$11-20A	●	●		20	19	200	48		30	15.6	6.1				Fig.3	SB-4065TR	FT-15
	S16Q-SDUC$^{R}_{L}$11-23A	●	●	23	16	15	180	21		31	14.5					Fig.4		
	S20R-SDUC$^{R}_{L}$11-27A	●	●	27	20	19	200	23		36	16.5							
	S25S-SDUC$^{R}_{L}$11-32A	●	●	32	25	24	250	24		39	19							
Carbide	E10N-SDUC$^{R}_{L}$07-14A	●	●	14	10	9	160	20	-	19	8.7	3.3	5°	0.4	Yes	Fig.5	SB-2560TR	FT-8
	E10N-SDUCR 07-14A-2/3	●					105											
	E12Q-SDUC$^{R}_{L}$07-16A	●	●	16	12	11	180	23		22	9.7							
	E12Q-SDUCR 07-16A-2/3	●					120											
	E16X-SDUC$^{R}_{L}$07-20A	●	●	20	16	15	220	28		26	11.7							
	E16X-SDUCR 07-20A-2/3	●					145											
	E16X-SDUC$^{R}_{L}$11-23A	●	●	23			220			27	14.5	6.1					SB-4065TR	FT-15
	E16X-SDUCR 11-23A-2/3	●					145											
	E20S-SDUC$^{R}_{L}$11-27A	●	●	27	20	19	250	32		31	16.5							
	E20S-SDUCR 11-27A-2/3	●					165											
	E25T-SDUC$^{R}_{L}$11-32A	●	●	32	25	24	300	38		37	19							
	E25T-SDUCR 11-32A-2/3	●					200											

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Medium-Roughing	Finishing	Finishing / Precision	Low Feed
Ref. to Page	B57	B57,B58	B58	B58	B58	B59	B59	B61	B60	B62,B63
Insert / Toolholder Description	CF	CK	WP(Wiper)	PP	GK	HQ	Standard	$^{R}_{L}$-F	$^{R}_{L}$-FSF	(E/F)$^{R}_{L}$-U
----SDUC$^{R}_{L}$07----	DCGT0702..	DCGT0702..	DCMX0702..	DCMT0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
----SDQC$^{R}_{L}$07----										
----SDZC$^{R}_{L}$07----										
----SDUC$^{R}_{L}$11----	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3.. DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..
----SDQC$^{R}_{L}$11----										
----SDZC$^{R}_{L}$11----										

Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B62	B64,B65	B59	B59	B60	B65	B65	B65	C25	C15
Insert / Toolholder Description	F$^{R}_{L}$-USF	(E/F)$^{R}_{L}$-J	XP	XQ	MQ	Without chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
----SDUC$^{R}_{L}$07----	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
----SDQC$^{R}_{L}$07----										
----SDZC$^{R}_{L}$07----										
----SDUC$^{R}_{L}$11----	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
----SDQC$^{R}_{L}$11----										
----SDZC$^{R}_{L}$11----										

* For WP chipbreaker, cutting edge offsets or program corrections are required. F42

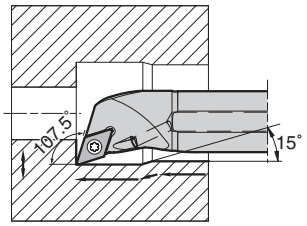
Recommended Cutting Conditions F93~F94
Applicable Sleeves F84~F86

● : Std. Item

Dynamic Bar [DC□□ Insert]

A-SDQC-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



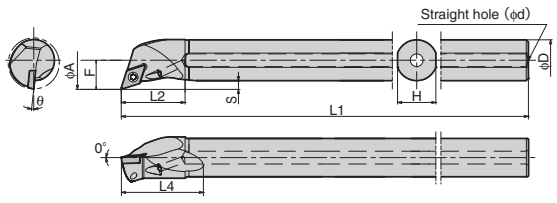


Fig.1

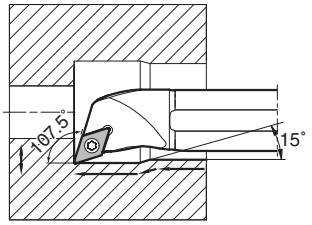
Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	ϕ5
ϕ20	
ϕ25	

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SDQC-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



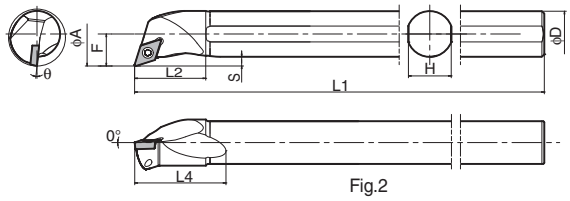


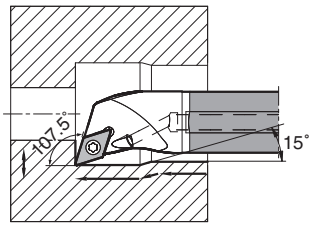
Fig.2

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SDQC-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



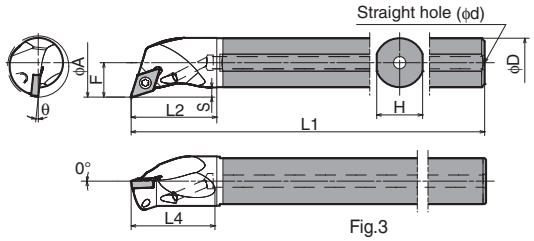


Fig.3

Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	
ϕ20	ϕ6
ϕ25	

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

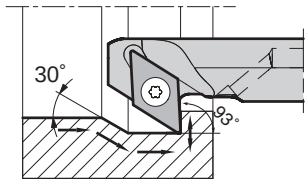
	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L3	L4	F	S	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SDQC$^{R}_{L}$07-13AE	●	●	13	10	9	140	19		21	7.5	2.1	10°	0.4	Yes	Fig.1	SB-2560TR	FT-8
	A12M-SDQC$^{R}_{L}$07-16AE	●	●	16	12	11	150	22		25	9.25	2.6	8°					
	A16Q-SDQC$^{R}_{L}$07-20AE	●	●	20	16	15	180	25	-	32	11.3		6°					
	A20R-SDQC$^{R}_{L}$11-25AE	●	●	25	20	19	200	31		37	14.4	3.7	5°				SB-4065TR	FT-15
	A25S-SDQC$^{R}_{L}$11-30AE	●	●	30	25	24	250	38		45	16.9		4°					
Steel	S10L-SDQC$^{R}_{L}$07-13A	●	●	13	10	9	140	19		21	7.5	2.1	10°	0.4	No	Fig.2	SB-2560TR	FT-8
	S12M-SDQC$^{R}_{L}$07-16A	●	●	16	12	11	150	22		25	9.25	2.6	8°					
	S16Q-SDQC$^{R}_{L}$07-20A	●	●	20	16	15	180	25	-	32	11.3		6°					
	S20R-SDQC$^{R}_{L}$11-25A	●	●	25	20	19	200	31		37	14.4	3.7	5°				SB-4065TR	FT-15
	S25S-SDQC$^{R}_{L}$11-30A	●	●	30	25	24	250	38		45	16.9		4°					
Carbide	E10N-SDQC$^{R}_{L}$07-13A	●	●	13	10	9	160	20	-	19	7.5	2.1	10°	0.4	Yes	Fig.3	SB-2560TR	FT-8
	E10N-SDQCR 07-13A-2/3	●					105											
	E12Q-SDQC$^{R}_{L}$07-16A	●	●	16	12	11	180	23	-	22	9.25	2.6	8°					
	E12Q-SDQCR 07-16A-2/3	●					120											
	E16X-SDQC$^{R}_{L}$07-20A	●	●	20	16	15	220	28	-	27	11.3	2.6	6°					
	E16X-SDQCR 07-20A-2/3	●					145											
	E20S-SDQC$^{R}_{L}$11-25A	●	●	25	20	19	250	32	-	31	14.4	3.7	5°				SB-4065TR	FT-15
	E20S-SDQCR 11-25A-2/3	●					165											
	E25T-SDQC$^{R}_{L}$11-30A	●	●	30	25	24	300	38	-	37	16.9	3.7	4°					
	E25T-SDQCR 11-30A-2/3	●					200											

* WP chipbreaker (DCMX-WP : Wiper insert) is not applicable to A-SDQC-AE type, S-SDQC-A type and E-SDQC-A type Toolholders.

● : Std. Item

A-SDZC-AE Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5.5



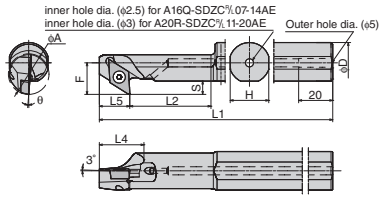


Fig.1

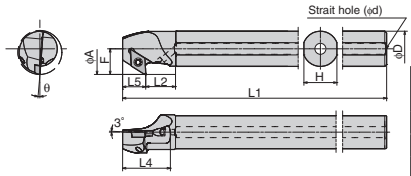


Fig.2

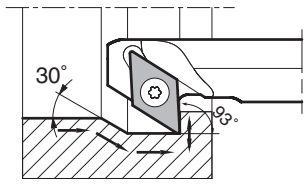
Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	ϕ5
ϕ20	
ϕ25	

・Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

S-SDZC-A Steel Bar (Back Boring)

Max. Overhang Length L/D=~4



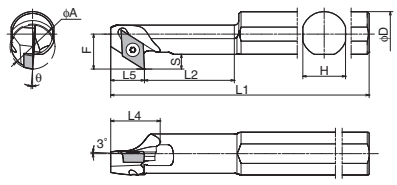


Fig.3

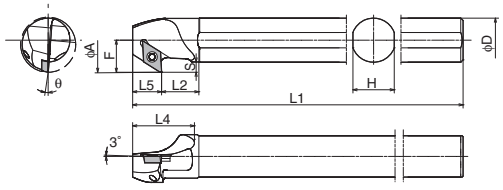


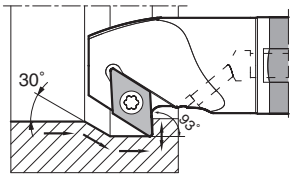
Fig.4

・Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

E-SDZC-A Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7



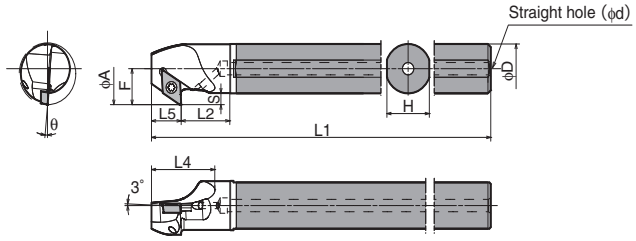


Fig.5

Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	
ϕ20	ϕ6

・Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L4	L5	F	S	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SDZC□07-14AE	●	●	14	10	9	140	14	16	9.5	8.7	3.3	5°	0.4	Yes	Fig.2	SB-2545TR	FT-8
	A16Q-SDZC□07-14AE	●	●		16	15	180	30	17	10	10.8	4.4				Fig.1		
	A12M-SDZC□07-16AE	●	●	16	12	11	150	14	20	10.5	9.7	3.3				Fig.2	SB-2560TR	
	A16Q-SDZC□07-20AE	●	●	20	16	15	180		22		11.7							
	A20R-SDZC□11-20AE	●	●		20	19	200	40	24	15	15.6	6.1				Fig.1	SB-4065TR	FT-15
	A16Q-SDZC□11-23AE	●	●	23	16	15	180	15	22		14.5					Fig.2		
	A20R-SDZC□11-27AE	●	●	27	20	19	200		25		16.5							
	A25S-SDZC□11-32AE	●	●	32	25	24	250		26		19							
Steel	S10L-SDZC□07-14A	●	●	14	10	9	140	14	16	9.5	8.7	3.3	5°	0.4	No	Fig.4	SB-2545TR	FT-8
	S16Q-SDZC□07-14A	●	●		16	15	180	30	17	10	10.8	4.4				Fig.3		
	S12M-SDZC□07-16A	●	●	16	12	11	150	14	20	10.5	9.7	3.3				Fig.4	SB-2560TR	
	S16Q-SDZC□07-20A	●	●	20	16	15	180		22		11.7							
	S20R-SDZC□11-20A	●	●		20	19	200	40	24	15	15.6	6.1				Fig.3	SB-4065TR	FT-15
	S16Q-SDZC□11-23A	●	●	23	16	15	180	15	22		14.5					Fig.4		
	S20R-SDZC□11-27A	●	●	27	20	19	200		25		16.5							
	S25S-SDZC□11-32A	●	●	32	25	24	250		26		19							
Carbide	E10N-SDZCR07-14A	●		14	10	9	160	10.5	16	9.5	8.7	3.3	5°	0.4	Yes	Fig.5	SB-2545TR	FT-8
	E12Q-SDZCR07-16A	●		16	12	11	180	12.5	20	10.5	9.7						SB-2560TR	
	E16X-SDZCR07-20A	●		20	16	15	220	17.5	22		11.7							
	E16X-SDZCR11-23A	●		23				13		15	14.5	6.1					SB-4065TR	FT-15
	E20S-SDZCR11-27A	●		27	20	19	250	17	25		16.5							

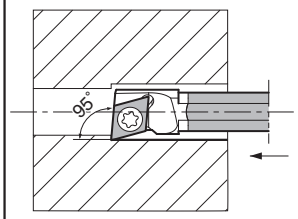
* For WP chipbreaker, cutting edge offsets or program corrections are required. F42

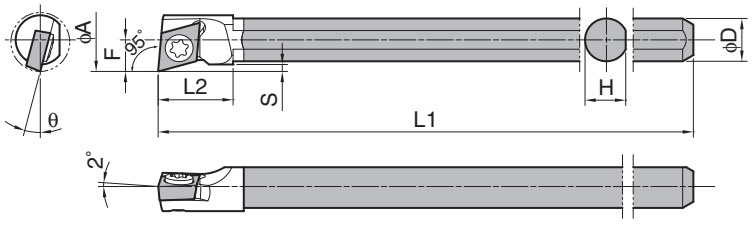
● : Std. Item

Boring Bar [JC□□ Insert]

C…SJLC Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



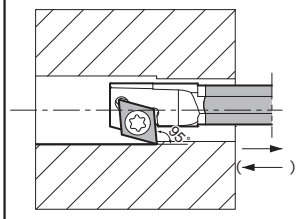


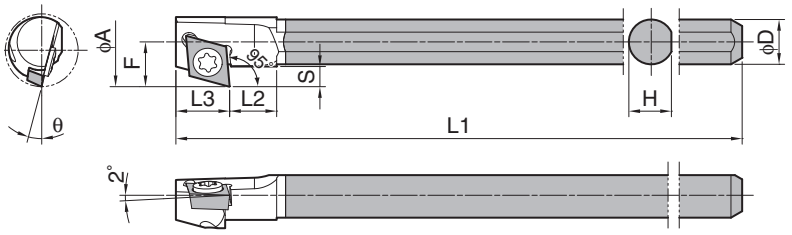
·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C…SJZC Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7





·Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

* When using Right-hand Toolholder, use Right-hand insert if machining from back to front in this direction (→).
Use Left-hand insert if machining from front to back in this direction (←).

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	F	S	θ	Std. Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
C04X-SJLC$^{R}_{L}$03-055	●	●	5.5	4	3.8	91	7	-	2.95	0.65	15°	0.03	SB-1635TR	FT-6
C04X-SJZC$^{R}_{L}$03-065	●	●	6.5			93	4	4.8	4.0	1.8				

Applicable Inserts

Applications	Finishing	Finishing / Precision
Ref. to Page	B67	B67
Insert / Toolholder Description	$^{R}_{L}$-F	$^{R}_{L}$-FSF
----SJLC$^{R}_{L}$03----	JCGT0301..	JCET0301..
----SJZC$^{R}_{L}$03----	JCGT0301..	JCET0301..

Recommended Cutting Conditions ➡ F93~F94
Applicable Sleeves ➡ F83,F85,F86

•Features of C···SJLC

1. Specially designed for minimized bore dia.
2. A relief angle of 15° ensures high flexibility of the tool pass during necking.
3. Retaining front relief angle 5° and good surface roughness during internal facing.

•Features of C···SJZC

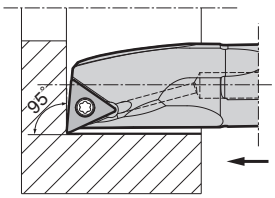
1. Back boring bars for workpiece that require high concentric circle accuracy and when a change of chuck is not possible.
2. Available for back boring and necking.
3. Despite the small size of minimum boring dia. as φ6.5, the edge gap is retained as large as 1.8 mm.

● : Std. Item

Dynamic Bar [TC□□ Insert]

A-STLC-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



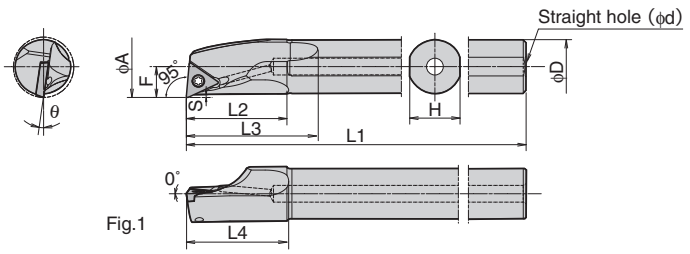


Fig.1

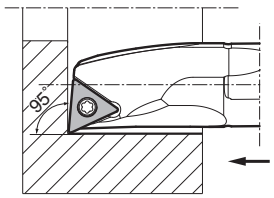
Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ8	ϕ2.5
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	ϕ5
ϕ20	

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-STLC-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



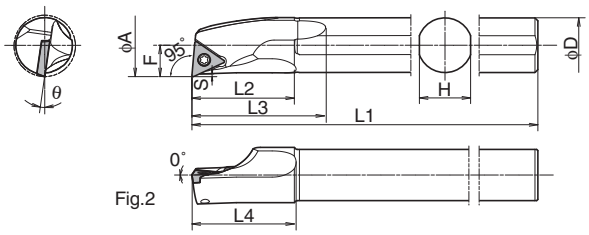


Fig.2

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

F

Boring

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L3	L4	F	S	θ	Std.Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A08X-STLCR/L09-10AE	●	●	10	8	7	120	16	22	16	5	0.5	14°	0.4	Yes	Fig.1	SB-2250TR	FT-7
	A10L-STLCR/L09-12AE	●	●	12	10	9	140	20	26	20	6.2	0.9	12°					
	A10L-STLCR/L11-12AE	●	●														SB-2560TR	FT-8
	A12M-STLCR/L11-14AE	●	●	14	12	11	150	24	30	25	7.2	0.7	10°					
	A16Q-STLCR/L11-18AE	●	●	18	16	15	180	30	39	31	9.2		8°					
	A20R-STLCR/L11-22AE	●	●	22	20	19	200	36	44	36	11.2		6°					
Steel	S08X-STLCR/L09-10A	●	●	10	8	7	120	16	22	16	5	0.5	14°	0.4	No	Fig.2	SB-2250TR	FT-7
	S10L-STLCR/L09-12A	●	●	12	10	9	140	20	26	20	6.2	0.9	12°					
	S10L-STLCR/L11-12A	●	●														SB-2560TR	FT-8
	S12M-STLCR/L11-14A	●	●	14	12	11	150	24	30	25	7.2	0.7	10°					
	S16Q-STLCR/L11-18A	●	●	18	16	15	180	30	39	31	9.2		8°					
	S20R-STLCR/L11-22A	●	●	22	20	19	200	36	44	36	11.2		6°					

Applicable Inserts

Applications	*Finishing	Finishing-Medium								
Ref. to Page	B71	B71								
Insert / Toolholder Description	WP(Wiper)	HQ								
...-STLCR/L09-...	TCMX0902..	TCMT0902..								
...-STLCR/L11-...	TCMX1102..	TCMT1102..								

* For WP chipbreaker, cutting edge offsets or program corrections are required. F42

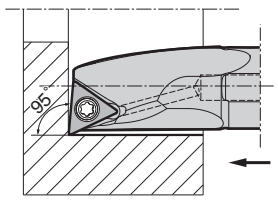
Recommended Cutting Conditions F93~F94
Applicable Sleeves F84~F86

● : Std. Item

Dynamic Bar [TB□□, TP□□ Insert]

A / S-STLB(P)-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



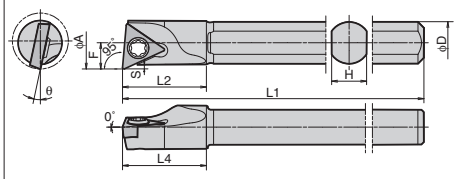


Fig.1

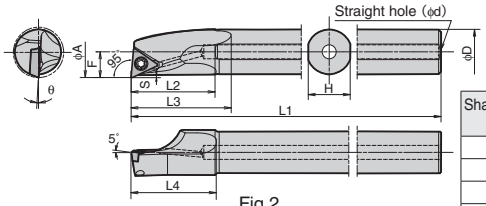


Fig.2

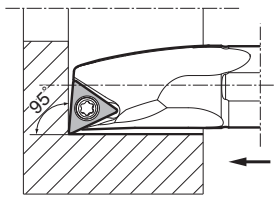
Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ8	ϕ2.5
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	ϕ5
ϕ20	
ϕ25	

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-STLB(P)-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



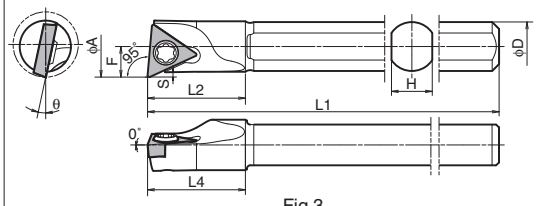


Fig.3

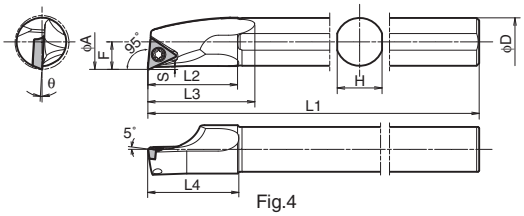


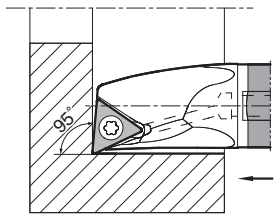
Fig.4

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E(C)-STLB(P)-A(N) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



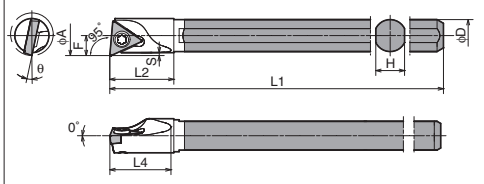


Fig.5

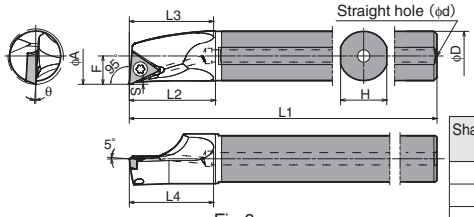


Fig.6

Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ8	ϕ3
ϕ10	
ϕ12	ϕ4
ϕ16	
ϕ20	ϕ6
ϕ25	

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Applicable Inserts

Applications	Minute ap	*Finishing	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Medium	Low Feed / Precision
Ref. to Page	B70,B74	B74	B74	B74	B70	B75	B70,B75,B76	B78	B77	B78
Insert / Toolholder Description	CF	WP(Wiper)	PP	GP	DP	HQ	R/L	R/L-FSF	R/L-H	F R/L-USF
...-STLB R/L 06-...	TBGT0601..	–	–	–	TBMT0601..	–	TBGT0601..	–	–	–
...-STLP R/L 08-...	TPGT0802..	–	–	–	–	–	TPGH0802..	TPET0802..	–	TPET0802..
...-STLP R/L 09-...	TPGT0902..	TPMX0902..	TPMT0902..	TPMT0902..	–	TPMT0902..	TPGH0902..	–	TPGH0902..	–
...-STLP R/L 11-...	–	TPMX1103..	TPMT1103..	TPMT1103..	–	TPMT1103..	TPGH1103..	TPET1103..	TPGH1103..	TPET1103..
...-STLP R/L 16-...	–	–	–	TPMT1603..	–	TPMT1603..	TPGH1603..	–	TPGH1603..	–

Applications	Soft Steel / Finishing	Soft Steel / Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. to Page	B75	B75	B70,B79	C26~C28	C16
Insert / Toolholder Description	XP	XQ	Without chipbreaker	PCD	CBN
...-STLB R/L 06-...	–	–	TBGW0601..	TBMT0601.. TBGW0601..	–
...-STLP R/L 08-...	–	–	TPGB0802..	TPMH0802.. TPGB0802..	TPGB0802..
...-STLP R/L 09-...	TPMT0902..	–	TPGB0902..	TPMH0902.. TPGB0902..	TPGB0902..
...-STLP R/L 11-...	TPMT1103..	TPMT1103..	TPGB1103..	TPMH1103.. TPGB1103..	TPGB1103..
...-STLP R/L 16-...	TPMT1603..	TPMT1603..	TPGB1603..	TPMH1603.. TPGB1603..	TPGB1603..

* For WP chipbreaker, cutting edge offsets or program corrections are required. F42

Recommended Cutting Conditions F93~F94
Applicable Sleeves F84~F86

● Toolholder Dimensions

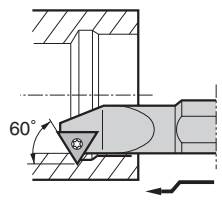
	Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	L4	F	S	θ	Std.Corner-R(r_ε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	**S06H-STLB$^{R}_{L}$06-08AE**	●	●	8	6	5	100	12	-	12	3.8	0.5	12°	0.2	No	Fig.1	SB-2035TR	FT-6
	A08X-STLP$^{R}_{L}$08-10AE	●	●	10	8	7	120	16	22	16	5	0.5	10°	0.4	Yes	Fig.2	SB-1TR	
	A08X-STLP$^{R}_{L}$09-10AE	●	●														SB-2545TR	FT-8
	A10L-STLP$^{R}_{L}$09-12AE	●	●	12	10	9	140	20	25	20	6.2	0.9	8°					
	A10L-STLP$^{R}_{L}$11-12AE	●	●						26		6	0.7	10°				SB-3060TR	FT-10
	A12M-STLP$^{R}_{L}$11-14AE	●	●	14	12	11	150	24	30	24	7.2	0.8	7°					
	A12M-STLP$^{R}_{L}$09-16AE	●	●	16							8	0.6	5°				SB-2545TR	FT-8
	A16Q-STLP$^{R}_{L}$11-18AE	●	●	18	16	15	180	30	36	30	9.2	0.7	3.5°				SB-3060TR	FT-10
	A20R-STLP$^{R}_{L}$11-22AE	●	●	22	20	19	200	36	46	37	11.2		2°					
	A20R-STLP$^{R}_{L}$16-25AE	●	●	25							13		0°				SB-4065TR	FT-15
	A25S-STLP$^{R}_{L}$16-27AE	●	●	27	25	24	250	46	55	46	13.7							
Steel	**S06H-STLB$^{R}_{L}$06-08A**	●	●	8	6	5	100	12	-	12	3.8	0.5	12°	0.2	No	Fig.3	SB-2035TR	FT-6
	S08X-STLP$^{R}_{L}$08-10A	●	●	10	8	7	120	16	22	16	5	0.5	10°	0.4		Fig.4	SB-1TR	
	S08X-STLP$^{R}_{L}$09-10A	●	●														SB-2545TR	FT-8
	S10L-STLP$^{R}_{L}$09-12A	●	●	12	10	9	140	20	25	20	6.2	0.9	8°					
	S10L-STLP$^{R}_{L}$11-12A	●	●						26		6	0.7	10°				SB-3060TR	FT-10
	S12M-STLP$^{R}_{L}$11-14A	●	●	14	12	11	150	24	30	24	7.2	0.8	7°					
	S12M-STLP$^{R}_{L}$09-16A	●	●	16							8	0.6	5°				SB-2545TR	FT-8
	S16Q-STLP$^{R}_{L}$11-18A	●	●	18	16	15	180	30	36	30	9.2	0.7	3.5°				SB-3060TR	FT-10
	S20R-STLP$^{R}_{L}$11-22A	●	●	22	20	19	200	36	46	37	11.2		2°					
	S25S-STLP$^{R}_{L}$16-27A	●	●	27	25	24	250	46	55	46	13.7						SB-4065TR	FT-15
Carbide	**C06J-STLB$^{R}_{L}$06-08AN**	●	●	8	6	5.4	110	10	-	11	3.8	0.5	12°	0.2	No	Fig.5	SB-2035TR	FT-6
	C06J-STLB$^{R}_{L}$ 06-08A	□	□					12		12								
	E08L-STLP$^{R}_{L}$08-10AN	●	●	10	8	7	140	14	15	15	5	0.5	10°	0.4	Yes	Fig.6	SB-1TR	
	E08L-STLP$^{R}_{L}$09-10AN	●	●														SB-2545TR	FT-8
	E10N-STLP$^{R}_{L}$09-12AN	●	●	12	10	9	160	18	19	19	6.2	0.9	8°					
	E10N-STLPR09-12AN2/3	●					105											
	E10N-STLPR09-12AN1/2	●					80											
	E10N-STLP$^{R}_{L}$11-12AN	●	●				160				6	0.7	10°				SB-3060TR	FT-10
	E10N-STLPR11-12AN2/3	●					105											
	E10N-STLPR11-12AN1/2	●					80											
	E08L-STLP$^{R}_{L}$08-10A	□	□	10	8	7	140	16	15	15	5	0.5	10°	0.4	Yes	Fig.6	SB-1TR	FT-6
	E08L-STLP$^{R}_{L}$09-10A	□	□														SB-2545TR	FT-8
	E10N-STLP$^{R}_{L}$09-12A	□	□	12	10	9	160	20	19	19	6.2	0.9	8°					
	E10N-STLPR09-12A-2/3	□					105											
	E10N-STLPR09-12A-1/2	□					80											
	E10N-STLP$^{R}_{L}$11-12A	□	□				160				6	0.7	10°				SB-3060TR	FT-10
	E10N-STLPR11-12A-2/3	□					105											
	E10N-STLPR11-12A-1/2	□					80											
	E12Q-STLP$^{R}_{L}$11-14A	●	●	14	12	11	180	23	22	22	7.2	0.8	7°					
	E12Q-STLPR 11-14A-2/3	●					120											
	E12Q-STLPR 11-14A-1/2	●					90											
	E12Q-STLP$^{R}_{L}$09-16A	●	●	16			180				8	0.6	5°				SB-2545TR	FT-8
	E12Q-STLPR 09-16A-2/3	●					120											
	E12Q-STLPR 09-16A-1/2	●					90											
	E16X-STLP$^{R}_{L}$ 11-18A	●	●	18	16	15	220	28	27	27	9.2	0.7	3.5°				SB-3060TR	FT-10
	E16X-STLPR 11-18A-2/3	●					145											
	E16X-STLPR 11-18A-1/2	●					110											
	E20S-STLP$^{R}_{L}$ 11-22A	●	●	22	20	19	250	32	31	31	11.2		2°					
	E20S-STLPR 11-22A-2/3	●					165											
	E20S-STLPR 11-22A-1/2	●					125											
	E20S-STLP$^{R}_{L}$ 16-25A	●	●	25			250				13		0°				SB-4065TR	FT-15
	E20S-STLPR 16-25A-2/3	●					165											
	E20S-STLPR 16-25A-1/2	●					125											
	E25T-STLP$^{R}_{L}$ 16-27A	●	●	27	25	24	300	38	37	37	13.7							
	E25T-STLPR 16-27A-2/3	●					200											

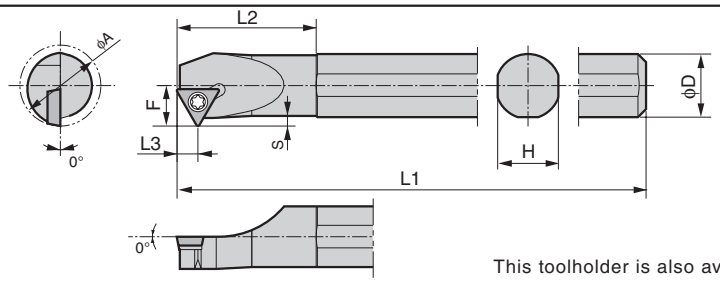
● : Std. Item
□ : Deleted from the next catalogue

Boring Bar [TB□□, TP□□ Insert]

S...STWP-E Excellent Bar (Copying)

Max. Overhang Length L/D=~5





(➡ J31)

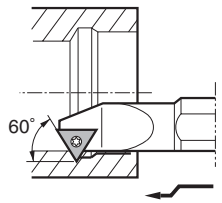
This toolholder is also available for threading.

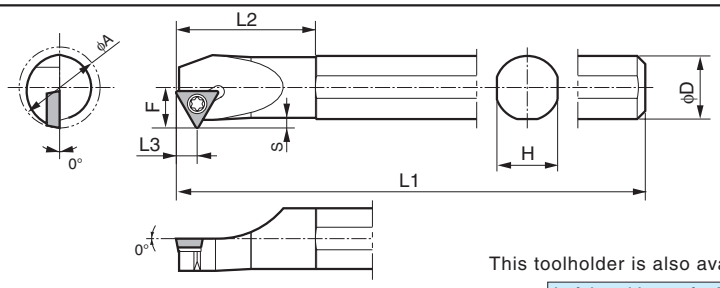
・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S...STWP Steel Bar (Copying)

Max. Overhang Length L/D=~3





(➡ J31)

This toolholder is also available for threading.

・Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	F	S	θ	Std.Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10M-STWP[R/L]11-12E	●	●	12	10	9.2	150	23	5.5	6	1.0	0°	0.1	SB-3STR	FT-10
S12M-STWP[R/L]11-16E	●	●	16	12	11		30		8	1.5				
S16R-STWP[R/L]11-20E	●	●	20	16	15	200	35		10	2.0			SB-3TR	
S20X-STWP[R/L]11-25E	●	●	25	20	19	220	40		12.5	2.5				
S20X-STWP[R/L]16-25E	●	●	25	20	19	220	40	7.7	14	4.0	0°	0.8	SB-4TR	FT-15
S25X-STWP[R/L]16-32E	●	●	32	25	23	270	42		16.5					
S10M-STWPR11-12	●		12	10	9.2	150	23	5.5	6	1.0	0°	0.1	SB-3STR	FT-10
S12M-STWPR11-16	●		16	12	11		30		8	1.5				
S16Q-STWPR11-20	●		20	16	15	180	35		10	2.0			SB-3TR	
S20R-STWPR11-25	●		25	20	19	200	40		12.5	2.5				

Applicable Inserts

Applications	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Medium	Low Feed / Precision	Soft Steel / Finishing	Soft Steel / Finishing-Medium
Ref. to Page	B74	B74	B75	B75,B76	B78	B77	B78	B75	B75
Insert / Toolholder Description	PP	GP	HQ	R/L	R/L-FSF	R/L-H	FR/L-USF	XP	XQ
S10M-STWP[R/L]11-12(E)	-	-	-	TPGH1102..	-	-	-	-	-
...-STWP[R/L]11-16~25(E)	TPMT1103..	TPMT1103..	TPMT1103..	TPGH1103..	TPET1103..	TPGH1103..	TPET1103..	TPMT1103..	TPMT1103..
...-STWP[R/L]16-...	-	TPMT1603..	TPMT1603..	TPGH1603..	-	TPGH1603..	-	TPMT1603..	TPMT1603..

Applications	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. to Page	B79	C26~C28	C16
Insert / Toolholder Description	Without chipbreaker	PCD	CBN
S10M-STWP[R/L]11-12(E)	TPGB1102..	-	-
...-STWP[R/L]11-16~25(E)	TPGB1103..	TPMH1103.. TPGB1103..	TPGB1103..
...-STWP[R/L]16-...	TPGB1603..	TPMH1603.. TPGB1603..	TPGB1603..

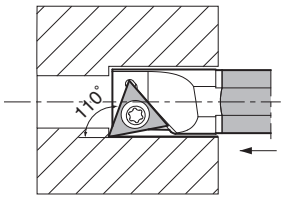
*WP chipbreaker (TPMX-WP : Wiper insert) is not applicable to S-STWP-E type and S-STWP type Toolholders.

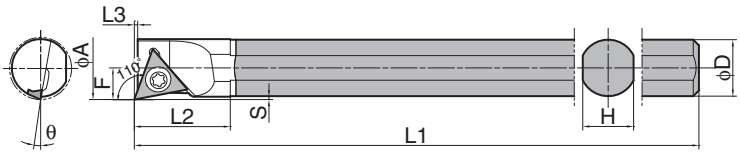
Recommended Cutting Conditions ➡ F93~F94
Applicable Sleeves ➡ F84~F86

● : Std. Item

C...STXP(B) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7





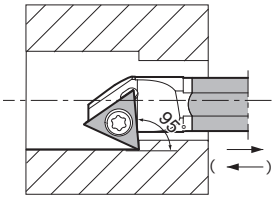
C···STXB$^{R}_{L}$ type···α=0°
C···STXP$^{R}_{L}$ type···α=5°

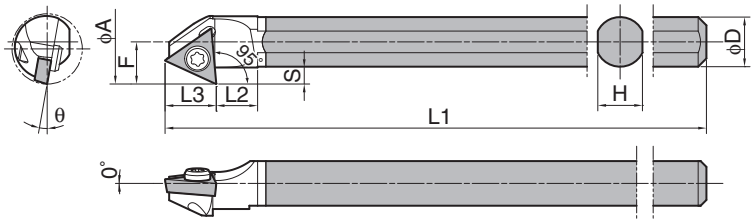
·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C...STZB Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7





·Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

* When using Right-hand Toolholder, use Right-hand insert if machining from back to front in this direction (→).
Use Left-hand insert if machining from front to back in this direction (←).

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	F	S	θ	Std.Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
C06J -STXB$^{R}_{L}$06-075	●	●	7.5	6	5.4	110	11	0.5	3.75	0.5	10°	0.03	SB-1STR	FT-6
C08X -STXP$^{R}_{L}$08-09	●	●	9.0	8	7.0	143	14	0.6	4.6				SB-1TR	
C10X -STXP$^{R}_{L}$09-11	●	●	11.0	10	9.0	164	17		5.6				SB-2TR	FT-8
C06J -STZB$^{R}_{L}$06-085	●	●	8.5	6	5.4	110	5	5.7	5.1	2.0			SB-1STR	FT-6

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Low Feed / Precision	Soft Steel / Finishing	Cast Iron
Ref. to Page	**B70,B74**	**B74**	**B74**	**B70**	**B75**	**B70,B75,B76**	**B78**	**B78**	**B75**	**B70,B79**
Insert / Toolholder Description	CF	PP	GP	DP	HQ	$^{R}_{L}$	$^{R}_{L}$-FSF	F$^{R}_{L}$-USF	XP	Without chipbreaker
...-STXB$^{R}_{L}$06-...	TBGT0601..	-	-	TBMT0601..	-	TBGT0601..	-	-	-	TBGW0601..
...-STXP$^{R}_{L}$08-...	TPGT0802..	-	-	-	-	TPGH0802..	TPET0802..	TPET0802..	-	TPGB0802..
...-STXP$^{R}_{L}$09-...	TPGT0902..	TPMT0902..	TPMT0902..	-	TPMT0902..	TPGH0902..	-	-	TPMT0902..	TPGB0902..
...-STZB$^{R}_{L}$06-...	TBGT0601..	-	-	TBMT0601..	-	TBGT0601..	-	-	-	TBGW0601..

Applications	Non-ferrous Metals	Hard Materials
Ref. to Page	**C26,C27**	**C16**
Insert / Toolholder Description	PCD	CBN
...-STXB$^{R}_{L}$06-...	TBMT0601..	-
...-STXP$^{R}_{L}$08-...	TPMH0802.. TPGB0802..	TPGB0802..
...-STXP$^{R}_{L}$09-...	TPMH0902.. TPGB0902..	TPGB0902..
...-STZB$^{R}_{L}$06-...	TBMT0601..	-

*WP chipbreaker (TPMX-WP : Wiper insert) is not applicable to C-STXP type Toolholders.

Recommended Cutting Conditions ⇨ **F93~F94**
Applicable Sleeves ⇨ **F83~F86**

C···STXP(B) Type Boring Bar Cutting Conditions

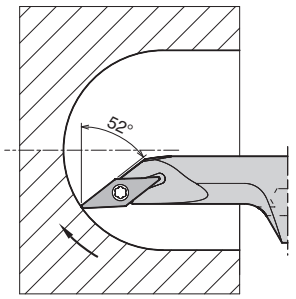
Toolholder Description	Insert Description (Grades)	Vc (m/min)	ap (mm)	f (mm/rev)	Coolant
C06J-STXB$^{R}_{L}$06-075	**TBGT0601003$^{L}_{R}$(PR930)**	30~100	0.02~0.1	0.02~0.04	Yes
C08X-STXP$^{R}_{L}$08-09	**TPGH080201$^{L}_{R}$(PR930)**	30~100	0.05~0.15	0.03~0.08	Yes
C10X-STXP$^{R}_{L}$09-11	**TPGH090201$^{L}_{R}$(PR930)**	30~100	0.05~0.15	0.03~0.08	Yes

(Workpiece Material: Alloy Steel)

● : Std. Item

A-SVJP(C)(B)-AE Excellent Bar (Internal Spherical Machining / Internal Facing / Copying)

Max. Overhang Length L/D=~5.5



For applications, ref. to page **F53**

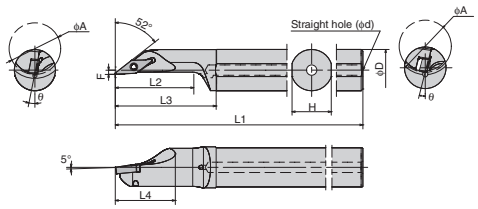


Fig.1

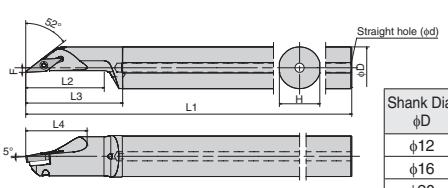


Fig.2

Shank Dia. φD	Straight hole Dia.φd
φ12	φ4
φ16	
φ20	φ5
φ25	
φ32	φ7
φ40	φ9

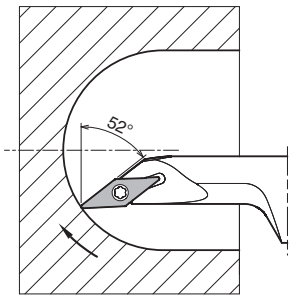
* No shim for SVJP(C)R/L08 / SVJBR/L11.

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SVJP(C)(B)-A Steel Bar (Internal Spherical Machining / Internal Facing / Copying)

Max. Overhang Length L/D=~4



For applications, ref. to page **F53**

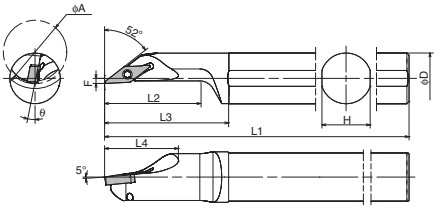


Fig.3

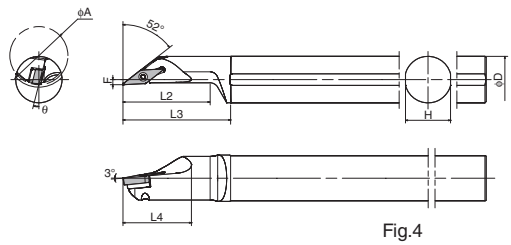


Fig.4

* No shim for SVJP(C)R/L08 / SVJBR/L11.

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	L4	F	S	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A12M-SVJPR/L08-16AE	●	●	16	12	11	150	26	33	21	2	-	5°	0.2	Yes	Fig.1	SB-2050TR	FT-6
	A12M-SVJCR/L08-16AE	●	●							20								
	A16Q-SVJCR/L08-20AE	●	●	20	16	15	180	36	43	22				0.4				
	A20R-SVJBR/L11-25AE	●	●	25	20	19	200	37.5	48	30							SB-2570TR	FT-8
	A25S-SVJBR/L11-30AE	●	●	30	25	24	250	45	58	33	3.5							
	A32S-SVJBR/L16-40AE	●	●	40	32	31		60	74	45			8°			Fig.2	SB-40125TRN	FT-15
	A40T-SVJBR/L16-50AE	●	●	50	40	39	300	75	91	49	4.5		7°					
Steel	S12M-SVJPR/L08-16A	●	●	16	12	11	150	26	33	21	2	-	5°	0.2	No	Fig.3	SB-2050TR	FT-6
	S12M-SVJCR/L08-16A	●	●							20								
	S16Q-SVJCR/L08-20A	●	●	20	16	15	180	36	43	22				0.4				
	S20R-SVJBR/L11-25A	●	●	25	20	19	200	37.5	48	30							SB-2570TR	FT-8
	S25S-SVJBR/L11-30A	●	●	30	25	24	250	45	58	33	3.5							
	S32S-SVJBR/L16-40A	●	●	40	32	31		60	74	45			8°			Fig.4	SB-40125TRN	FT-15
	S40T-SVJBR/L16-50A	●	●	50	40	39	300	75	91	49	4.5		7°					

Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Low Feed / Precision	Non-ferrous Metals	Non-ferrous Metals
Ref. to Page	B86	B82,B85	B82,B85	B82	B82,B85	B83	B82,B87	B88	B85	B85
Insert / Toolholder Description	CK	VF	PP	GP	HQ	R/L-F	R/L-FSH	FR/L-USF	AH	R/L-A3
...-SVJPR/L08-...	VPGT0802..	-	-	-	-	-	VPET0802..	VPET0802..	-	-
...-SVJCR/L08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVJBR/L11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	-	-	-
...-SVJBR/L16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	-	VCGT1604..	VCGT1604..

Applications	Non-ferrous Metals	Hard Materials
Ref. to Page	C28	C17
Insert / Toolholder Description	PCD	CBN
...-SVJPR/L08-...	-	-
...-SVJCR/L08-...	VCMT0802..	VCGW0802..
...-SVJBR/L11-...	VBMT1103..	VBGW1103..
...-SVJBR/L16-...	VBMT1604..	VBGW1604..

* Use of VBGT1103..-Y / VBGT1604..-Y with A-SVJB-AE / S-SVJB-A is not recommended.

Spare Parts (See **P24** for spare parts of old products.)

Description	Spare Parts: Shim	Spare Parts: Shim Screw	Spare Parts: Wrench (for Shim Screw)
□32S-SVJBR/L16-40A□	SVN-32N *(SVN-32S)	SS-4N	LW-4
□40T-SVJBR/L16-50A□			

·For insert with corner-R(rε) 0.2 or 0.4, shim of marked * is recommended (sold separately).

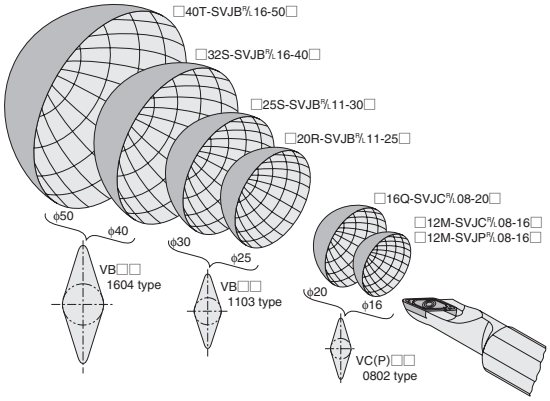
Recommended Cutting Conditions **F93~F94**
Applicable Sleeves **F84~F86**

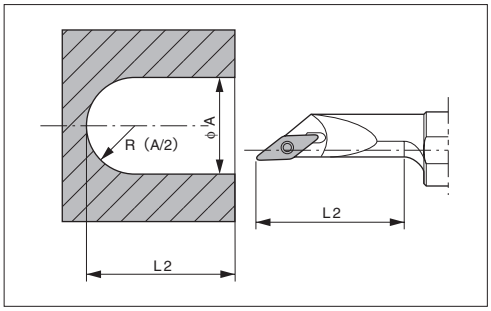
●: Std. Item

Application of □···SVJB(C)-□, S···SVJP-□

Ref. to Page for Toolholders F52

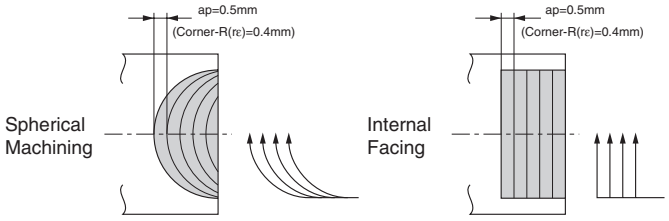
1. Application Range





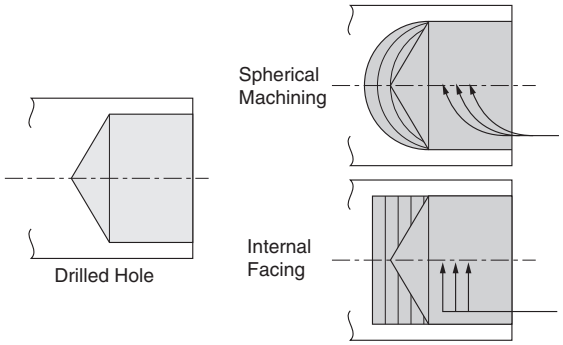
2. Application

Case with No Existing Hole



(Note) f shall be under 0.05mm/rev at internal facing.

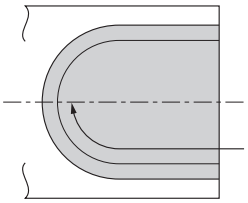
Case with Drilled Hole



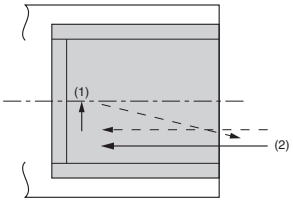
(Note) f shall be under 0.05mm/rev at internal facing.

Finishing

Spherical Machining

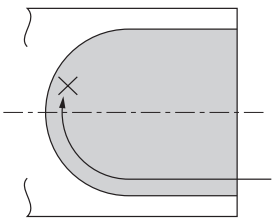


Internal Facing

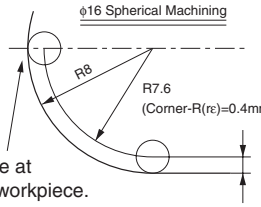


Machining Process
(1) Finish the internal face first.
(2) Next, finish the internal diameter.

3. Caution

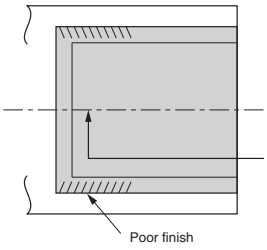


When machining past the center of the workpiece, insert may break.



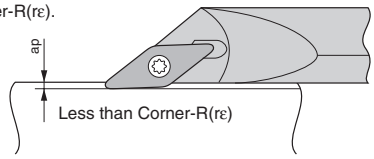
Fix the insert edge at the center of the workpiece.

Adjust the machining program to radius minus the value of Corner-R(rε).



This type of machining is possible, but the chips might scratch the surface.

For internal profiling, ap should be less than the value of Corner-R(rε).

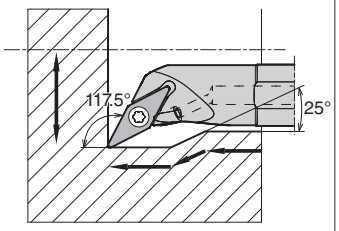


[Burrs may occur, if ap is bigger than Corner-R(rε)]

Dynamic Bar [VB□□, VC□□ Insert]

A-SVPC(B)-AE Excellent Bar (Copying / Undercutting)

Max. Overhang Length L/D=~5.5



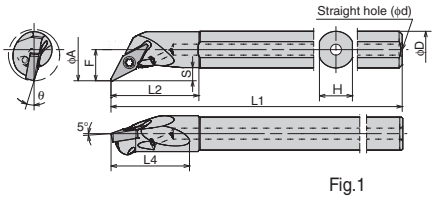


Fig.1

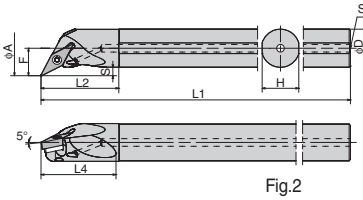


Fig.2

Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	ϕ5
ϕ20	
ϕ25	
ϕ32	

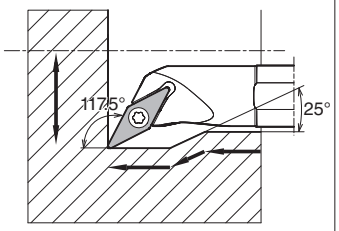
* No shim for SVPC$^{R}_{L}$08 / SVPB$^{R}_{L}$11.

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SVPC(B)-A Steel Bar (Copying / Undercutting)

Max. Overhang Length L/D=~4



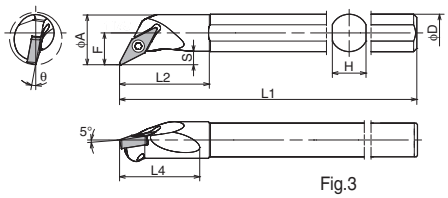


Fig.3

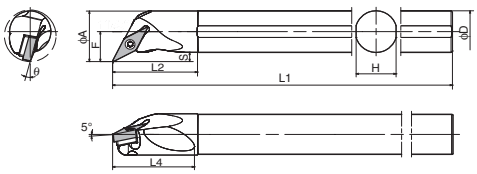


Fig.4

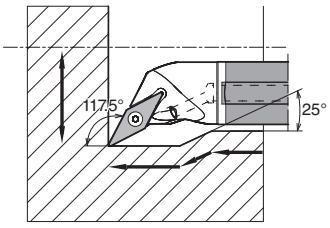
* No shim for SVPC$^{R}_{L}$08 / SVPB$^{R}_{L}$11.

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SVPC(B)-A Carbide Shank Bar (Copying / Undercutting)

Max. Overhang Length L/D=~7



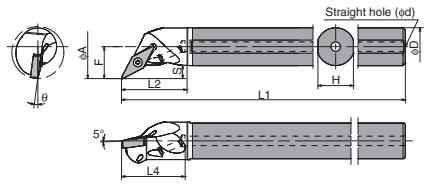


Fig.5

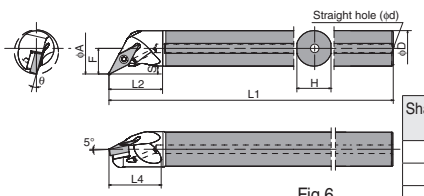


Fig.6

Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ10	ϕ3
ϕ12	ϕ4
ϕ16	
ϕ20	ϕ6
ϕ25	

* No shim for SVPC$^{R}_{L}$08 / SVPB$^{R}_{L}$11.

・Right-hand shown

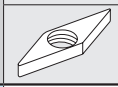
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L3	L4	F	S	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SVPC$^{R}_{L}$08-14AE	●	●	14	10	9	140	24	-	21	8.5	3	8°	0.4	Yes	Fig.1	SB-2050TR	FT-6
	A12M-SVPB$^{R}_{L}$11-18AE	●	●	18	12	11	150	29		26	11	4.5					SB-2570TR	FT-8
	A16Q-SVPB$^{R}_{L}$11-22AE	●	●	22	16	15	180	35		33	13.5	5	5°					
	A20R-SVPB$^{R}_{L}$11-26AE	●	●	26	20	19	200	41		39	15.5							
	A25S-SVPB$^{R}_{L}$16-31AE	●	●	31	25	24	250	51		49	18		13°			Fig.2	SB-40125TRN	FT-15
	A32S-SVPB$^{R}_{L}$16-40AE	●	●	40	32	31		54		53	23	6.5	9°					
Steel	S10L-SVPC$^{R}_{L}$08-14A	●	●	14	10	9	140	24	-	21	8.5	3	8°	0.4	No	Fig.3	SB-2050TR	FT-6
	S12M-SVPB$^{R}_{L}$11-18A	●	●	18	12	11	150	29		26	11	4.5					SB-2570TR	FT-8
	S16Q-SVPB$^{R}_{L}$11-22A	●	●	22	16	15	180	35		33	13.5	5	5°					
	S20R-SVPB$^{R}_{L}$11-26A	●	●	26	20	19	200	41		39	15.5							
	S25S-SVPB$^{R}_{L}$16-31A	●	●	31	25	24	250	51		49	18		13°			Fig.4	SB-40125TRN	FT-15
	S32S-SVPB$^{R}_{L}$16-40A	●	●	40	32	31		54		53	23	6.5	9°					
Carbide	E10N-SVPCR08-14A	●		14	10	9	160	20	-	18.5	8.5	3	8°	0.4	Yes	Fig.5	SB-2050TR	FT-6
	E12Q-SVPBR11-18A	●		18	12	11	180	23		22	11	4.5					SB-2570TR	FT-8
	E16X-SVPBR 11-22A	●		22	16	15	220	28		27	13.5	5	5°					
	E20S-SVPBR 11-26A	●		26	20	19	250	32		31	15.5							
	E25T-SVPBR 16-31A	●		31	25	24	300	38		37	18		13°			Fig.6	SB-40125TRN	FT-15

●: Std. Item

Spare Parts (See P24 for spare parts of old products.)

Description	Spare Parts		
	Shim	Shim Screw	Wrench (for Shim Screw)
			
□25□-SVPB$^{R}_{L}$16-31A□ □32S-SVPB$^{R}_{L}$16-40A□	SVN-32N *(SVN-32S)	SS-4N	LW-4

·For insert with corner-R(r_ε) 0.2 or 0.4, shim of marked * is recommended (sold separately).

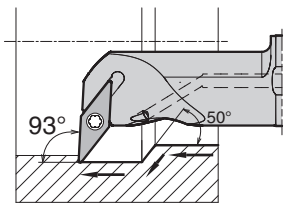
Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Low Feed / Precision	Non-ferrous Metals
Ref. to Page	-	**B82,B85**	**B82,B85**	**B82**	**B82,B85**	**B83**	**B82**	**B84**	-	**B85**
Insert / Toolholder Description	**CK**	**VF**	**PP**	**GP**	**HQ**	**$^{R}_{L}$-F**	**$^{R}_{L}$-FSF**	**$^{R}_{L}$-Y**	**F$^{R}_{L}$-USF**	**AH**
...-SVPC$^{R}_{L}$08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVPB$^{R}_{L}$11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-
...-SVPB$^{R}_{L}$16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..
Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials							
Ref. to Page	**B85**	**C28**	**C17**							
Insert / Toolholder Description	**$^{R}_{L}$-A3**	**PCD**	**CBN**							
...-SVPC$^{R}_{L}$08-...	-	VCMT0802..	VCGW0802..							
...-SVPB$^{R}_{L}$11-...	-	VBMT1103..	VBGW1103..							
...-SVPB$^{R}_{L}$16-...	VCGT1604..	VBMT1604..	VBGW1604..							

Recommended Cutting Conditions ➡ **F93~F94**
Applicable Sleeves ➡ **F84~F86**

A-SVUC(B)-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



Inner hole dia. (ϕ3) of A12M-SVUC$^{R}_{L}$08-16AE
Inner hole dia. (ϕ3) of A16Q-SVUB$^{R}_{L}$11-20AE
Inner hole dia. (ϕ3) for A20R-SVUB$^{R}_{L}$11-25AE
Straight hole dia. (ϕ5) of A32S-SVUB$^{R}_{L}$16-40AE

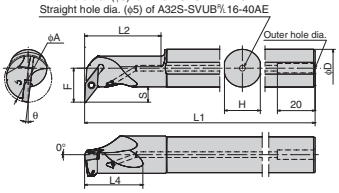


Fig.1

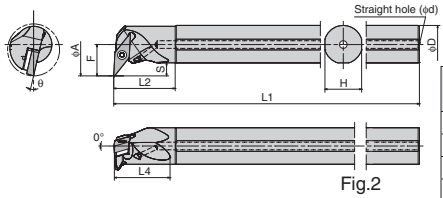


Fig.2

Shank Dia. ϕD	Outer hole dia.	Straight hole Dia.ϕd
ϕ12	ϕ4	-
ϕ16	ϕ5	
ϕ20		
ϕ25	-	ϕ5
ϕ32		

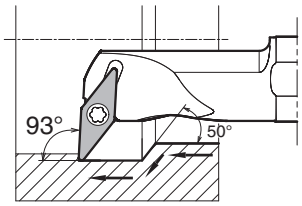
* No shim for SVUC$^{R}_{L}$08 / SVUB$^{R}_{L}$11.

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SVUC(B)-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



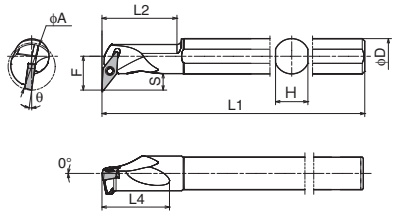


Fig.3

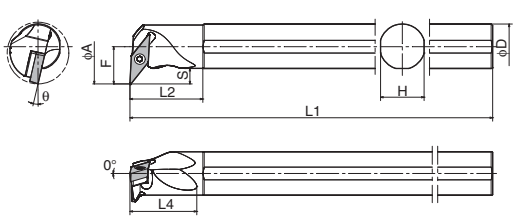


Fig.4

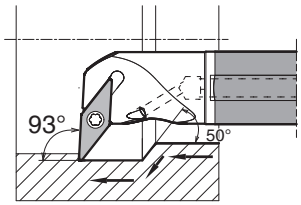
* No shim for SVUC$^{R}_{L}$08 / SVUB$^{R}_{L}$11.

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SVUC(B)-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



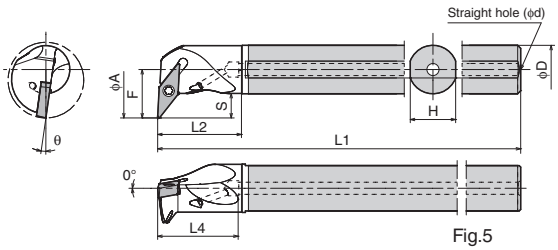


Fig.5

Shank Dia. ϕD	Straight hole Dia.ϕd
ϕ12	ϕ4
ϕ16	
ϕ20	ϕ6
ϕ25	

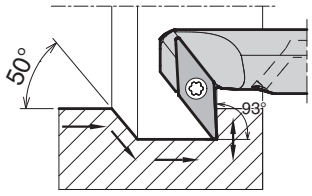
* Shim is attached only for SVUBR16

・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

A-SVZC(B)-AE Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5.5



Inner hole dia. (ϕ3) of A12M-SVUC$^{R}_{L}$08-16AE
Inner hole dia. (ϕ3) of A16Q-SVUB$^{R}_{L}$11-20AE
Inner hole dia. (ϕ3) for A20R-SVUB$^{R}_{L}$11-25AE
Straight hole dia. (ϕ5) of A32S-SVUB$^{R}_{L}$16-40AE

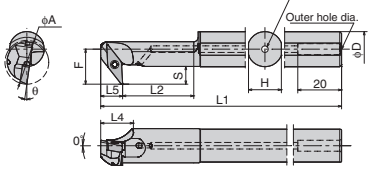


Fig.6

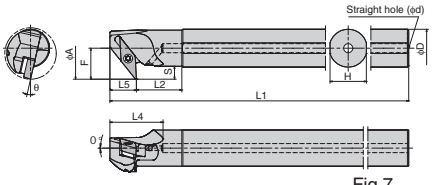


Fig.7

Shank Dia. ϕD	Outer hole dia.	Straight hole Dia.ϕd
ϕ12	ϕ4	-
ϕ16	ϕ5	
ϕ20		
ϕ25	-	ϕ5
ϕ32		

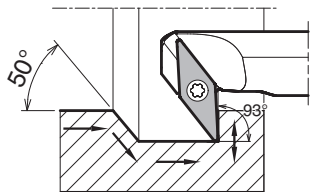
* No shim for SVZC$^{R}_{L}$08 / SVZB$^{R}_{L}$11.

・Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

S-SVZC(B)-A Steel Bar (Back Boring)

Max. Overhang Length L/D=~4



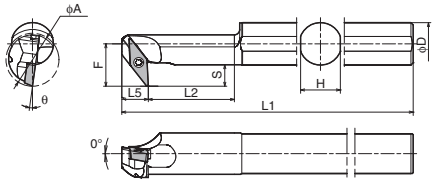


Fig.8

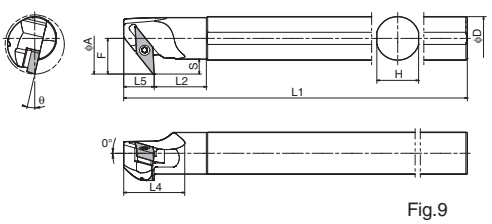


Fig.9

* No shim for SVZC$^{R}_{L}$08 / SVZB$^{R}_{L}$11.

・Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L4	L5	F	S	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A12M-SVUCR/L08-16AE	●	●	16	12	11	150	25.5	23		11.5	5.5	8°				SB-2050TR	FT-6
	A16Q-SVUBR/L11-20AE	●	●	20	16	15	180	32.5	27		16	8				Fig.1	SB-2570TR	FT-8
	A20R-SVUBR/L11-25AE	●	●	25	20	19	200	40.5	31	-	18		7°	0.4	Yes			
	A25S-SVUBR/L16-34AE	●	●	34	25	24	250	40	37		20.5	8.5	13°			Fig.2	SB-40125TRN	FT-15
	A32S-SVUBR/L16-40AE	●	●	40	32	31		84	47		28	12	9°			Fig.1		
Steel	S12M-SVUCR/L08-16A	●	●	16	12	11	150	25.5	23		11.5	5.5	8°				SB-2050TR	FT-6
	S16Q-SVUBR/L11-20A	●	●	20	16	15	180	32.5	27		16	8				Fig.3	SB-2570TR	FT-8
	S20R-SVUBR/L11-25A	●	●	25	20	19	200	40.5	31	-	18		7°	0.4	No			
	S25S-SVUBR/L16-34A	●	●	34	25	24	250	40	37		20.5	8.5	13°			Fig.4	SB-40125TRN	FT-15
	S32S-SVUBR/L16-40A	●	●	40	32	31		84	47		28	12	9°			Fig.3		
Carbide	E12Q-SVUCR08-18A	●		18	12	11	180	23	22		11.5	5.5	8°				SB-2050TR	FT-6
	E16X-SVUBR11-25A	●		25	16	15	220	28	27		16	8				Fig.5	SB-2570TR	FT-8
	E20S-SVUBR11-29A	●		29	20	19	250	32	30	-	18		7°	0.4	Yes			
	E25T-SVUBR16-34A	●		34	25	24	300	38	37		21	8.5	13°				SB-40125TRN	FT-15
Excellent Bar	A12M-SVZCR/L08-16AE	●	●	16	12	11	150	25.5	14	7.5	11.5	5.5	8°				SB-2050TR	FT-6
	A16Q-SVZBR/L11-20AE	●	●	20	16	15	180	32.5	20	10	16	8				Fig.6	SB-2570TR	FT-8
	A20R-SVZBR/L11-25AE	●	●	25	20	19	200	40.5	23		18		7°	0.4	Yes			
	A25S-SVZBR/L16-34AE	●	●	34	25	24	250	30	34	17.5	20.5	8.5	13°			Fig.7	SB-40125TRN	FT-15
	A32S-SVZBR/L16-40AE	●	●	40	32	31		72.5	36		28	12	9°			Fig.6		
Steel	S12M-SVZCR/L08-16A	●	●	16	12	11	150	25.5	14	7.5	11.5	5.5	8°				SB-2050TR	FT-6
	S16Q-SVZBR/L11-20A	●	●	20	16	15	180	32.5	20	10	16	8				Fig.8	SB-2570TR	FT-8
	S20R-SVZBR/L11-25A	●	●	25	20	19	200	40.5	23		18		7°	0.4	No			
	S25S-SVZBR/L16-34A	●	●	34	25	24	250	30	34	17.5	20.5	8.5	13°			Fig.9	SB-40125TRN	FT-15
	S32S-SVZBR/L16-40A	●	●	40	32	31		72.5	36		28	12	9°			Fig.8		

Spare Parts (See P24 for spare parts of old products.)

Description	Spare Parts: Shim	Spare Parts: Shim Screw	Spare Parts: Wrench (for Shim Screw)
□25□-SVUBR/L16-34A□ □32S-SVUBR/L16-40A□ □25S-SVZBR/L16-34A□ □32S-SVZBR/L16-40A□	SVN-32N *(SVN-32S)	SS-4N	LW-4

·For insert with corner-R(rε) 0.2 or 0.4, shim of marked * is recommended (sold separately).

Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Low Feed / Precision	Non-ferrous Metals
Ref. to Page	-	B82,B85	B82,B85	B82	B82,B85	B83	B82	B84	-	B85
Insert / Toolholder Description	CK	VF	PP	GP	HQ	R/L-F	R/L-FSF	R/L-Y	FR/L-USF	AH
...-SVUCR/L08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVUBR/L11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-
...-SVUBR/L16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..
...-SVZCR/L08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVZBR/L11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-
...-SVZBR/L16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..

Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B85	C28	C17
Insert / Toolholder Description	R/L-A3	PCD	CBN
...-SVUCR/L08-...	-	VCMT0802..	VCGW0802..
...-SVUBR/L11-...	-	VBMT1103..	VBGW1103..
...-SVUBR/L16-...	VCGT1604..	VBMT1604..	VBGW1604..
...-SVZCR/L08-...	-	VCMT0802..	VCGW0802..
...-SVZBR/L11-...	-	VBMT1103..	VBGW1103..
...-SVZBR/L16-...	VCGT1604..	VBMT1604..	VBGW1604..

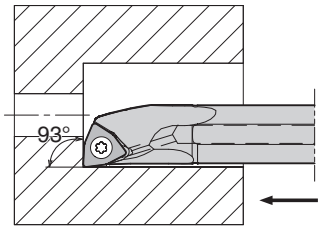
Recommended Cutting Conditions ➡ F93~F94
Applicable Sleeves ➡ F84~F86

●: Std. Item

Dynamic Bar [WB□□, WP□□ Insert]

S / A-SWUB(P)-AE Excellent Bar (Boring)

Max. Overhang Length L/D=~5.5



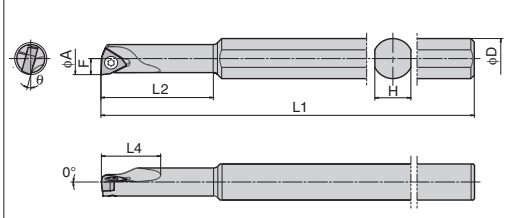
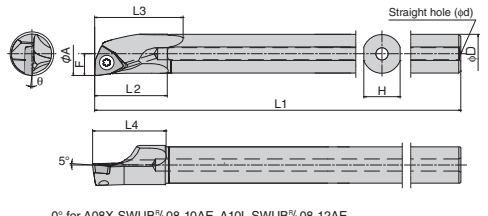


Fig.1



0° for A08X-SWUB$^{R/L}$08-10AE, A10L-SWUB$^{R/L}$08-12AE

Fig.2

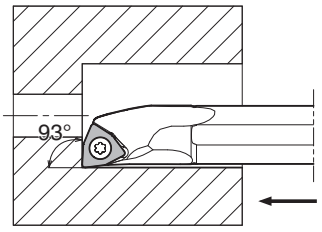
Shank Dia. φD	Straight hole Dia.φd
φ8	φ2.5
φ10	φ3
φ12	φ4
φ16	φ5
φ20	

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SWUB(P)-A Steel Bar (Boring)

Max. Overhang Length L/D=~4



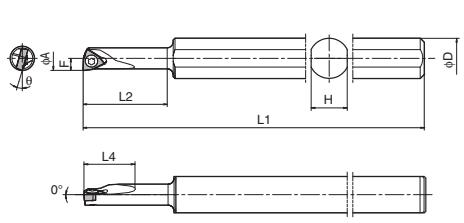
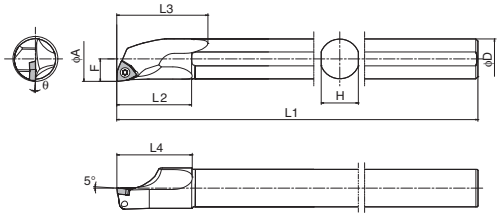


Fig.3



0° for S08X-SWUB$^{R/L}$08-10A, S10L-SWUB$^{R/L}$08-12A

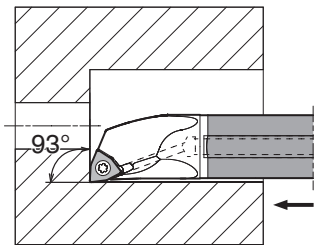
Fig.4

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E(C)-SWUB(P)-A(N) Carbide Shank Bar (Boring)

Max. Overhang Length L/D=~7



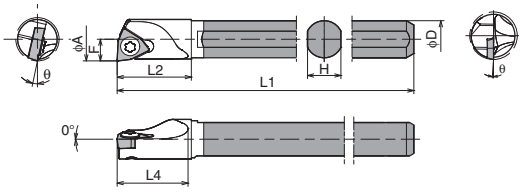
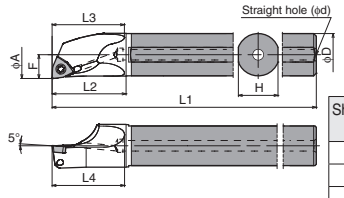


Fig.5



0° for E08L-SWUB$^{R/L}$08-10A,E10N-SWUB$^{R/L}$08-12A, E10N-SWUB$^{R/L}$08-12A-2/3, E10N-SWUB$^{R/L}$08-12A-1/2

Fig.6

Shank Dia. φD	Straight hole Dia.φd
φ5	-
φ6	
φ7	
φ8	φ3
φ10	
φ12	φ4
φ16	
φ20	φ6

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials	
Ref. to Page	B89	B91	B89	B91	B89,B90	B91	B90,B91	C28,C29	C18	
Insert / Toolholder Description	CF	GP	R/L-DP	HQ	R/L-F	R/L-Y	Without Chipbreaker	PCD	CBN	
...-SWUB$^{R/L}$06-...	WBGT0601..	-	WBMT0601..	-	WBGT0601..	-	WBGW0601..	WBMT0601..	WBGW0601..	
...-SWUB$^{R/L}$08-...	-	-	WBMT0802..	-	WBGT0802..	-	WBGW0802..	WBMT0802..	WBGW0802..	
...-SWUP$^{R/L}$11-...	-	WPMT1102..	-	WPMT1102..	-	WPGT1102..	WPGW1102..	WPMT1102..	-	
...-SWUP$^{R/L}$16-...	-	WPMT1603..	-	WPMT1603..	-	WPGT1603..	WPGW1603..	-	-	

Recommended Cutting Conditions F93~F94
Applicable Sleeves F83~F86

Toolholder Dimensions

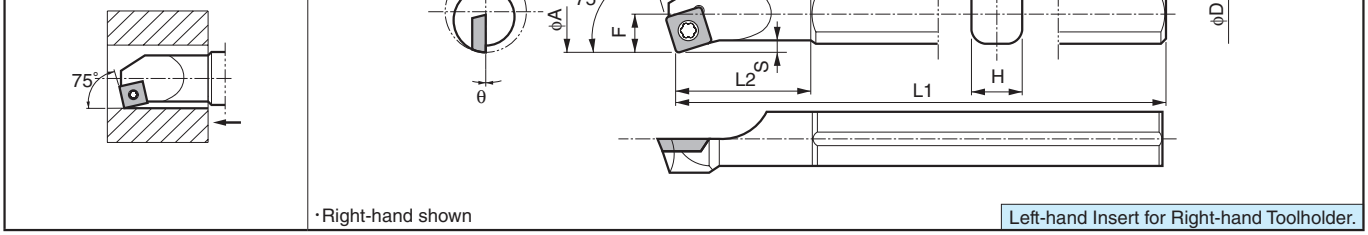
	Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	L4	F	S	θ	Std. Corner-R(rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	**S10H-SWUB$^{R}_{L}$06-06AE**	●	●	6	10	9	100	21	-	13	3	-	15°	0.2	No	Fig.1	SB-2035TR	FT-6
	S10H-SWUB$^{R}_{L}$06-07AE	●	●	7				25		15	3.5		13°					
	S10H-SWUB$^{R}_{L}$08-08AE	●	●	8				28			4		15°					
	A08X-SWUB$^{R}_{L}$08-10AE	●	●	10	8	7	120	16	21	16	5		13°		Yes	Fig.2	SB-2050TR	
	A10L-SWUB$^{R}_{L}$08-12AE	●	●	12	10	9	140	20	25	20	6		10°					
	A12M-SWUP$^{R}_{L}$11-14AE	●	●	14	12	11	150	24	30	24	7		4°	0.4			SB-2545TR	FT-8
	A16Q-SWUP$^{R}_{L}$11-18AE	●	●	18	16	15	180	30	37	30	9		1°					
	A16Q-SWUP$^{R}_{L}$16-18AE	●	●										3.5°	0.8			SB-4065TR	FT-15
	A20R-SWUP$^{R}_{L}$16-22AE	●	●	22	20	19	200	36	46	37	11		2°					
Steel	**S10H-SWUB$^{R}_{L}$06-06A**	●	●	6	10	9	100	21	-	13	3	-	15°	0.2	No	Fig.3	SB-2035TR	FT-6
	S10H-SWUB$^{R}_{L}$06-07A	●	●	7				25		15	3.5		13°					
	S10H-SWUB$^{R}_{L}$08-08A	●	●	8				28			4		15°					
	S08X-SWUB$^{R}_{L}$08-10A	●	●	10	8	7	120	16	21	16	5		13°			Fig.4	SB-2050TR	
	S10L-SWUB$^{R}_{L}$08-12A	●	●	12	10	9	140	20	25	20	6		10°					
	S12M-SWUP$^{R}_{L}$11-14A	●	●	14	12	11	150	24	30	24	7		4°	0.4			SB-2545TR	FT-8
	S16Q-SWUP$^{R}_{L}$11-18A	●	●	18	16	15	180	30	37	30	9		1°					
	S16Q-SWUP$^{R}_{L}$16-18A	●	●										3.5°	0.8			SB-4065TR	FT-15
	S20R-SWUP$^{R}_{L}$16-22A	●	●	22	20	19	200	36	46	37	11		2°					
Carbide	**C05H-SWUB$^{R}_{L}$06-06AN**	●	●	6	5	4.4	100	9	-	10	3	-	15°	0.2	No	Fig.5	SB-2035TR	FT-6
	C06J-SWUB$^{R}_{L}$ 06-07AN	●	●	7	6	5.4	110	10		11	3.5		13°					
	C07K-SWUB$^{R}_{L}$08-08AN	●	●	8	7	6.4	125	11		12	4		15°					
	C05H-SWUB$^{R}_{L}$06-06A	□	□	6	5	4.4	100	11	-	11	3		15°					
	C06J-SWUB$^{R}_{L}$ 06-07A	□	□	7	6	5.4	110	12		12	3.5		13°					
	C07K-SWUB$^{R}_{L}$08-08A	□	□	8	7	6.4	125	13		13	4		15°					
	E08L-SWUB$^{R}_{L}$ 08-10AN	●	●	10	8	7	140	14	15	15	5		13°	0.2	Yes	Fig.6	SB-2050TR	FT-6
	E10N-SWUB$^{R}_{L}$08-12AN	●	●	12	10	9	160	18	19	19	6		10°					
	E10N-SWUBR08-12AN2/3	●					105											
	E10N-SWUBR08-12AN1/2	●					80											
	E08L-SWUB$^{R}_{L}$08-10A	□	□	10	8	7	140	16	15	15	5		13°					
	E10N-SWUB$^{R}_{L}$08-12A	□	□	12	10	9	160	20	19	19	6		10°					
	E10N-SWUBR08-12A-2/3	□					105											
	E10N-SWUBR08-12A-1/2	□					80											
	E12Q-SWUP$^{R}_{L}$ 11-14A	●	●	14	12	11	180	23	22	22	7		4°	0.4			SB-2545TR	FT-8
	E12Q-SWUPR 11-14A-2/3	●					120											
	E12Q-SWUPR 11-14A-1/2	●					90											
	E16X-SWUP$^{R}_{L}$ 11-18A	●	●	18	16	15	220	28	27	27	9		1°					
	E16X-SWUPR 11-18A-2/3	●					145											
	E16X-SWUPR 11-18A-1/2	●					110											
	E16X-SWUP$^{R}_{L}$ 16-18A	●	●				220						3.5°	0.8			SB-4065TR	FT-15
	E16X-SWUPR 16-18A-2/3	●					145											
	E16X-SWUPR 16-18A-1/2	●					110											
	E20S-SWUP$^{R}_{L}$ 16-22A	●	●	22	20	19	250	32	31	31	11		2°					
	E20S-SWUPR 16-22A-2/3	●					165											
	E20S-SWUPR 16-22A-1/2	●					125											

●: Std. Item
□: Deleted from the next catalogue

Boring Bar [SP□□ Insert]

S-SSKP (Boring)

Max. Overhang Length L/D=~3



・Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

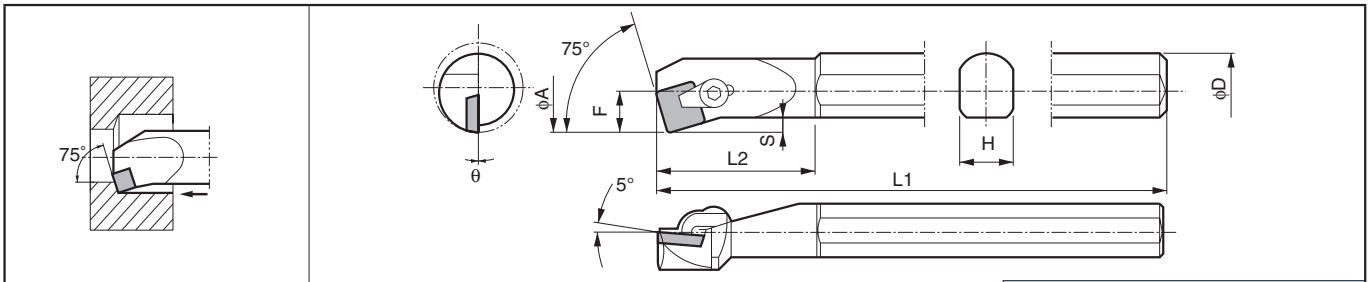
Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
S16Q-SSKPR09-20	●		20	16	14	180	30	10	2.0	-3°	0.8	SB-4TR	FT-15
S20R-SSKPR09-25	●		25	20	18	200	35	12.5	2.5	0°			

Applicable Inserts

Applications	Finishing									
Ref. to Page	B69									
Insert / Toolholder Description	R/L									
····SSKPR/L09···	SPGH0903..									

S-CSKP (Boring)

Max. Overhang Length L/D=~3



・Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(rε)	Spare Parts: Clamp Set	Spare Parts: Wrench		Spare Parts: Shim	Spare Parts: Shim Screw
S16N -CSKPR09-20	●		20	16	14	160	40	10	2.0	0°	0.8	CPS-2	FH-2.5	-	-	-
S20Q -CSKPR09-27	●		27	20	18	180	45	13.5	3.5							
S25X -CSKPR12-34	●		34	25	23	220	60	17	4.5	0°	0.8	CPS-3	-	LW-3	-	-
S32S -CSKPR12-43	●		43	32	30	250	75	21.5	5.5						KPS-42	SP3X10

Applicable Inserts

Applications	Medium	Medium	Finishing-Medium	Cast Iron	Cast Iron	Non-ferrous Metals
Ref. to Page	B69	B69	B69	B69	B105	C29
Insert / Toolholder Description	G	Standard	R/L	Without Chipbreaker	Ceramic	PCD
····CSKPR09···	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-
····CSKPR12···	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..

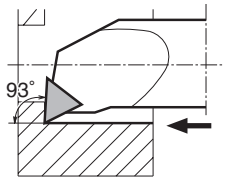
Recommended Cutting Conditions ➡ F93~F94
Applicable Sleeves ➡ F85~F86

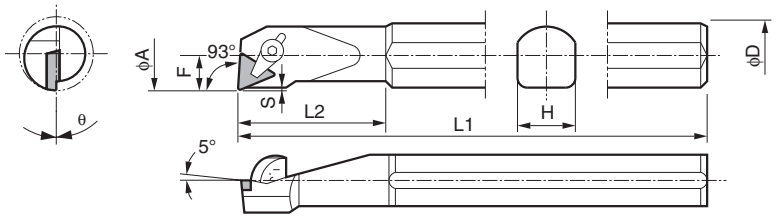
●: Std. Item

Boring Bar [TP□□ Insert]

S-CTUP (Boring)

Max. Overhang Length L/D=~3





・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(rε)	Spare Parts: Clamp Set		Wrench		Shim	Shim Screw
S12L-CTUPR 09-16	●		16	12	11	140	32	8	0.5	0°	0.4	CPS-1	-	FH-2	-	-	-
S16N-CTUP$^{R}_{L}$11-20	●	●	20	16	14	160	30	10	0.5	0°	0.4	-	CPS-2	FH-2.5	-	-	-
S20Q-CTUP$^{R}_{L}$11-27	●	●	27	20	18	180	40	13.5	1.3								
S25X-CTUP$^{R}_{L}$16-34	●	●	34	25	23	220	60	17	1.0	0°	0.8	-	CPS-3	-	LW-3	-	-
S32S-CTUP$^{R}_{L}$16-43	●	●	43	32	30	250	70	21.5								KPT-32	SP3X10
S40X-CTUP$^{R}_{L}$16-50	●	●	50	40	37	315	80	25									

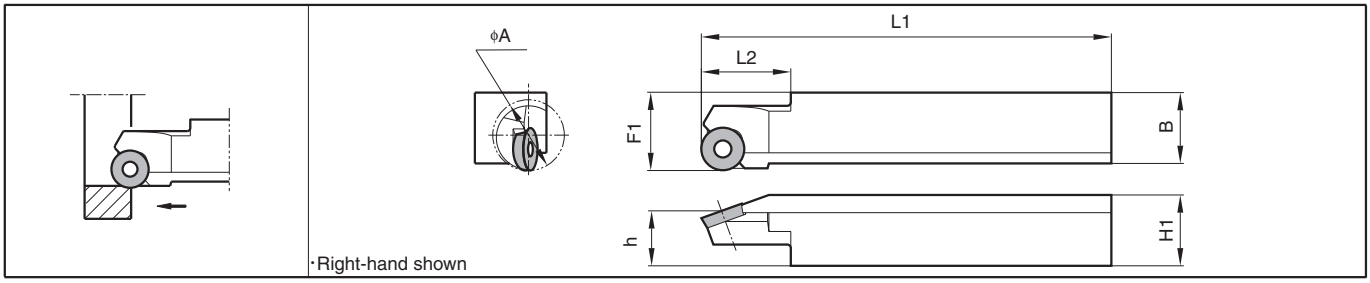
Applicable Inserts

Applications	Finishing	Finishing-Medium	Medium	Medium	Finishing	Finishing-Medium	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. to Page	**B80**	**B80**	**B80**	**B80**	**B80**	**B81**	**B81**	**B105**	**C29**	**C18**
Insert / Toolholder Description	**GP**	**HQ**	**G**	**Standard**	**$^{R}_{L}$-F**	**$^{R}_{L}$-□**	**Without Chipbreaker**	**Ceramic**	**PCD**	**CBN**
----CTUPR09----	-	-	TPMR0902..	-	TPGR0902..	-	TPGN0902..	-	-	-
----CTUP$^{R}_{L}$11----	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	-	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
----CTUP$^{R}_{L}$16----	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	-	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..

Recommended Cutting Conditions ➔ **F93~F94**
Applicable Sleeves ➔ **F84~F86**

●: Std. Item

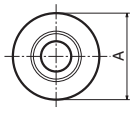
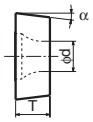
SRCP-B (Boring)



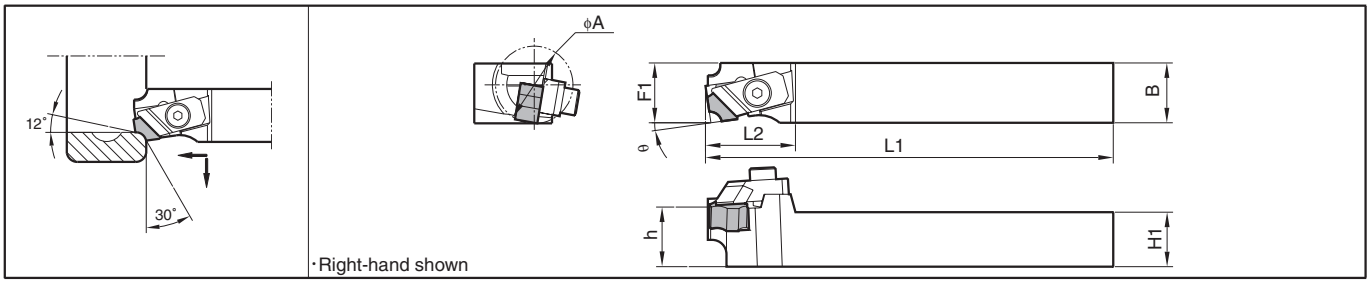
Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) H1	h	B	L1	L2	F1	Spare Parts: Clamp Screw	Spare Parts: Wrench		Applicable Inserts ➡ B95
SRCP R/L	2020B-12-A20	●	●	20	20	15.5	20	125	25	22	SB-4TR	FT-15	-	RPMT1203M0-BB
	2525B-16-A32	●	●	32	25	20	25	150	31	27	SB-5090TR	-	LTW-20	RPMT1604M0-BB

Applicable Inserts

Insert			Description	Dimension (mm) A	T	ϕd	Angle α
			RPMT 1203M0-BB	12.0	3.18	4.4	11°
			RPMT 1604M0-BB	16.0	4.76	5.5	

CBSN-B (Internal Round Chamfering)

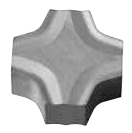
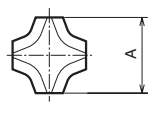
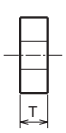
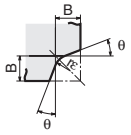


Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) H1	h	B	L1	L2	F1	θ	Spare Parts: Clamp Set	Spare Parts: Wrench		Applicable Inserts ➡ B95
CBSN R/L	2020B-12-A20	●	●	20	20	21	20	125	32	20	9°	CP-RC R/L	LW-5		SNMF1204○○-21
	2525B-12-A20	●	●		25	26	25	150		25					

·Clamp Set: CP-RCR for Right-hand Toolholder, and CP-RCL for Left-hand Toolholder.

Applicable Inserts

Insert				Description	Dimension (mm) A	T	B	rε	Angle θ
				SNMF 120406-21	12.70	4.76	1.5	0.6	21°
				SNMF 120410-21			3.0	1.0	
				SNMF 120416-21			3.1	1.6	
				SNMF 120421-21			3.2	2.1	
				SNMF 120426-21			3.3	2.6	

●: Std. Item

Identification System for Interchangeable Heads

Interchangeable Head	Clamping System	Insert Shape	Hand of Tool	Min. Bore Dia.
	P : Pin Lock (Lever Lock) S : Screw Clamp	C : 80° Rhombic D : 55° Rhombic T : Triangle	R : Right-hand L : Left-hand	

H A 32 P C L N R 12 – 40

Type of Head

A	Steel head with Coolant Hole

Applicable Adapter Diameter

Cutting Edge Angle

F: 90°

L: 95°

U: 93°

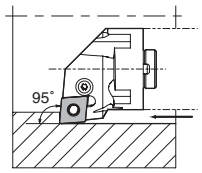
Insert Relief Angle

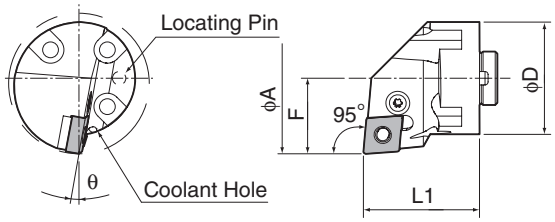
C : 7° Positive
N : 0° Negative

Insert Size

T, C, D

HA…PCLN12 (Boring / Internal Facing, with Coolant Hole)





·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Mi. Bore Dia. ϕA	Dimension (mm) ϕD	L1	F	θ	Std. Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	*Punch	Wrench	Applicable Boring Adapter ➡F66
HA32PCLNR/L12-40	●	●	40	32	41	22	10°	0.8	LL-2K	LS-2P	LC-4K	LSP-3K	*PC-2K	LTP-15	AD32U
HA40PCLNR/L12-50	●	●	50	40		27									AD40V
HA50PCLNR/L12-63	●	●	63	50		35									AD50W

* Punch (*PC-2K): Not included. Purchase separately.

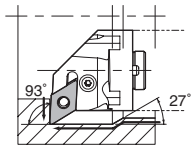
Applicable Inserts

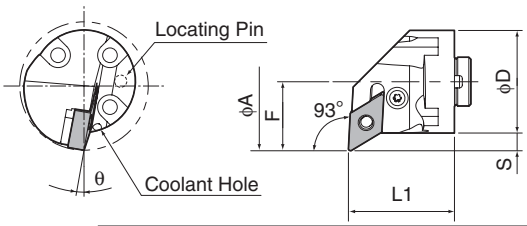
Toolholder Description	Insert Description		Ref. to Page: Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PCLNR/L12-40	CN□A	1204..	B14~B20	B98	C23	C6,C7
HA40PCLNR/L12-50	CN□G					
HA50PCLNR/L12-63	CN□M					

Recommended Cutting Conditions ➡F93~F94

●: Std. Item

HA…PDUN15 (Copying, with Coolant Hole)





·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	L1	F	S	θ	Std. Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	*Punch	Wrench	Applicable Boring Adapter ➡F66
HA32PDUNR/L15-43	●	●	43	32	41	25	9	12°	0.8	LL-3K	LS-3P	LD-4K43 (LD-4K)	LSP-3K	*PC-2K	LTP-15	AD32U
HA40PDUNR/L15-50	●	●	50	40		27	7	10°								AD40V
HA50PDUNR/L15-63	●	●	63	50		35	10									AD50W

* Punch (*PC-2K): Not included. Purchase separately.

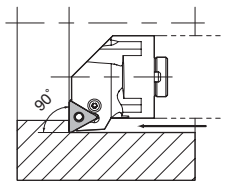
* Shim: LD-4K43 is attached to Toolholder. When using DN□□ 1506 Insert, purchase LD-4K separately.

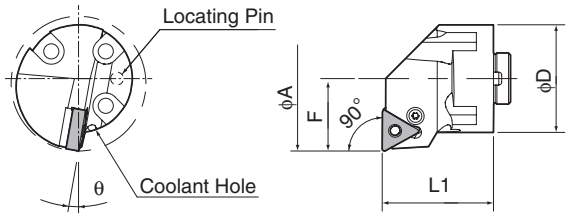
Applicable Inserts

Toolholder Description	Insert Description Shim:LD-4K43		Shim:LD-4K		Ref. to Page: Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PDUNR/L15-43	DN□A	1504..	DN□A	1506..	B21~B27	B99	C23	C8,C9
HA40PDUNR/L15-50	DN□G		DN□G					
HA50PDUNR/L15-63	DN□M		DN□M					

Recommended Cutting Conditions ➡F93~F94

HA…PTFN16 (Boring, with Coolant Hole)





·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	L1	F	θ	Std. Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	*Punch	Wrench	Applicable Boring Adapter ➡F66
HA32PTFNR/L16-40	●	●	40	32	41	22	10°	0.8	LL-1K	LS-1P	LT-3K	LSP-2K	*PC-2K	LTP-10	AD32U
HA40PTFNR/L16-50	●	●	50	40		27									AD40V
HA50PTFNR/L16-63	●	●	63	50		35	8°								AD50W

* Punch (*PC-2K): Not included. Purchase separately.

Applicable Inserts

Toolholder Description	Insert Description		Ref. to Page: Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PTFNR/L16-40	TN□A	1604..	B33~B39	B103	C23	C10,C11
HA40PTFNR/L16-50	TN□G					
HA50PTFNR/L16-63	TN□M					

Recommended Cutting Conditions ➡F93~F94

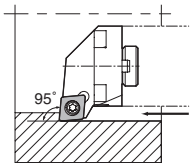
Reference

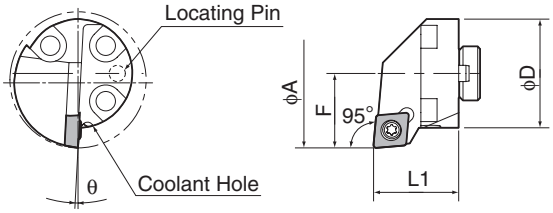
Wrenches (LTP-10, LTP-15) are Torx Plus.
The size of Torx Plus is engraved on the long shaft.

Wrench Description	LTP-10	LTP-15
Engraved Size	10IP	15IP

●: Std. Item

HA…SCLC09 (Boring / Internal Facing, with Coolant Hole)





·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

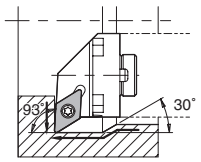
Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	L1	F	S	θ	Std. Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Boring Adapter ➡F66	Applicable Inserts
HA32SCLC$^{R}_{L}$09-40	●	●	40	32	25	22	-	3°	0.8	SB-3580TR	FTS-15	**AD32U**	CC..09T3..

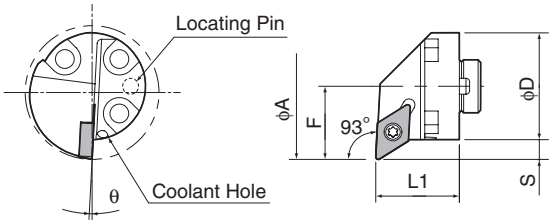
Applicable Inserts

Insert Description	Ref. to Page: Cermet / Coated Carbide / Carbide	PCD	CBN
CC..09T3..	**B49~B55**	**C24**	**C14**

Recommended Cutting Conditions ➡**F93~F94**

HA…SDUC11 (Copying, with Coolant Hole)





·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	L1	F	S	θ	Std. Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Boring Adapter ➡F66	Applicable Inserts
HA32SDUC$^{R}_{L}$11-40	●	●	40	32	25	22	6	3°	0.8	SB-3580TR	FTS-15	**AD32U**	DC..11T3..

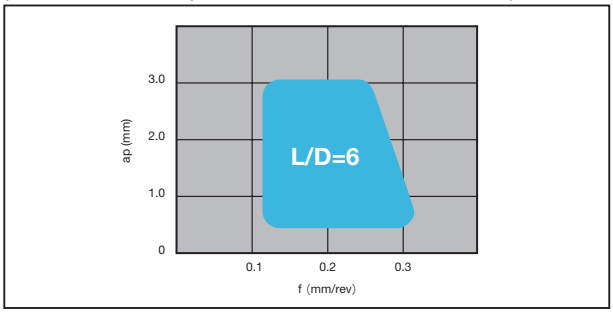
Applicable Inserts

Insert Description	Ref. to Page: Cermet / Coated Carbide / Carbide	PCD	CBN
DC..11T3..	**B57~B65**	**C25**	**C15**

Recommended Cutting Conditions ➡**F93~F94**

Possible machining area (Guide-Line for Overhang Length of AD Bars)

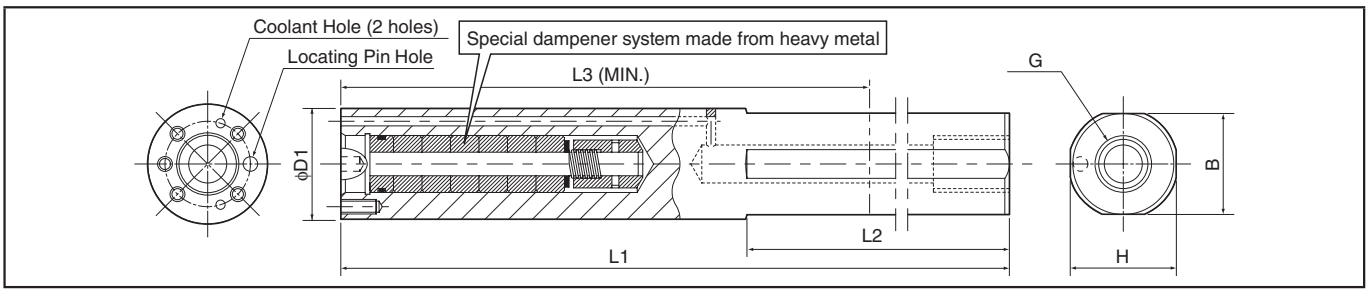
(SCM435 Vc=150m/min ap=0.5~3mm f=0.1~0.3mm/rev TNMG160408)



●: Std. Item

AD Bars Interchangeable Head Boring Bars with Anti-vibration Dampener System

Boring Adapter (with Coolant Hole / Anti-vibration Dampener System)



Dimensions

Description	Std.	Dimension (mm)							Spare Parts		
									Clamp Bolt		Wrench (sold separately)
		φD1	H	B	L1	L2	L3 (MIN.)	G			
AD32U	●	32	31	29	310	200	200	Rp3/8	HH5X20 (3 pcs)	HH5X30 (1 pcs)	LW-4
AD40V	●	40	39	37	360	248	228				
AD50W	●	50	47	47	410	280	276		HH6X20 (3 pcs)	HH6X30 (1 pcs)	LW-5

Note) L3 (MIN.) dimension indicates the minimum length in case of the back end of boring adapter is cut for use.
Do not shorten it to less than L3 (MIN.).

Combination of Boring Adapter and Interchangeable Head

Interchangeable Head Description		Boring Adapter			
		Base Description	Clamp Bolt		Wrench
HA32	**PCLN$^{R}_{L}$ 12-40**	AD32U	HH5X20	HH5X30	LW-4
	PDUN$^{R}_{L}$15-43				
	PTFN$^{R}_{L}$ 16-40				
	SCLC$^{R}_{L}$ 09-40		HH5×20		
	SDUC$^{R}_{L}$11-40				
HA40	**PCLN$^{R}_{L}$ 12-50**	AD40V	HH5X20	HH5X30	
	PDUN$^{R}_{L}$15-50				
	PTFN$^{R}_{L}$ 16-50				
HA50	**PCLN$^{R}_{L}$ 12-63**	AD50W	HH6X20	HH6X30	LW-5
	PDUN$^{R}_{L}$15-63				
	PTFN$^{R}_{L}$ 16-63				

How to exchange heads

1. No head attached

2. Align hole positions

3. Tighten 3 bolts to attach the head

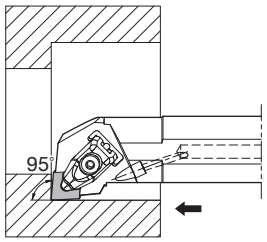
For lever lock type Interchangeable head, use 2 short bolts for upper side and 1 long bolt for lower side.
HA32 SCLC$^{R}_{L}$09-40 and
HA32 SDUC$^{R}_{L}$11-40
use HH5 X 20 for all 3 bolts.

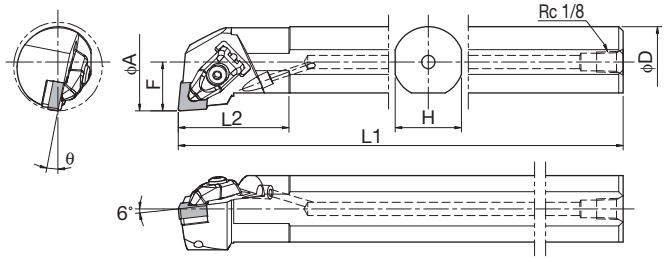
●: Std. Item

Boring Bar [CN□□ Negative Insert]

A-DCLN (Boring / Internal Facing)

Max. Overhang Length L/D=~3





・Right-hand shown

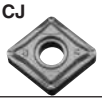
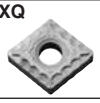
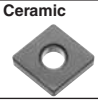
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(re)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
A25R-DCLN$^{R}_{L}$12-32	●	●	32	25	23	200	42	17	-	11°	0.8	CP-3D	CS-3D	SP-3D	DC-42	SB-4085TR	DN10	LW-3	FT-15
A32S-DCLN$^{R}_{L}$12-40	●	●	40	32	30	250	50	22	-	11°									
A40T-DCLN$^{R}_{L}$12-50	●	●	50	40	37	300	60	27	-	14°							DN20		

*Not applicable to high-pressure coolant.

Applicable Inserts

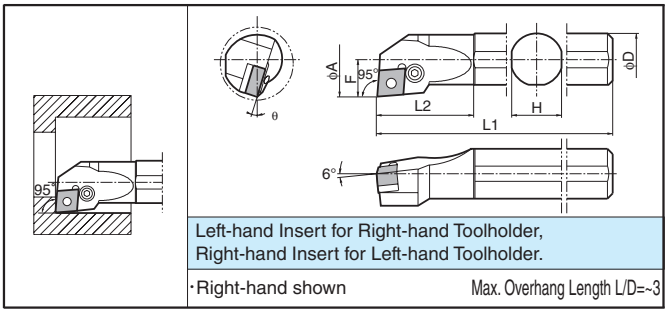
Applications	Finishing	Finishing-Medium	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing
Ref. to Page	**B14**	**B14**	**B14**	**B14**	**B14**	**B14**	**B14**	**B14**	**B15**	**B15**
Insert / Toolholder Description	**WP** (Wiper)	**WQ** (Wiper)	**PP**	**GP**	**PQ**	**HQ**	**CQ**	**CJ** 	**GS**	**PG**
...-DCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..
Applications	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing	Single Sided / Roughing / High Feed Rate	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing
Ref. to Page	**B15**	**B15**	**B16**	**B16**	**B20**	**B17**	**B17**	**B17**	**B18**	**B18**
Insert / Toolholder Description	**PS**	**PT**	**Standard**	**PX**	$^{R}_{L}$	**XP**	**XQ** 	**XS**	**MQ**	**MS**
...-DCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMM1204..	CNGG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..
Applications	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	**B18**	**B19**	**B19**	**B19**	**B19**	**B98**	**B19**	**B19**	**C23**	**C6,C7**
Insert / Toolholder Description	**MU**	**C**	**ZS**	**GC**	Without Chipbreaker	**Ceramic** 	**AH**	$^{R}_{L}$**-A3**	**PCD**	**CBN**
...-DCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMA1204.. CNGA1204..	CNMA1204.. CNGA1204..	CN_G1204..	CNGG1204..	CNMM1204..	CNGA1204..

Recommended Cutting Conditions ➔ **F93~F94**

●: Std. Item

Boring Bar [CN□□ Negative Insert]

S-PCLN○○ (Boring / Internal Facing)

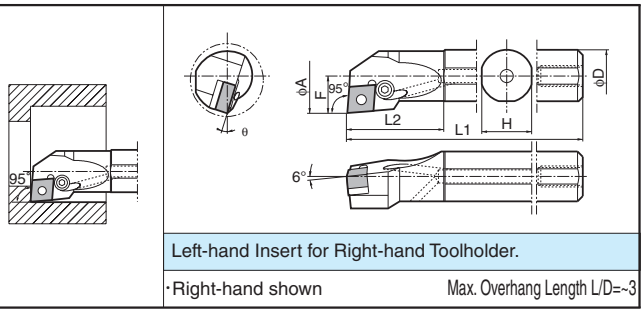


Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

·Right-hand shown Max. Overhang Length L/D=~3

A-PCLN09

(Boring / Internal Facing, with Coolant Hole)
Twin-Hole Bar



Left-hand Insert for Right-hand Toolholder.

·Right-hand shown Max. Overhang Length L/D=~3

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	θ	Std. Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S16M -PCLN$^{R}_{L}$09-20	●	●	20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q -PCLN$^{R}_{L}$09-27	●	●	27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LC-32N	LSP-1	PC-1	
S25R -PCLN$^{R}_{L}$09-32	●	●	32	25	24	200	42	15.7	15°							
S25R -PCLN$^{R}_{L}$12-32	●	●	32	25	24	200	42	16.3	16°	0.8	LL-2N	LS-2N	LC-42N$^{R}_{L}$	LSP-2	PC-2	LW-3
S32S -PCLN$^{R}_{L}$12-40	●	●	40	32	30	250	50	21	10°							
S40T -PCLN$^{R}_{L}$12-50	●	●	50	40	37	300	60	25								
A16M -PCLNR09 -20	●		20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
A20Q -PCLNR09 -27	●		27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LC-32N	LSP-1	PC-1	
A25R -PCLNR09 -32	●		32	25	24	200	42	15.7	15°							

· LC-42NR for Right-hand Toolholder, LC-42NL for Left-hand Toolholder.

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing
Ref. to Page	B14	B14	B14	B14	B14	B14	B14	B14	B15	B15
Insert / Toolholder Description	WP (Wiper)	WQ (Wiper)	PP	GP	PQ	HQ	CQ	CJ	GS	PG
...-PCLN$^{R}_{L}$09-...	-	-	-	CNMG0904..	-	CNMG0904..	-	-	CNMG0904..	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..

Applications	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing	Single Sided / Roughing / High Feed Rate	Finishing	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing
Ref. to Page	B15	B15	B15	B16	B16	B20	B20	B17	B17	B17
Insert / Toolholder Description	PS	HS	PT	Standard	PX	$^{R}_{L}$-S	$^{R}_{L}$	XP	XQ	XS
...-PCLN$^{R}_{L}$09-...	-	-	-	-	-	CNGG0904..	CNGG0904..	-	-	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMM1204..	-	CNGG1204..	CNMG1204..	CNMG1204..	CNMG1204..

Applications	Stainless Steel Finishing	Stainless Steel Medium-Roughing	Stainless Steel Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals
Ref. to Page	B18	B18	B18	B19	B19	B19	B19	B98	B19	B19
Insert / Toolholder Description	MQ	MS	MU	C	ZS	GC	Without Chipbreaker	Ceramic	AH	$^{R}_{L}$-A3
...-PCLN$^{R}_{L}$09-...	-	-	-	-	-	-	-	-	-	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMA1204.. CNGA1204..	CNMA1204.. CNGA1204..	CN_G1204..	CNGG1204..

Applications	Non-ferrous Metals	Hard Materials
Ref. to Page	C23	C6,C7
Insert / Toolholder Description	PCD	CBN
...-PCLN$^{R}_{L}$09-...	-	-
...-PCLN$^{R}_{L}$12-...	CNMM1204..	CNGA1204..

Recommended Cutting Conditions ➡ F93~F94

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A16M-PCLN$^{R}_{L}$09-20	SHC1640-70,SHC1650-95	SJS-8
A20Q-PCLN$^{R}_{L}$09-27	SHC2040-70,SHC2050-95	
A25R-PCLN$^{R}_{L}$09-32	SHC2540-70,SHC2550-95	

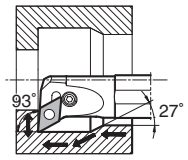
·For Coolant Sleeve, Coolant Joint, ref. to page ➡ F85~F86.

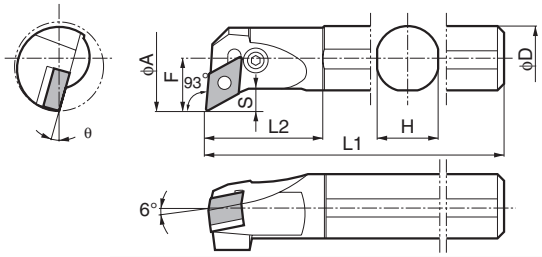
●: Std. Item

Boring Bar [DN11 Small Negative Insert]

S-PDUN11 (Copying)

Max. Overhang Length L/D=~3



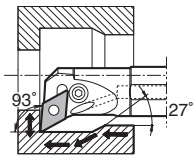


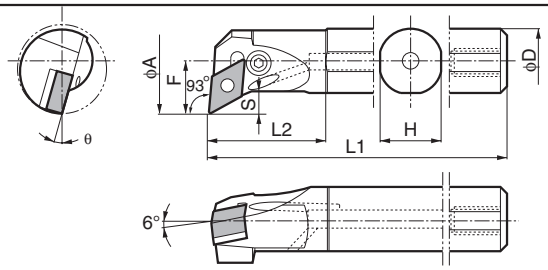
·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

A-PDUN11 Twin-Hole Bar (Copying, with Coolant Hole)

Max. Overhang Length L/D=~3

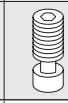




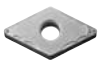
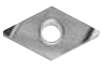
·Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
																	
S20Q -PDUN$^{R}_{L}$11-27	●	●	27	20	19	180	35	16	7.6	17°	0.4	LL-1DN	LS-1SN	LD-32N	LSP-1	PC-1	FH-2.5
S25R -PDUN$^{R}_{L}$11-32	●	●	32	25	24	200	40	17	7.6	15°							
S32S -PDUN$^{R}_{L}$11-40	●	●	40	32	31	250	45	22	8.5	12°							
A20Q -PDUNR11-27	●		27	20	19	180	35	16	7.6	17°	0.4	LL-1DN	LS-1SN	LD-32N	LSP-1	PC-1	FH-2.5
A25R -PDUNR11-32	●		32	25	24	200	40	17	7.6	15°							
A32S -PDUNR11-40	●		40	32	31	250	45	22	8.5	12°							

Applicable Inserts

Applications	Finishing	Finishing-Medium	Medium-Roughing	Finishing	Medium
Ref. to Page	B21	B21	B22	B27	B27
Insert / ToolholderDescription	GP 	HQ	GS	$^{R}_{L}$-S 	$^{R}_{L}$
----PDUN$^{R}_{L}$11----	DNMG1104..	DNMG1104..	DNMG1104..	DNGG1104..	DNGG1104..

Recommended Cutting Conditions ➡ F93~F94

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A20Q -PDUNR11-27	SHC2040-70,SHC2050-95	SJS-8
A25R -PDUNR11-32	SHC2540-70,SHC2550-95	
A32S -PDUNR11-40	-	

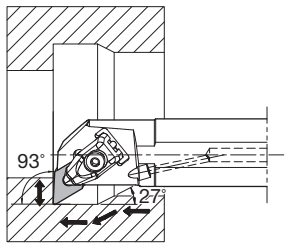
·For Coolant Sleeve, Coolant Joint, ref. to page ➡ F85~F86.

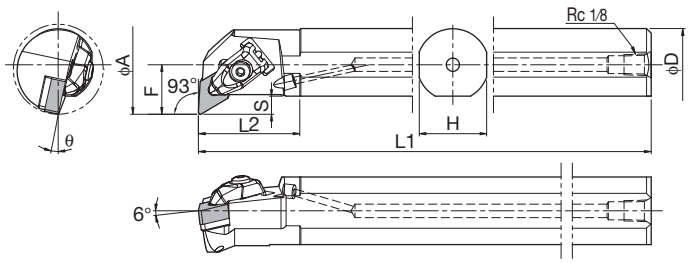
●: Std. Item

Boring Bar [DN15 Negative Insert]

A-DDUN (Boring / Copying)

Max. Overhang Length L/D=~3





・Right-hand shown

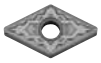
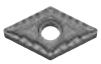
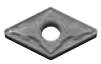
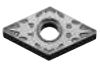
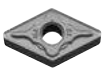
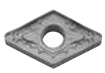
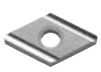
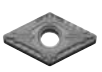
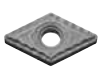
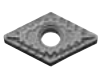
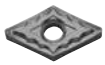
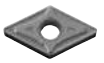
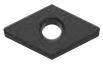
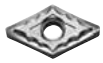
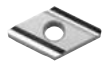
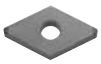
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(rε)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
A32S-DDUN$^{R}_{L}$15-40	●	●	40	32	30	250	45	22	8	12°	0.8	CP-3D	CS-3D	SP-3D	DD-42 *DD-42-16	SB-4085TR	DN10	LW-3	FT-15
A40T- DDUN$^{R}_{L}$15-50	●	●	50	40	37	300	55	27	8.5										
A50U-DDUN$^{R}_{L}$15-63	●	●	63	50	47	350	65	35	10.5								DN20		

When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim (DD-42-16) with * mark and use it in order to prevent workpiece and shim from interfering each other.
*Not applicable to high-pressure coolant.

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing
Ref. to Page	**B21**	**B21**	**B22**	**B22**	**B22**	**B22**	**B23**	**B23**	**B23**
Insert / Toolholder Description	**PP**	**PQ**	**CQ**	**CJ**	**GS**	**PG**	**PS**	**PT**	**Standard**
									
----DDUN$^{R}_{L}$15----	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..
Applications	Roughing	Single Sided / Roughing / High Feed Rate	Medium	Soft Steel / Medium	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing
Ref. to Page	**B24**	**B24**	**B27**	**B24**	**B24**	**B24**	**B25**	**B25**	**B25**
Insert / Toolholder Description	**PH**	**PX**	$^{R}_{L}$	**XP**	**XQ**	**XS**	**MQ**	**MS**	**MU**
									
----DDUN$^{R}_{L}$15----	DNMG1504..	DNMM1504..	DNGG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..
Applications	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	**B25**	**B26**	**B26**	**B26**	**B99**	**B27**	**B27**	**C23**	**C8,C9**
Insert / Toolholder Description	**TK**	**C**	**ZS**	**GC**	**Ceramic**	**AH**	$^{R}_{L}$**-A3**	**PCD**	**CBN**
									
----DDUN$^{R}_{L}$15----	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNGA1504..	DN_G1504..	DNGG1504..	DNMM1504..	DNGA1504..

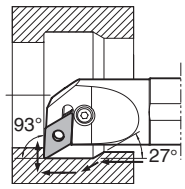
Recommended Cutting Conditions ➔ **F93~F94**

●: Std. Item

Boring Bar [DN15 Negative Insert]

S-PDUN15 (Copying)

Max. Overhang Length L/D=~3



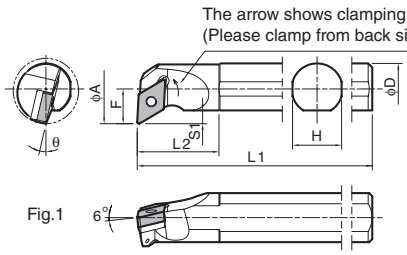


Fig.1

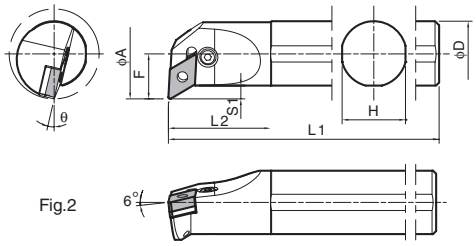


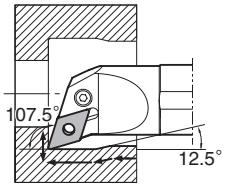
Fig.2

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-PDQN15 (Copying)

Max. Overhang Length L/D=~3



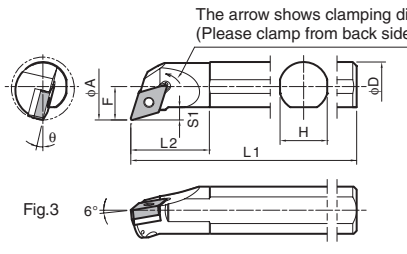


Fig.3

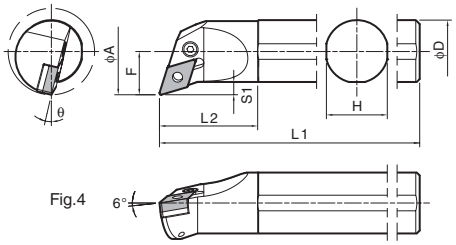


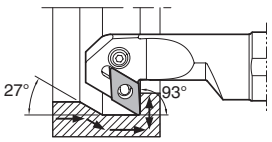
Fig.4

·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-PDZN15 (Back Boring)

Max. Overhang Length L/D=~3



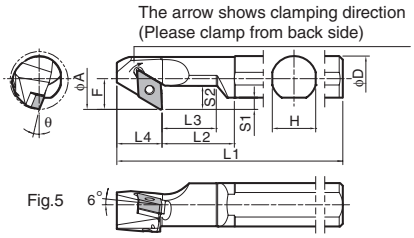


Fig.5

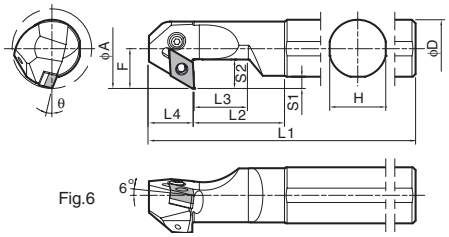


Fig.6

·Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

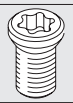
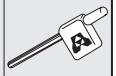
Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	L3	L4	F	S1	S2	θ	Std. Corner-R(rε)	Drawing	Applicable Inserts	
S25R -PDUNR/L15-32	●	●	32	25	24	200	40	-	-	17	6.5	-	13°	0.8	Fig.1	DN□A	1504..
S32S -PDUNR/L15-44	●	●	44	32	31	250	50			22					Fig.2	DN□G	
S40T -PDUNR/L15-54	●	●	54	40	39	300	65			27	7.5		12°			DN□M	
S25R -PDQNR/L15-32	●	●	32	25	24	200	40	-	-	17	6.5	-	13°	0.8	Fig.3	DN□A	1504..
S32S -PDQNR/L15-44	●	●	44	32	31	250	50			22					Fig.4	DN□G	
S40T -PDQNR/L15-54	●	●	54	40	39	300	65			27	7.5		12°			DN□M	
S25R -PDZNR/L15-32	●	●	32	25	24	225	40	30	25	17	6.5	13	13°	0.8	Fig.5	DN□A	1504..
S32S -PDZNR/L15-44	●	●	44	32	31	275	50			22		16			Fig.6	DN□G	
S40T -PDZNR/L15-54	●	●	54	40	39	325	65	50		27	7.5		12°			DN□M	

●: Std. Item

Boring Bar [DN15 Negative Insert]

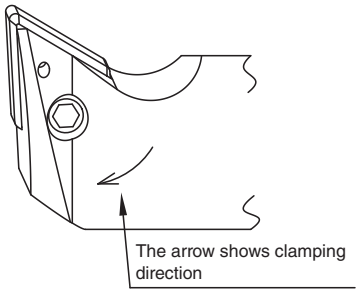
Spare Parts (Common)

Toolholder Description	Spare Parts									
	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Lock Pin	Shim	Shim Screw	Wrench (for Shim Screw)
										
S25R-PD□N$^{R}_{L}$15-32	-	-	-	-	-	LW-3	PP-4	PD-42	SB-2050TR	FT-6
S32S-PD□N$^{R}_{L}$15-44	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2		-	-	-	-
S40T-PD□N$^{R}_{L}$15-54										

· Shim When using inserts whose corner-R(rε) is greater than 1.6mm for S25R-PD□N$^{R}_{L}$15-32, use shim modified by additional processing in order to prevent workpiece and shim from interfering each other.
When using inserts whose corner-R(rε) is greater than 1.6mm for S32S-PD□N$^{R}_{L}$15-44 and S40T-PD□N$^{R}_{L}$15-54, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

How to change S25R-PD□N$^{R}_{L}$15-32 inserts

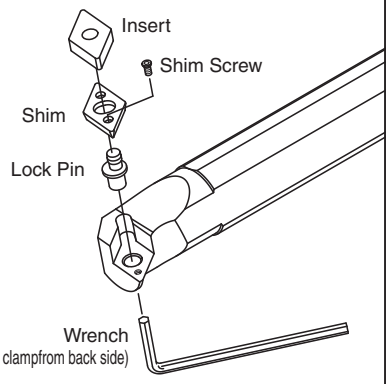
· Please replace S25R-PD□N$^{R}_{L}$15-32 insert from the back side



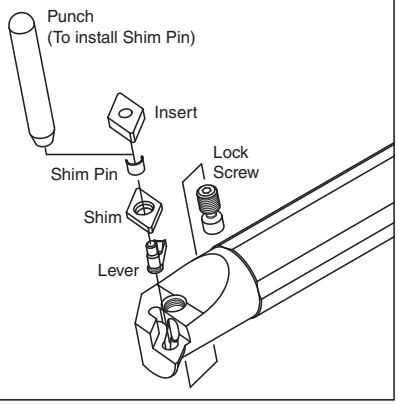
Back side of toolholder

How to assemble spare parts

· S25R-PD□N$^{R}_{L}$15-32 (Pin Lock)



· S32S-PD□N$^{R}_{L}$15-44 (Lever Lock)
· S40T-PD□N$^{R}_{L}$15-54 (Lever Lock)



Applicable Inserts

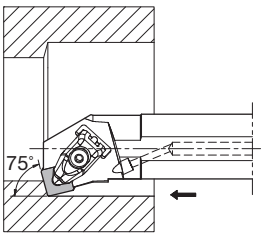
Applications	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing
Ref. to Page	B21	B21	B22	B22	B22	B22	B23	B23	B23
Insert / Toolholder Description	PP	PQ	CQ	CJ	GS	PG	PS	PT	Standard
----PD□N$^{R}_{L}$15----	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..
Applications	Roughing	Single Sided / Roughing / High Feed Rate	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel Finishing	Stainless Steel Medium-Roughing	Stainless Steel Medium-Roughing
Ref. to Page	B24	B24	B27	B24	B24	B24	B25	B25	B25
Insert / Toolholder Description	PH	PX	$^{R}_{L}$	XP	XQ	XS	MQ	MS	MU
----PD□N$^{R}_{L}$15----	DNMG1504..	DNMM1504..	DNGG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..
Applications	Stainless Steel Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B25	B26	B26	B26	B99	B27	B27	C23	C8,C9
Insert / Toolholder Description	TK	C	ZS	GC	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
----PD□N$^{R}_{L}$15----	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNGA1504..	DN_G1504..	DNGG1504..	DNMM1504..	DNGA1504..

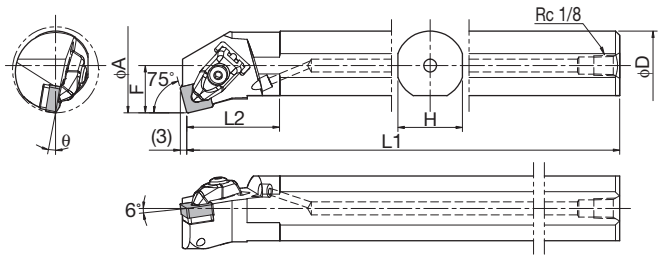
Recommended Cutting Conditions ➡ F93~F94

Boring Bar [SN12 Negative Insert]

A-DSKN (Boring)

Max. Overhang Length L/D=~3





・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(re)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
A25R-DSKN$^{R}_{L}$12-32	●	●	32	25	23	200	43	17	-	11°	0.8	CP-3D	CS-3D	SP-3D	DS-42	SB-4085TR	DN10	LW-3	FT-15
A32S-DSKN$^{R}_{L}$12-40	●	●	40	32	30	250	43	22	-	11°									
A40T- DSKN$^{R}_{L}$12-50	●	●	50	40	37	300	53	27	-	11°							DN20		

*Not applicable to high-pressure coolant.

Applicable Inserts

Applications	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing	Roughing	Single Sided / Roughing / High Feed Rate
Ref. to Page	B29	B29	B29	B29	B29	B29	B30	B30
Insert / Toolholder Description	PQ	PG	PS	HS	PT	Standard	PH	PX
···DSKN$^{R}_{L}$12···	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMM1204..
Applications	Finishing-Roughing	Medium-Roughing / Low Cutting Force	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel Finishing	Stainless Steel Medium-Roughing	Cast Iron
Ref. to Page	B32	B32	B30	B30	B30	B31	B31	B31
Insert / Toolholder Description	$^{R}_{L}$-□	$^{R}_{L}$-25R	XP	XQ	XS	MQ	MS	C
···DSKN$^{R}_{L}$12···	SNGG1204..	SNGG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..
Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Hard Materials			
Ref. to Page	B31	B31	B31	B101	C10			
Insert / Toolholder Description	ZS	GC	Without Chipbreaker	Ceramic	CBN			
···DSKN$^{R}_{L}$12···	SNMG1204..	SNMG1204..	SN□A1204..	SN□A1204..	SNGA1204..			

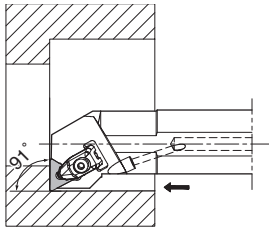
Recommended Cutting Conditions ➡ F93~F94

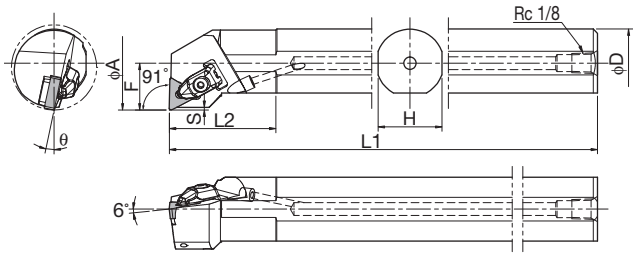
●: Std. Item

Boring Bar [TN□□ Negative Insert]

A-DTFN (Boring)

Max. Overhang Length L/D=~3





・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(re)	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
A25R-DTFN$^{R}_{L}$16-32	●	●	32	25	23	200	42	17	0.8	12°	0.8	CP-2D	CS-2D	SP-3D	DT-32	SB-3080TR	DN10	LW-2.5	FT-10
A32S-DTFN$^{R}_{L}$16-40	●	●	40	32	30	250	50	22	1.2	12°									
A40T- DTFN$^{R}_{L}$22-50	●	●	50	40	37	300	60	27	1.5	12°		CP-3D	CS-3D	SP-3D	DT-42	SB-4085TR	DN20	LW-3	FT-15

*Not applicable to high-pressure coolant.

Applicable Inserts

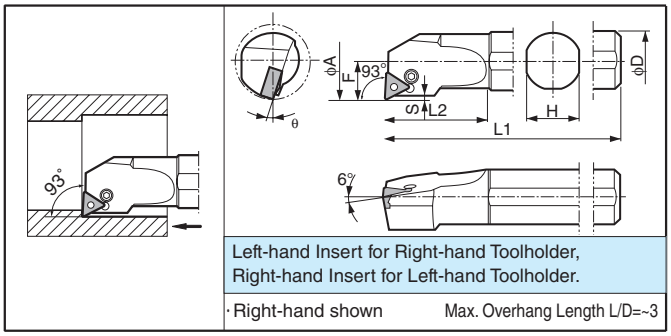
Applications	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate
Ref. to Page	B33	B33	B33	B33	B33	B33	B33	B33	B34	B34
Insert / Toolholder Description	PP	GP	PQ	HQ	CQ	GS	PG	PS	HS	PT
----DTFN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
----DTFN$^{R}_{L}$22----	-	-	-	-	TNMG2204..	-	-	TNMG2204..	TNMG2204..	-
Applications	Medium-Roughing / High Feed Rate	Roughing	Finishing	Medium-Roughing	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel Finishing	Stainless Steel Medium-Roughing	Stainless Steel Medium-Roughing
Ref. to Page	B34	B34	B38	B38,B39	B35	B35	B35	B36	B36	B36
Insert / Toolholder Description	GT	Standard	$^{R}_{L}$-S	$^{R}_{L}$-□	XP	XQ	XS	MQ	MS	MU
----DTFN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNGG1604..	TNGG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
----DTFN$^{R}_{L}$22----	-	TNMG2204..	-	TNGG2204..	-	-	-	-	-	-
Applications	Stainless Steel Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B36	B37	B37	B37	B37	B103	B37	B37	C23	C10,C11
Insert / Toolholder Description	$^{R}_{L}$-ST	C	ZS	GC	Without Chipbreaker	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
----DTFN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMA1604.. TNGA1604..	TNGA1604..	TN_G1604..	TNGG1604..	TNMM1604..	TNGA1604..
----DTFN$^{R}_{L}$22----	-	-	-	-	-	-	-	-	-	-

Recommended Cutting Conditions ➔ F93~F94

●: Std. Item

Boring Bar [TN□□ Negative Insert]

S-PTUN○○ (Boring)

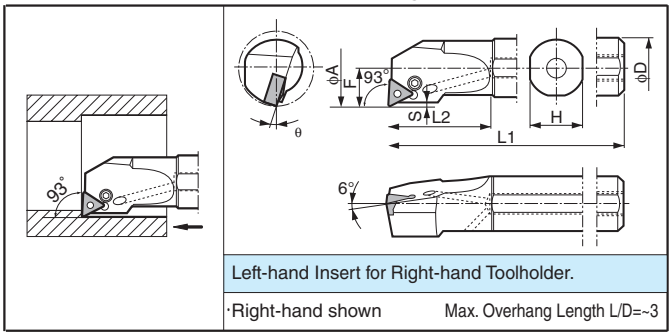


Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

· Right-hand shown Max. Overhang Length L/D=~3

A-PTUN11

Twin-Hole Bar
(Boring, with Coolant Hole)



Left-hand Insert for Right-hand Toolholder.

· Right-hand shown Max. Overhang Length L/D=~3

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S16M-PTUN$^{R}_{L}$11-20	●	●	20	16	15	150	34	11	0.3	18°	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
S20Q-PTUN$^{R}_{L}$11-25	●	●	25	20	19	180	37	13.2	0.2	17°							
S25R-PTUN$^{R}_{L}$11-32	●	●	32	25	24	200	42	15.7	0.3	16°							
S16M-PTUN$^{R}_{L}$16-20	●	●	20	16	15	150	34	11	1.3	18°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q-PTUN$^{R}_{L}$16-25	●	●	25	20	19	180	37	13.2	1.3	17°							
S25R-PTUN$^{R}_{L}$16-30	●	●	30	25	24	200	42	15.5	1.3	13°							
S32S-PTUN$^{R}_{L}$16-40	●	●	40	32	30	250	50	22	0.7	13°		LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
S40T-PTUN$^{R}_{L}$16-50	●	●	50	40	37	300	60	27	0.6	11°							
A16M-PTUNR11-20	●		20	16	15	150	34	11	0.3	18°	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
A20Q-PTUNR11-25	●		25	20	19	180	37	13.2	0.2	17°							
A25R-PTUNR11-32	●		32	25	24	200	42	15.7	0.3	16°							

NEW

· When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

Applications	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate
Ref. to Page	B33	B33	B33	B33	B33	B33	B33	B33	B34	B34
Insert / Toolholder Description	PP	GP	PQ	HQ	CQ	GS	PG	PS	HS	PT
----PTUN$^{R}_{L}$11----	-	TNMG1104..	-	TNMG1104..	-	TNMG1104..	-	-	-	-
----PTUN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
Applications	Medium-Roughing / High Feed Rate	Roughing	Finishing	Medium-Roughing	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel Finishing	Stainless Steel Medium-Roughing	Stainless Steel Medium-Roughing
Ref. to Page	B34	B34	B38	B38,B39	B35	B35	B35	B36	B36	B36
Insert / Toolholder Description	GT	Standard	$^{R}_{L}$-S	$^{R}_{L}$-□	XP	XQ	XS	MQ	MS	MU
----PTUN$^{R}_{L}$11----	-	-	TNGG1104..	TNGG1104..	-	-	-	-	-	-
----PTUN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNGG1604..	TNGG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
Applications	Stainless Steel Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B36	B37	B37	B37	B37	B103	B37	B37	C23	C10,C11
Insert / Toolholder Description	$^{R}_{L}$-ST	C	ZS	GC	Without Chipbreaker	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
----PTUN$^{R}_{L}$11----	-	-	-	-	-	-	-	-	-	-
----PTUN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMA1604.. TNGA1604..	TNGA1604..	TN_G1604..	TNGG1604..	TNMM1604..	TNGA1604..

Recommended Cutting Conditions ➡ F93~F94

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A16M-PTUN$^{R}_{L}$11-20	SHC1640-70,SHC1650-95	SJS-8
A20Q-PTUN$^{R}_{L}$11-25	SHC2040-70,SHC2050-95	
A25R-PTUN$^{R}_{L}$11-32	SHC2540-70,SHC2550-95	

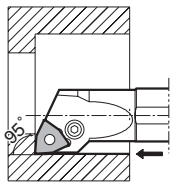
· For Coolant Sleeve, Coolant Joint, ref. to page ➡ F85~F86.

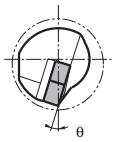
●: Std. Item

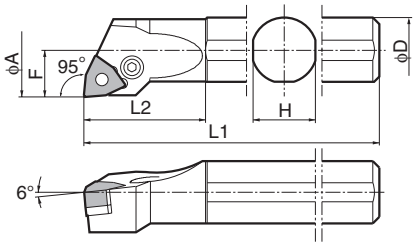
Boring Bar [WN06 Small Negative Insert]

S-PWLN06 (Boring / Internal Facing)

Max. Overhang Length L/D=~3





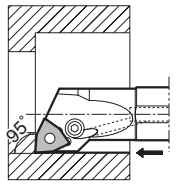


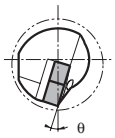
・Right-hand shown

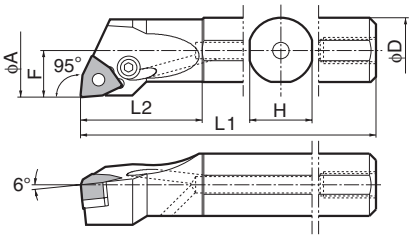
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

A-PWLN06 Twin-Hole Bar (Boring / Internal Facing, with Coolant Hole)

Max. Overhang Length L/D=~3







・Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	θ	Std. Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S16M -PWLN$^{R}_{L}$06 -20	●	●	20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q -PWLN$^{R}_{L}$06 -27	●	●	27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LW-32N	LSP-1	PC-1	
S25R -PWLN$^{R}_{L}$06 -32	●	●	32	25	24	200	42	15.7	15°							
A16M -PWLNR06 -20	●		20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
A20Q -PWLNR06 -27	●		27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LW-32N	LSP-1	PC-1	
A25R -PWLNR06 -32	●		32	25	24	200	42	15.7	15°							

Applicable Inserts

Applications	Finishing	Finishing-Medium	Medium-Roughing	Finishing	Medium
Ref. to Page	B42	B42	B43	B45	B45
Insert / Toolholder Description	GP	HQ	GS	$^{R}_{L}$-S	$^{R}_{L}$
----PWLN$^{R}_{L}$06----	WNMG0604..	WNMG0604..	WNMG0604..	WNGG0604..	WNGG0604..

Recommended Cutting Conditions ➡ F93~F94

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A16M-PWLNR06-20	SHC1640-70,SHC1650-95	SJS-8
A20M-PWLNR06-27	SHC2040-70,SHC2050-95	
A25R-PWLNR06-32	SHC2540-70,SHC2550-95	

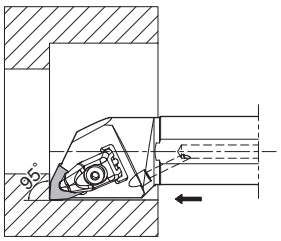
For Coolant Sleeve, Coolant Joint, ref. to page ➡ F85~F86.

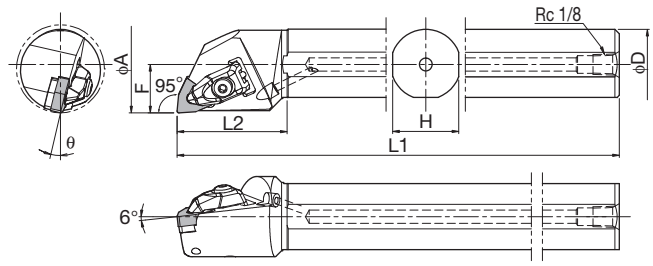
●: Std. Item

Boring Bar [WN08 Negative Insert]

A-DWLN (Boring / Internal Facing)

Max. Overhang Length L/D=~3





・Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	S	θ	Std. Corner-R(re)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
A25R-DWLNR/L08-32	●	●	32	25	23	200	50	17	-	13°	0.8	CP-3D	CS-3D	SP-3D	DW-42	SB-4085TR	DN10	LW-3	FT-15
A32S-DWLNR/L08-40	●	●	40	32	30	250	50	22	-	13°									
A40T- DWLNR/L08-50	●	●	50	40	37	300	60	27	-	13°							DN20		

*Not applicable to high-pressure coolant.

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing
Ref. to Page	B42	B42	B42	B42	B42	B42	B43	B43	B43	B43	B43
Insert / Toolholder Description	WP (Wiper)	WQ (Wiper)	PP	PQ	CQ	CJ	GS	PG	PS	PT	Standard
...-DWLNR/L08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..

Applications	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel Finishing	Stainless Steel Medium-Roughing	Stainless Steel Medium-Roughing	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B44	B44	B44	B44	B44	B44	B45	B45	B45	C23	C13
Insert / Toolholder Description	XP	XQ	XS	MQ	MS	MU	C(GC)	ZS	AH	PCD	CBN
...-DWLNR/L08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNGG0804..	WNMM0804..	WNGA0804..

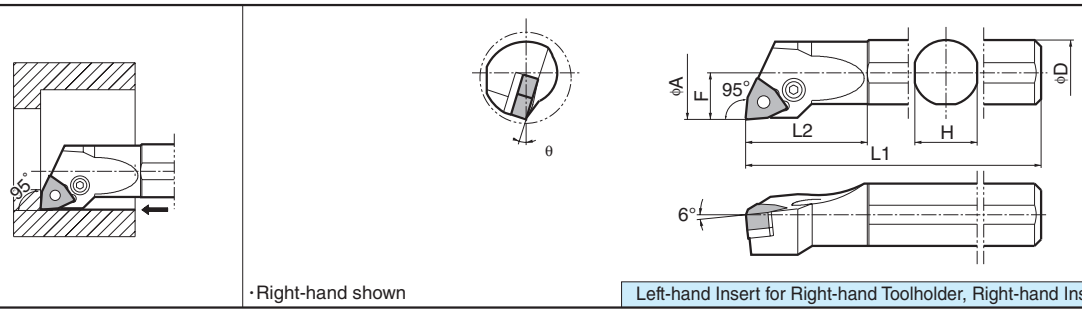
Recommended Cutting Conditions ➔ F93~F94

●: Std. Item

Boring Bar [WN08 Negative Insert]

S-PWLN08 (Boring / Internal Facing)

Max. Overhang Length L/D=~3



·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

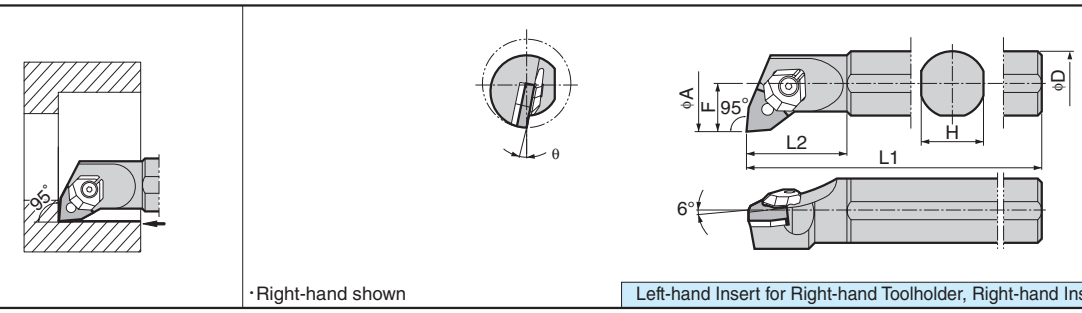
Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	θ	Std. Corner-R(rε)	Spare Parts Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S32S -PWLN$^{R}_{L}$08-40	●	●	40	32	30	250	50	22	10°	0.8	LL-2N	LS-2N	LW-42N$^{R}_{L}$	LSP-2	PC-2	LW-3
S40T -PWLN$^{R}_{L}$08-50	●	●	50	40	37	300	60	27								

· Shim: LW-42NR for Right-hand Toolholder, LW-42NL for Left-hand Toolholder.

S-WWLN08-E Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5



·Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	θ	Std. Corner-R(rε)	Spare Parts Clamp Set	Wrench	Shim	Shim Pin	Wrench
S25S -WWLN$^{R}_{L}$08-28E	●	●	28	25	24	250	36	14	13°	1.2	WCS-8	LW-3	WWP-42 WWP-42-16	WP5X11	LW-2
S25S -WWLN$^{R}_{L}$08-34E	●	●	34	25	24		40	17	11°						
S32S -WWLN$^{R}_{L}$08-40E	●	●	40	32	30		50	20	10°						

· When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Roughing
Ref. to Page	B42	B42	B42	B42	B42	B42	B43	B43	B43	B43	B43
Insert / Toolholder Description	WP(Wiper)	WQ(Wiper)	PP	PQ	CQ	CJ	GS	PG	PS	PT	Standard
...-PWLN$^{R}_{L}$08-... / ...-WWLN$^{R}_{L}$08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..
Applications	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel Finishing	Stainless Steel Medium-Roughing	Stainless Steel Medium-Roughing	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. to Page	B44	B44	B44	B44	B44	B44	B45	B45	B45	C23	C13
Insert / Toolholder Description	XP	XQ	XS	MQ	MS	MU	C(GC)	ZS	AH	PCD	CBN
...-PWLN$^{R}_{L}$08-... / ...-WWLN$^{R}_{L}$08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNGG0804..	WNMM0804..	WNGA0804..

· In wedge lock, use of ceramic insert other than silicon nitride insert is not recommended due to strong restrain force.

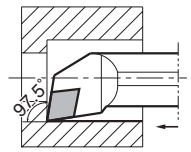
Recommended Cutting Conditions F93~F94

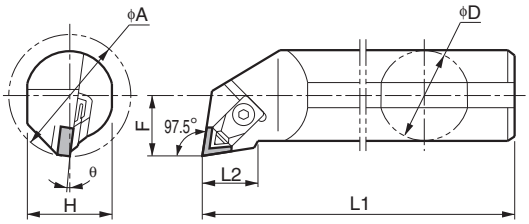
●: Std. Item

Boring Bars for Ceramic Tools [EN□□, SN□□ Insert]

S-CELN (Boring / Internal Facing)

Max. Overhang Length L/D=~3





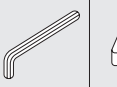
·Right-hand shown

Applicable Inserts

Cast Iron / Hard Materials
B99
Ceramic
ENGN1307..

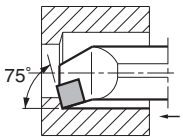
Recommended Cutting Conditions ➡ F93~F94

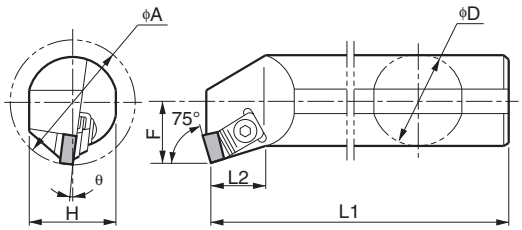
Toolholder Dimensions

Description	Std.		Min. Bore Dia.	Dimension (mm)					θ	Std. Corner-R(rε)	Spare Parts				
	R	L	ϕA	ϕD	H	L1	L2	F			Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
															
S40T-CELNR13-50	●		50	40	37	300	32	27	12°	0.8	CB-16	CE-010	LW-4	SP-341P	M3X8

S-CSKN (Boring)

Max. Overhang Length L/D=~3





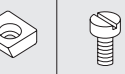
·Right-hand shown

Applicable Inserts

Cast Iron / Hard Materials	Cast Iron	Hard Materials / Cast Iron
B101	B31	C19
Ceramic	Coated Carbide	CBN(KBN900)
SNGN1207..(1204..) SNMN1207..	(SNMN1204..)	(SNMN1204..)

Recommended Cutting Conditions ➡ F93~F94

Toolholder Dimensions

Description	Std.		Min. Bore Dia.	Dimension (mm)					θ	Std. Corner-R(rε)	Spare Parts				
	R	L	ϕA	ϕD	H	L1	L2	F			Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
															
S40T-CSKN$^{R}_{L}$12-50	●	●	50	40	37	300	26	27	10.5°	0.8	CB-13/12	CE-320	LW-4	SP-141P (SP-143P)	M3X8 (M3X12)

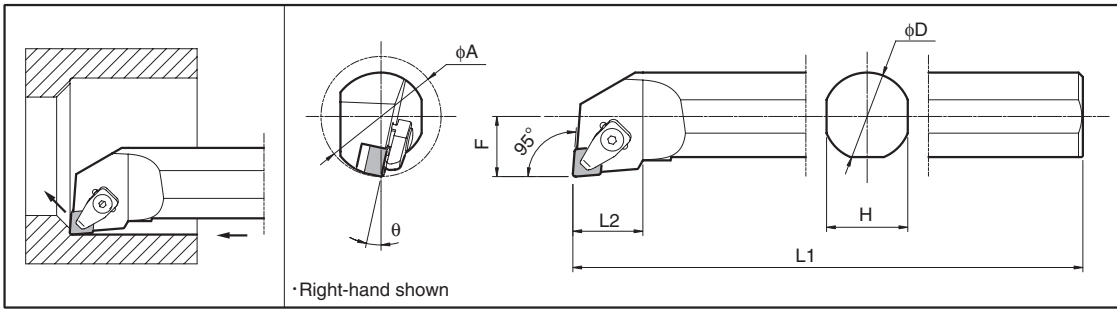
· Chipbreaker: CB-13 for Right-hand Toolholder, CB-12 for Left-hand Toolholder.

· Shim & Shim Screw : When using SN□□1204 Insert, purchase spare parts in ( ) separately.

●: Std. Item

S-CCLN-GX (Boring / Internal Facing)

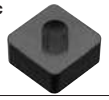
Max. Overhang Length L/D=~3



·Right-hand shown

Applicable Inserts

Cast Iron
B98
Ceramic



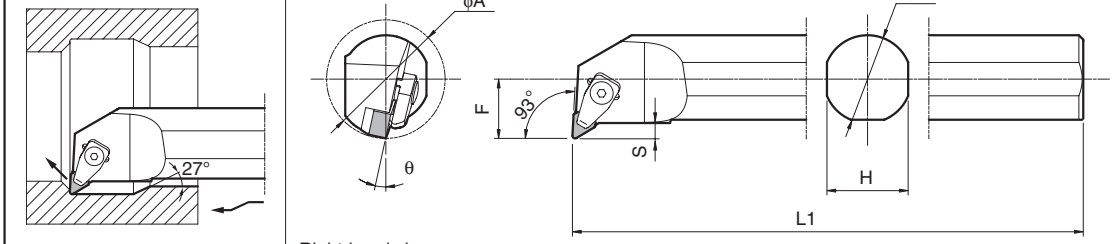
CNGX1207..

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	θ	Std. Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	Recommended Cutting Conditions
S32S- CCLN$^{R}_{L}$12-40GX	●	●	40	32	30	250	32	22	14°	1.2	CE-410	LW-4	-	-	F93~F94
S40T- CCLN$^{R}_{L}$12-50GX	●	●	50	40	37	300	32	27	12°	1.2	CE-410	LW-4	SP-441P	M3X8	

S-CDUN-GX (Boring / Copying)

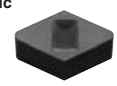
Max. Overhang Length L/D=~3



·Right-hand shown

Applicable Inserts

Cast Iron
B99
Ceramic



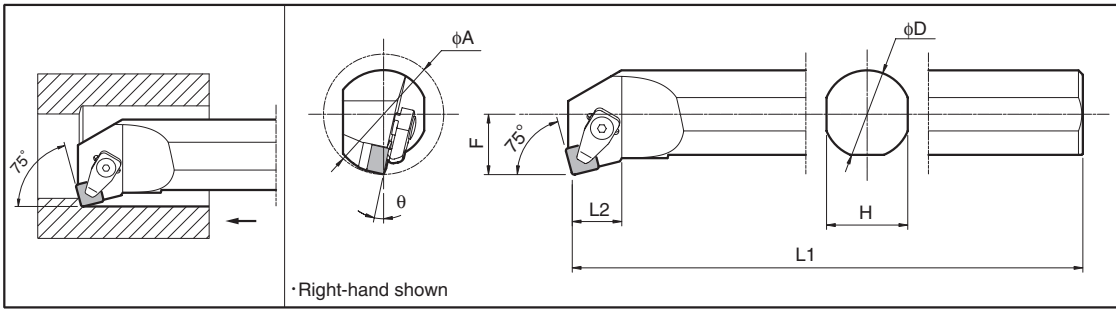
DNGX1207..

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	S	F	θ	Std. Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	Recommended Cutting Conditions
S32S- CDUN$^{R}_{L}$12-40GX	●	●	40	32	30	250	7.5	22	14°	1.2	CE-410	LW-4	-	-	F93~F94
S40T- CDUN$^{R}_{L}$12-50GX	●	●	50	40	37	300	7.5	27	12°	1.2	CE-410	LW-4	SP-521P	M3X8	

S-CSKN-GX (Boring)

Max. Overhang Length L/D=~3



·Right-hand shown

Applicable Inserts

Cast Iron
B102
Ceramic

SNGX1207..

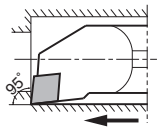
Toolholder Dimensions

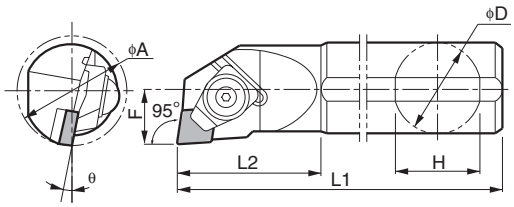
Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	θ	Std. Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	Recommended Cutting Conditions
S32S- CSKN$^{R}_{L}$12-40GX	●	●	40	32	30	250	22.5	22	14°	1.2	CE-410	LW-4	-	-	F93~F94
S40T- CSKN$^{R}_{L}$12-50GX	●	●	50	40	37	300	22.5	27	12°	1.2	CE-410	LW-4	SP-141P	M3X8	

●: Std. Item

Boring Bars for CBN Tools [CNMN,TNMN Insert]

S-CCLN-A (Boring / Internal Facing)





・Right-hand shown

Applicable Inserts

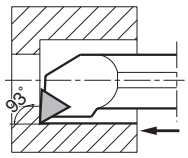
Hard Materials / Cast Iron
C19
CBN (KBN900)
CNMN0903..

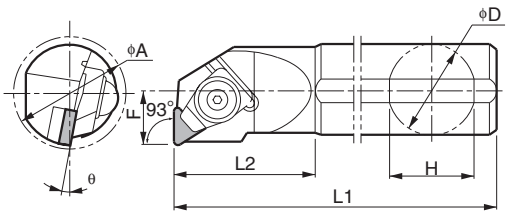
Recommended Cutting Conditions F93~F94

Toolholder Dimensions

Description	Std.		Min. Bore Dia.	Dimension (mm)					θ	Std. Corner-R(rε)	Spare Parts			
	R	L	ϕA	ϕD	H	L1	L2	F			Clamp Set	Wrench	Shim	Shim Screw
S32S-CCLNR/L09-40A	●	●	40	32	30	250	50	22	8°	0.8	CE-360S	LW-4	SP-420A	BH3X6

S-CTUN-A (Boring)





・Right-hand shown

Applicable Inserts

Hard Materials / Cast Iron	Cast Iron / Hard Materials
C19	B103
CBN (KBN900)	Ceramic
TNMN1103..	TNGN1103..

Recommended Cutting Conditions F93~F94

Toolholder Dimensions

Description	Std.		Min. Bore Dia.	Dimension (mm)					θ	Std. Corner-R(rε)	Spare Parts			
	R	L	ϕA	ϕD	H	L1	L2	F			Clamp Set	Wrench	Shim	Shim Screw
S25X-CTUNR11-30A	●		30	25	24	220	40	15	10°	0.8	CE-360S	LW-4	SP-210A	BH3X6

●: Std. Item

EZH Sleeves

Sleeve Description				Applicable Inserts					Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length with coolant hole)	EZH-HP (Adjustable overhang length)	EZH-ST	Sleeve Shank Dia. ϕD1(mm)	EZB	EZG EZFG EZT EZVB	EZ Bar PLUS	HP	Shank Dia. ϕD(mm)	
–	–	EZH 01712ST-80	12	EZBR ...017...	–	–	–	1.7	(General purpose)
		02012ST-80		EZBR ...020...			HPB R/L 0202-...	2	
		02512ST-80		EZBR ...025...	EZ__ ...025-...		–	2.5	
		03012ST-80		EZBR ...030...	EZ__ ...030-...		HPB R/L 0303-...	3	
		03512ST-80		EZBR ...035...	EZ__ ...035-...		–	3.5	
		04012ST-80		EZBR ...040...	EZ__ ...040-...		HP__ ..04-...	4	
		05012ST-80		EZBR ...050...	EZ__ ...050-...		HP__ ..05-...	5	
		06012ST-80		EZBR ...060...	EZ__ ...060-...		HP__ 0606-...	6	
		07012ST-80		EZBR ...070...	EZ__ ...070-...		HP__ ..07-...	7	
–	EZH 01716HP-100	EZH 01716ST-100	16	EZBR ...017...	–	–	–	1.7	(General purpose)
	02016HP-100	02016ST-100		EZBR ...020...			HPB R/L 0202-...	2	
	02516HP-100	02516ST-100		EZBR ...025...	EZ__ ...025-...		–	2.5	
	03016HP-100	03016ST-100		EZBR ...030...	EZ__ ...030-...		HPB R/L 0303-...	3	
	03516HP-100	03516ST-100		EZBR ...035...	EZ__ ...035-...		–	3.5	
	04016HP-100	04016ST-100		EZBR ...040...	EZ__ ...040-...		HP__ ..04-...	4	
	04516HP-100	–		–	–	_045X- ...-050EZ	–	4.5	
	05016HP-100	05016ST-100		EZBR ...050...	EZ__ ...050-...	–	HP__ ..05-...	5	
	06016HP-100	06016ST-100		EZBR ...060...	EZ__ ...060-...	_060X- ...-070EZ	HP__ 0606-...	6	
	07016HP-100	07016ST-100		EZBR ...070...	EZ__ ...070-...	–	HP__ ..07-...	7	
EZH 01719CT-120	EZH 01719HP-120	EZH 01719ST-120	19.05	EZBR ...017...	–	–	–	1.7	Citizen Machinery
02019CT-120	02019HP-120	02019ST-120		EZBR ...020...			HPB R/L 0202-...	2	
02519CT-120	02519HP-120	02519ST-120		EZBR ...025...	EZ__ ...025-...		–	2.5	
03019CT-120	03019HP-120	03019ST-120		EZBR ...030...	EZ__ ...030-...		HPB R/L 0303-...	3	
03519CT-120	03519HP-120	03519ST-120		EZBR ...035...	EZ__ ...035-...		–	3.5	
04019CT-120	04019HP-120	04019ST-120		EZBR ...040...	EZ__ ...040-...		HP__ ..04-...	4	
–	04519HP-120	–		–	–	_045X- ...-050EZ	–	4.5	
05019CT-120	05019HP-120	05019ST-120		EZBR ...050...	EZ__ ...050-...	–	HP__ ..05-...	5	
06019CT-120	06019HP-120	06019ST-120		EZBR ...060...	EZ__ ...060-...	_060X- ...-070EZ	HP__ 0606-...	6	
07019CT-120	07019HP-120	07019ST-120		EZBR ...070...	EZ__ ...070-...	–	HP__ ..07-...	7	
EZH 01720CT-120	EZH 01720HP-120	EZH 01720ST-120	20	EZBR ...017...	–	–	–	1.7	Eguro Tsugami Citizen Machinery (General purpose)
02020CT-120	02020HP-120	02020ST-120		EZBR ...020...			HPB R/L 0202-...	2	
02520CT-120	02520HP-120	02520ST-120		EZBR ...025...	EZ__ ...025-...		–	2.5	
03020CT-120	03020HP-120	03020ST-120		EZBR ...030...	EZ__ ...030-...		HPB R/L 0303-...	3	
03520CT-120	03520HP-120	03520ST-120		EZBR ...035...	EZ__ ...035-...		–	3.5	
04020CT-120	04020HP-120	04020ST-120		EZBR ...040...	EZ__ ...040-...		HP__ ..04-...	4	
–	04520HP-120	–		–	–	_045X- ...-050EZ	–	4.5	
05020CT-120	05020HP-120	05020ST-120		EZBR ...050...	EZ__ ...050-...	–	HP__ ..05-...	5	
06020CT-120	06020HP-120	06020ST-120		EZBR ...060...	EZ__ ...060-...	_060X- ...-070EZ	HP__ 0606-...	6	
07020CT-120	07020HP-120	07020ST-120		EZBR ...070...	EZ__ ...070-...	–	HP__ ..07-...	7	
EZH 01722CT-135	EZH 01722HP-135	EZH 01722ST-135	22	EZBR ...017...	–	–	–	1.7	Star Micronics Nomura DS Tsugami
02022CT-135	02022HP-135	02022ST-135		EZBR ...020...			HPB R/L 0202-...	2	
02522CT-135	02522HP-135	02522ST-135		EZBR ...025...	EZ__ ...025-...		–	2.5	
03022CT-135	03022HP-135	03022ST-135		EZBR ...030...	EZ__ ...030-...		HPB R/L 0303-...	3	
03522CT-135	03522HP-135	03522ST-135		EZBR ...035...	EZ__ ...035-...		–	3.5	
04022CT-135	04022HP-135	04022ST-135		EZBR ...040...	EZ__ ...040-...		HP__ ..04-...	4	
–	04522HP-135	–		–	–	_045X- ...-050EZ	–	4.5	
05022CT-135	05022HP-135	05022ST-135		EZBR ...050...	EZ__ ...050-...	–	HP__ ..05-...	5	
06022CT-135	06022HP-135	06022ST-135		EZBR ...060...	EZ__ ...060-...	_060X- ...-070EZ	HP__ 0606-...	6	
07022CT-135	07022HP-135	07022ST-135		EZBR ...070...	EZ__ ...070-...	–	HP__ ..07-...	7	
EZH 01725.0CT-135	EZH 01725.0HP-135	EZH 01725.0ST-135	25	EZBR ...017...	–	–	–	1.7	Eguro Tsugami Citizen Machinery (General purpose)
02025.0CT-135	02025.0HP-135	02025.0ST-135		EZBR ...020...			HPB R/L 0202-...	2	
02525.0CT-135	02525.0HP-135	02525.0ST-135		EZBR ...025...	EZ__ ...025-...		–	2.5	
03025.0CT-135	03025.0HP-135	03025.0ST-135		EZBR ...030...	EZ__ ...030-...		HPB R/L 0303-...	3	
03525.0CT-135	03525.0HP-135	03525.0ST-135		EZBR ...035...	EZ__ ...035-...		–	3.5	
04025.0CT-135	04025.0HP-135	04025.0ST-135		EZBR ...040...	EZ__ ...040-...		HP__ ..04-...	4	
–	04525.0HP-135	–		–	–	_045X- ...-050EZ	–	4.5	
05025.0CT-135	05025.0HP-135	05025.0ST-135		EZBR ...050...	EZ__ ...050-...	–	HP__ ..05-...	5	
06025.0CT-135	06025.0HP-135	06025.0ST-135		EZBR ...060...	EZ__ ...060-...	_060X- ...-070EZ	HP__ 0606-...	6	
07025.0CT-135	07025.0HP-135	07025.0ST-135		EZBR ...070...	EZ__ ...070-...	–	HP__ ..07-...	7	
EZH 01725.4CT-120	EZH 01725.4HP-120	EZH 01725.4ST-120	25.4	EZBR ...017...	–	–	–	1.7	Citizen Machinery
02025.4CT-120	02025.4HP-120	02025.4ST-120		EZBR ...020...			HPB R/L 0202-...	2	
02525.4CT-120	02525.4HP-120	02525.4ST-120		EZBR ...025...	EZ__ ...025-...		–	2.5	
03025.4CT-120	03025.4HP-120	03025.4ST-120		EZBR ...030...	EZ__ ...030-...		HPB R/L 0303-...	3	
03525.4CT-120	03525.4HP-120	03525.4ST-120		EZBR ...035...	EZ__ ...035-...		–	3.5	
04025.4CT-120	04025.4HP-120	04025.4ST-120		EZBR ...040...	EZ__ ...040-...		HP__ ..04-...	4	
–	04525.4HP-120	–		–	–	_045X- ...-050EZ	–	4.5	
05025.4CT-120	05025.4HP-120	05025.4ST-120		EZBR ...050...	EZ__ ...050-...	–	HP__ ..05-...	5	
06025.4CT-120	06025.4HP-120	06025.4ST-120		EZBR ...060...	EZ__ ...060-...	_060X- ...-070EZ	HP__ 0606-...	6	
07025.4CT-120	07025.4HP-120	07025.4ST-120		EZBR ...070...	EZ__ ...070-...	–	HP__ ..07-...	7	

· Choose sleeves (ϕd1) to meet with ϕD dimension of bar.
· Adjustment Pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT/HP sleeves.
· Machine manufacturers in random order.

EZH Sleeves and Applicable Inserts / Toolholders

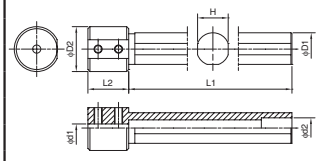
Shank Size (Hole Dia.: mm)		017 (1.7mm)	020 (2mm)	025 (2.5mm)	03 (3mm)	035 (3.5mm)
EZH-CT sleeve (Internal coolant) EZH-HP sleeve description (Adjustable overhang length)		EZH 01716HP-100	EZH 02016HP-100	EZH 02516HP-100	EZH 03016HP-100	EZH 03516HP-100
		01719CT/HP-120	02019CT/HP-120	02519CT/HP-120	03019CT/HP-120	03519CT/HP-120
		01720CT/HP-120	02020CT/HP-120	02520CT/HP-120	03020CT/HP-120	03520CT/HP-120
		01722CT/HP-135	02022CT/HP-135	02522CT/HP-135	03022CT/HP-135	03522CT/HP-135
		01725.0CT/HP-135	02025.0CT/HP-135	02525.0CT/HP-135	03025.0CT/HP-135	03525.0CT/HP-135
		01725.4CT/HP-120	02025.4CT/HP-120	02525.4CT/HP-120	03025.4CT/HP-120	03525.4CT/HP-120
EZH-ST sleeve description		EZH 01712ST-80	EZH 02012ST-80	EZH 02512ST-80	EZH 03012ST-80	EZH 03512ST-80
		01716ST-100	02016ST-100	02516ST-100	03016ST-100	03516ST-100
		01719ST-120	02019ST-120	02519ST-120	03019ST-120	03519ST-120
		01720ST-120	02020ST-120	02520ST-120	03020ST-120	03520ST-120
		01722ST-135	02022ST-135	02522ST-135	03022ST-135	03522ST-135
		01725.0ST-135	02025.0ST-135	02525.0ST-135	03025.0ST-135	03525.0ST-135
		01725.4ST-120	02025.4ST-120	02525.4ST-120	03025.4ST-120	03525.4ST-120
EZ Bars	Boring		EZBR 020020HP-	EZBR 025025HP-	EZBR 030030HP-	EZBR 035035HP-
		EZBR 020017ST-	EZBR 025020ST-	EZBR 030025ST-	EZBR 035030ST-	EZBR 040035ST-
		EZBR 020017-···NB	EZBR 025020-···NB	EZBR 030025-···NB	EZBR ···030-···NB	EZBR 040035-···NB
					EZVBR035030-	
	Internal Grooving				EZGR 030030-	
	Face Grooving					
	Internal Threading			EZTR 030025-	EZTR 035030-	EZTR 040035-
EZ Bars PLUS						
2-Edge Tip-Bars	Boring		HPB$^{R}_{L}$0202-		HPB$^{R}_{L}$0303-	
	Internal Grooving					
	Face Grooving					
	Internal Threading					
Boring Bars						

Shank Size (Hole Dia.: mm)		04 (4mm)	045 (4.5mm)	05 (5mm)	06 (6mm)	07 (7mm)
EZH-CT sleeve (Internal coolant) EZH-HP sleeve description (Adjustable overhang length)		EZH 04016HP-100	EZH 04516HP-100	EZH 05016HP-100	EZH 06016HP-100	EZH 07016HP-100
		04019CT/HP-120	04519HP-120	05019CT/HP-120	06019CT/HP-120	07019CT/HP-120
		04020CT/HP-120	04520HP-120	05020CT/HP-120	06020CT/HP-120	07020CT/HP-120
		04022CT/HP-135	04522HP-135	05022CT/HP-135	06022CT/HP-135	07022CT/HP-135
		04025.0CT/HP-135	04525.0HP-135	05025.0CT/HP-135	06025.0CT/HP-135	07025.0CT/HP-135
		04025.4CT/HP-120	04525.4HP-120	05025.4CT/HP-120	06025.4CT/HP-120	07025.4CT/HP-120
EZH-ST sleeve description		EZH 04012ST-80		EZH 05012ST-80	EZH 06012ST-80	EZH 07012ST-80
		04016ST-100		05016ST-100	06016ST-100	07016ST-100
		04019ST-120		05019ST-120	06019ST-120	07019ST-120
		04020ST-120		05020ST-120	06020ST-120	07020ST-120
		04022ST-135		05022ST-135	06022ST-135	07022ST-135
		04025.0ST-135		05025.0ST-135	06025.0ST-135	07025.0ST-135
		04025.4ST-120		05025.4ST-120	06025.4ST-120	07025.4ST-120
EZ Bars	Boring	EZBR 040040HP-		EZBR 050050HP-	EZBR 060060HP-	
		EZBR 045040ST-		EZBR 055050ST-	EZBR 065060ST-	EZBR 075070ST-
		EZBR ···040-···NB		EZBR ···050-···NB	EZBR ···060-···NB	EZBR ···070-···NB
		EZVBR045040-		EZVBR055050-	EZVBR065060-	
	Internal Grooving	EZGR 040040-		EZGR 050050-	EZGR 060060-	EZGR ···070-···
	Face Grooving	EZFGR050040-		EZFGR060050-		EZFGR080070-
	Internal Threading	EZTR 050040-		EZTR 060050-	EZTR 070060-	EZTR 080070-
EZ Bars PLUS			S045X- SCLCR03-050EZ		S060X- SCLCR04-070EZ	
			C045X- SCLCR03-050EZ		C060X- SCLCR04-070EZ	
2-Edge Tip-Bars	Boring	HPB$^{R}_{L}$0404-		HPB$^{R}_{L}$0505-	HPB$^{R}_{L}$0606-	HPB$^{R}_{L}$0707-
		HPBT$^{R}_{L}$0404-		HPBT$^{R}_{L}$0505-		
	Internal Grooving	HPG$^{R}_{L}$0404-		HPG$^{R}_{L}$0505-	HPG$^{R}_{L}$0606-	HPG$^{R}_{L}$0707-
	Face Grooving					HPFG$^{R}_{L}$0807-
	Internal Threading	HPT$^{R}_{L}$04504-		HPT$^{R}_{L}$06005-		HPT$^{R}_{L}$07507-
Boring Bars		C04-····		C05-····	C06-····	C07-····
					S06-····	

Note 1) When attaching 2-Edge Tip-Bars to EZH-CT/HP Sleeve (Adjustable overhang length), detach Adjustable Pin.
Overhang length of bar is not adjustable.

Sleeves for Boring Bars

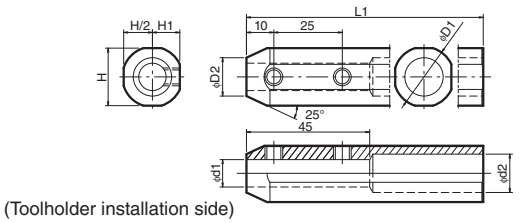
Sleeves for Tip-Bars

Shape	Description	Std.	Dimension (mm)							Spare Parts	
										Screw	Wrench
			ϕD1	ϕD2	ϕd1	ϕd2	H	L1	L2		
 (Tip-Bar installation side)	PH 0212-60	○	12	19	1.8	6	11	60	20	HS3X4	LW-1.5
	0312-60	○			2.8						
	0412-60	○			3.8					HS4X4	LW-2
	0512-60	○			4.8						
	0612-60	○			5.8	8					
	0712-60	○			6.8						
	PH 0216-80	○	16	22	1.8	Rp¼ (PS¼)	15	80	20	HS3X4	LW-1.5
	0316-80	○			2.8						
	0416-80	○			3.8					HS4X4	LW-2
	0516-80	○			4.8						
	0616-80	○			5.8						
	0716-80	○			6.8						

Description Table for PH Sleeves and Applicable Toolholders

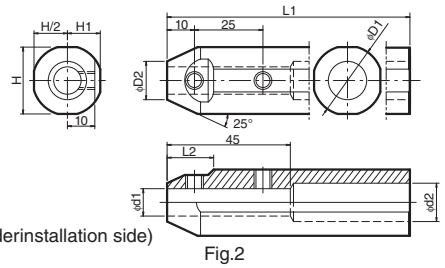
Shank Size (Hole Dia.: mm)		02 (1.8mm)	03 (2.8mm)	04 (3.8mm)	05 (4.8mm)	06 (5.8mm)	07 (6.8mm)
PH type sleeve Description		PH0212-60	PH0312-60	PH0412-60	PH0512-60	PH0612-60	PH0712-60
		PH0216-80	PH0316-80	PH0416-80	PH0516-80	PH0616-80	PH0716-80
1-Edge Tip-Bars	Boring	PSBR/L0202-	PSBR/L0303-	PSBR/L0404-	PSBR/L0505-	PSBR/L0606-	PSBR/L0707-
				PSBTR/L0415-	PSBTR/L0515-		
	Internal Grooving			PSGR/L0510-	PSGR/L0610-	PSGR/L0710-	PSGR/L0810-
				PSGR/L0520-	PSGR/L0620-	PSGR/L0720-	PSGR/L0820-
	Face Grooving						PSFGR/L0810-
							PSFGR/L0820-
							PSFGR/L0830-
	Internal Threading			PSTR0604-	PSTR0805-		

SHA sleeves (Applicable Toolholders F86)



(Toolholder installation side)

Fig.1



(Toolholderinstallation side)

Fig.2

Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Machine Manufacturer
												Screw	Wrench	
			ϕd1	ϕD1	ϕD2	ϕd2	H	H1	L1	L2				
SHA	0820-120	●	8	20	14	12	19	9.25	120	-	Fig.1	HS6x4P	LW-3	Eguro Tsugami Citizen Machinery
	1020-120	●	10											
SHA	0825.0-135	●	8	25	14	14	24	11.5	135	17	Fig.2			
	1025.0-135	●	10											
	1225.0-135	●	12		16									
SHA	0819-120	●	8	19.05	14	12	18	8.75	120	-	Fig.1	HS6x4P	LW-3	Citizen Machinery
	1019-120	●	10											
SHA	0820-120	●	8	20	14	12	19	9.25	120	-	Fig.1			
	1020-120	●	10											
SHA	0825.4-120	●	8	25.4	14	14	24.4	12	120	17	Fig.2			
	1025.4-120	●	10											
	1225.4-120	●	12		16									
SHA	0822-125	●	8	22	14	14	21	10	125	-	Fig.1	HS6x4P	LW-3	Star Micronics Nomura DS
	1022-125	●	10											
	1222-125	●	12		16									
SHA	0823-120	●	8	23	14	14	22	10.5	120	16	Fig.2	HS6x4P	LW-3	Nomura DS
	1023-120	●	10											
	1223-120	●	12		16									

* Length of ϕd1···45mm (All of SHA sleeves)

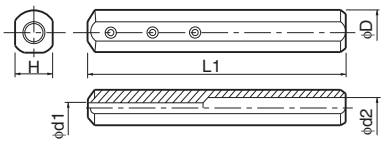
· Choose sleeves(ϕd1) to meet with ϕD dimension of toolholder.

· Machine manufacturers in random order.

●: Std. Item
○: Check Availability

Sleeves for Boring Bars

Sleeves for Boring Bars

Shape	Description		Std.	Dimension (mm)					Spare Parts	
									Screw	Wrench
				ϕD	ϕd1	ϕd2	H	L1		
 (Toolholder installation side)	SH	0416-100	●	16	4	5	14	100	HS4X4	LW-2
		0516-100	●		5	6				
		0616-100	●		6	7				
		0716-100	●		7	8				
	SH	0820-120	●	20	8	9	18	120	HS4X4	LW-2
		1020-120	●		10	11				
		1225-150	●	25	12	13	23	150	HS5X5	LW-2.5
		1632-180	●	32	16	18	30	180		
		2032-180	●		20	22				

Coolant Sleeve Dimensions

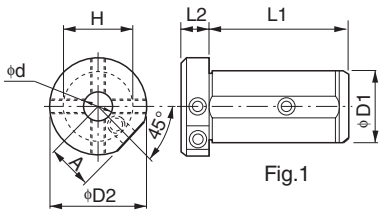


Fig.1

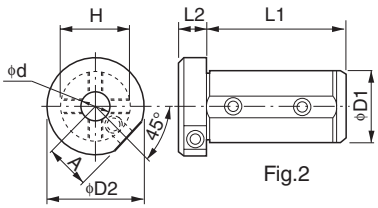


Fig.2

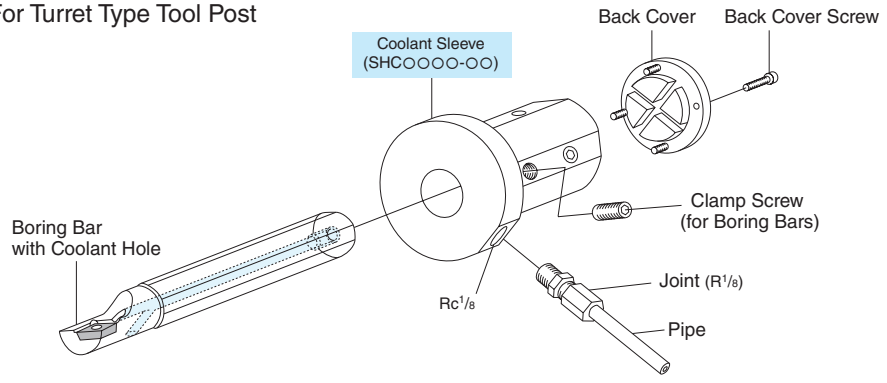
Accessories
- Back Cover / SHL-4···SHC○○40-70
  SHL-5···SHC○○50-95
- Back Cover Screw
- Shank Clamp Screw

(Note) To stabilize the Toolholder and to prevent coolant leaks, tighten all 4 screws of coolant sleeve securely.

Description		Std.	Dimension (mm)							Drawing	Spare Parts						
			ϕD1	ϕD2	ϕd	L1	L2	H	A		Front Screw	Wrench	Back Screw	Wrench	Back Cover	Back Cover Screw	Wrench
SHC	0840-70	●	40	56	8	70	16	38	27	Fig.1	HS6X22	LW-3	HS6X14	LW-3	SHL-4	HH3X6	LW-2.5
	1040-70	●			10												
	1240-70	●			12					Fig.2	HS10X10	LW-5	HS10X10	LW-5			
	1640-70	●			16												
	2040-70	●			20					Fig.1	HS10X10	LW-5	HS6X6	LW-3			
	2540-70	●			25												
SHC	0850-95	●	50	65	8	95	16	47	30.5	Fig.1	HS6X22	LW-3	HS6X14	LW-3	SHL-5	HH3X12	LW-2.5
	1050-95	●			10												
	1250-95	●			12					Fig.2	HS10X10	LW-5	HS10X10	LW-5			
	1650-95	●			16												
	2050-95	●			20												
	2550-95	●			25												

How to Install

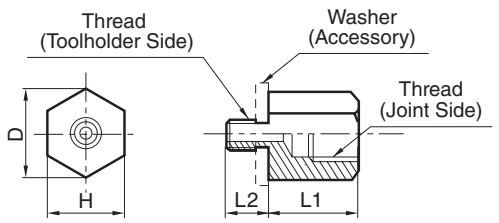
1 For Turret Type Tool Post



●: Std. Item

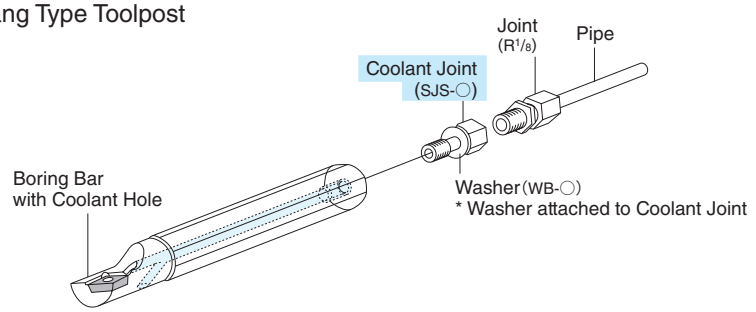
Sleeves for Boring Bars

● Coolant Joint Dimensions *This Coolant Joint is not applicable for Dynamic Bar



Description	Std.	Dimension (mm)				Thread (Toolholder Side)	Thread (Joint Side)	Spare Parts Washer
		D	L1	L2	H			
SJS-5	●	15	15	7	13	M5XP0.8	Rc1/8 (PT1/8)	WB-5
SJS-6	●			9		M6XP1.0		WB-6
SJS-8	●			13		M8XP1.25		WB-8

2 For Gang Type Toolpost



● List of toolholders and applicable joints

Toolholder Description	Applicable Coolant Joint
A08-...-○○E	SJS-5
A10-...-○○E	
A12-...-○○E	SJS-6
A16-...-○○E	SJS-8
A20-...-○○E	
A25-...-○○E	
E08-...-○○	SJS-5
E10-...-○○	
E12-...-○○	SJS-6
E16-...-○○	SJS-8
E20-...-○○	

*This Coolant Joint is not applicable for Dynamic Bar

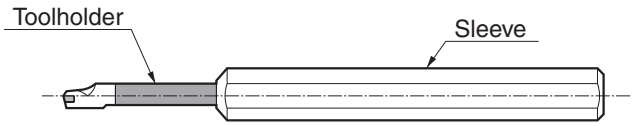
■ SHA / SH / SHC Sleeves and Applicable Toolholders

Shank Size (Hole Dia. : mm)	04 (4mm)	05 (5mm)	06 (6mm)	07 (7mm)	08 (8mm)	10 (10mm)	12 (12mm)	16 (16mm)	20 (20mm)	25 (25mm)
Sleeve Description	SH0416-100	SH0516-100	SH0616-100	SH0716-100	SH0820-120	SH1020-120	SH1225-150	SH1632-180	SH2032-180	
					SHA0819-120	SHA1019-120				
					SHA0820-120	SHA1020-120				
					SHA0822-125	SHA1022-125	SHA1222-125			
					SHA0823-120	SHA1023-120	SHA1223-120			
					SHA0825.0-135	SHA1025.0-135	SHA1225.0-135			
					SHA0825.4-120	SHA1025.4-120	SHA1225.4-120			
					SHC0840-70	SHC1040-70	SHC1240-70	SHC1640-70	SHC2040-70	SHC2540-70
					SHC0850-95	SHC1050-95	SHC1250-95	SHC1650-95	SHC2050-95	SHC2550-95
Boring Bar Description					A08-····	A10-····	A12-····	A16-····	A20-····	A25-····
	C04-····	C05-····	C06-····	C07-····	C08-····	C10-····	C12-····	C16-····	C20-····	C25-····
					E08-····	E10-····	E12-····	E16-····	E20-····	E25-····
			S06-····		S08-····	S10-····	S12-····	S16-····	S20-····	S25-····
Internal Grooving Toolholder Description					SIGER0808A-EH	SIGER1010B-EH	SIGER1412C-EH	SIGER1616C-EH	SIGER2020D-EH	SIGER2525E-EH
						SIGER1210B-EH	SIGER1612C-EH			KIGBAR3525-16
					SIGER0808A-WH	SIGER1010B-WH	SIGER1412C-WH	KIGMR2016B-3V	KIGMR2520B-3V	KIGMR3225B-4V
						SIGER1210B-WH	SIGER1612C-WH			KITGR3525T-16
					SIGER1008B-WH-90	SIGER1210B-WH-90	SIGER1412C-WH-90			
							GIVR1412-1SE	GIVR1216-1SS	GIVR1420-1S	GIVR2025-1B
							GIVR1612-1AE	GIVR2016-1BE	GIVR1620-1A	GIVR2025-2B
								GIVR2016-2BE	GIVR2520-1CE	GIVR3225-1CE
								GIVR1616-1AW	GIVR2720-2CE	GIVR3225-2CE
									GIVR2020-1BW	GIVR2525-1CW
									GIVR2020-2BW	GIVR2525-2CW
Internal Threading Toolholder Description							SINR0612S-06E	SINR0816S-08E	SINR2420S-16	CINR3025S-16
								SINR1216S-11E	SINR2420S-22	CINR3025S-22
								SINR1516S-11		
								SINR1616S-16		
								SINR2016S-16		

* For **SHA sleeves**, please ref. to page **F84.**
For **SH / SHC sleeves**, please ref. to page **F85**.

●: Std. Item

C...-AS (Assembly List)

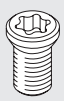
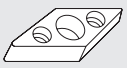
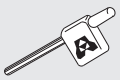


Assembly configuration

Assembly (Discontinued Description)	Toolholder (Discontinued Description)	Alternative Toolholder (Dynamic Bar)	Sleeve Description	Remarks
C04G- SCLCR03-05-AS	C04G- SCLCR03-05	C04G- SCLCR03-05AN	SH0416-100	-
SCLCL03-05-AS	SCLCL03-05	SCLCL03-05AN		
C05H- SCLCR03-06-AS	C05H- SCLCR03-06	C05H- SCLCR03-06AN	SH0516-100	
SCLCL03-06-AS	SCLCL03-06	SCLCL03-06AN		
C05H- SWUBR06-06-AS	C05H- SWUBR06-06	C05H- SWUBR06-06AN	SH0516-100	
SWUBL06-06-AS	SWUBL06-06	SWUBL06-06AN		
C06J- SCLCR04-07-AS	C06J- SCLCR04-07	C06J- SCLCR04-07AN	SH0616-100	
SCLCL04-07-AS	SCLCL04-07	SCLCL04-07AN		
C06J- SWUBR06-07-AS	C06J- SWUBR06-07	C06J- SWUBR06-07AN	SH0616-100	
SWUBL06-07-AS	SWUBL06-07	SWUBL06-07AN		
C07K- SCLCR04-08-AS	C07K- SCLCR04-08	C07K- SCLCR04-08AN	SH0716-100	
SCLCL04-08-AS	SCLCL04-08	SCLCL04-08AN		
C07K- SWUBR08-08-AS	C07K- SWUBR08-08	C07K- SWUBR08-08AN	SH0716-100	
SWUBL08-08-AS	SWUBL08-08	SWUBL08-08AN		
C08L- STUPR08-10-AS	C08L- STUPR08-10	E08L- STLPR08-10AN	SH0820-120	Difference of alternative toolholder No coolant hole → With coolant hole
C10N- STUPR09-12-AS	C10N- STUPR09-12	E10N- STLPR09-12AN	SH1020-120	
C10N- STUPR11-12-AS	C10N- STUPR11-12	E10N- STLPR11-12AN		
C12Q- STUPR09-16-AS	C12Q- STUPR09-16	E12Q- STLPR09-16A	SH1225-150	
C12Q- STUPR11-14-AS	C12Q- STUPR11-14	E12Q- STLPR11-14A		
C12Q- STUPR11-16-AS	C12Q- STUPR11-16			
C16X- STUPR11-18-AS	C16X- STUPR11-18	E16X- STLPR11-18A	SH1632-180	Front cutting edge angle 3° → 5°
C16X- STUPR11-20-AS	C16X- STUPR11-20			
C20S- STUPR11-25-AS	C20S- STUPR11-25	E20S- STLPR11-22A	SH2032-180	
C20S- STUPR16-25-AS	C20S- STUPR16-25	E20S- STLPR16-25A		

* "**AS**" indicates an assembly of toolholder and sleeve.
You can purchase the toolholder and sleeve and assemble them to make the corresponding assembly part.

Former Parts List (Boring Bar)

Description (Previous Description)	Spare Parts				
	Clamp Screw	Wrench	Shim	Shim Screw	Wrench
					
S32S-SVJB$^{R}_{L}$16-40E **S40T-SVJB$^{R}_{L}$16-50E**	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S25X-SVPB$^{R}_{L}$16-34E **S32S-SVPB$^{R}_{L}$16-40E**					
S25X-SVUB$^{R}_{L}$16-34E **S32S-SVUB$^{R}_{L}$16-40E**					
S25X-SVZB$^{R}_{L}$16-34E **S32S-SVZB$^{R}_{L}$16-40E**					

·S32S-SVJB$^{R}_{L}$16-40E and S40T-SVJB$^{R}_{L}$16-50E have been shifted to A32S-SVJB$^{R}_{L}$16-40AE and A40T-SVJB$^{R}_{L}$16-50AE respectively. Ref. to page **F52**
·S25X-SVPB$^{R}_{L}$16-34E and S32S-SVPB$^{R}_{L}$16-40E have been shifted to A25S-SVPB$^{R}_{L}$16-31AE and A32S-SVPB$^{R}_{L}$16-40AE respectively. Ref. to page **F54**
·S25X-SVUB$^{R}_{L}$16-34E and S32S-SVUB$^{R}_{L}$16-40E have been shifted to A25S-SVUB$^{R}_{L}$16-34AE and A32S-SVUB$^{R}_{L}$16-40AE respectively. Ref. to page **F57**
·S25X-SVZB$^{R}_{L}$16-34E and S32S-SVZB$^{R}_{L}$16-40E have been shifted to A25S-SVZB$^{R}_{L}$16-34AE and A32S-SVZB$^{R}_{L}$16-40AE respectively. Ref. to page **F57**

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	Ref. to Page	Coolant Hole	Description	Ref. to Page
Excellent Bar	CC..	No	S08X-SCLC$^{R/L}$06-10E	Yes	A08X-SCLC$^{R/L}$06-10AE	F39	No	S08X-SCLC$^{R/L}$06-10A	F39
			S10H-SCLC$^{R/L}$03-05E	No	S10H-SCLC$^{R/L}$03-05AE		-	-	-
			S10H-SCLC$^{R/L}$03-06E		S10H-SCLC$^{R/L}$03-06AE				
			S10J-SCLC$^{R/L}$04-07E		S10H-SCLC$^{R/L}$04-07AE				
			S10J-SCLC$^{R/L}$04-08E		S10H-SCLC$^{R/L}$04-08AE				
		Yes	A08H-SCLC$^{R/L}$06-10E	Yes	A08X-SCLC$^{R/L}$06-10AE		No	S08X-SCLC$^{R/L}$06-10A	F39
	CP..	No	S10M-SCLP$^{R/L}$08-12E	Yes	A10L-SCLP$^{R/L}$08-12AE	F41	No	S10L-SCLP$^{R/L}$08-12A	F41
			S12M-SCLP$^{R/L}$08-14E		A12M-SCLP$^{R/L}$08-14AE			S12M-SCLP$^{R/L}$08-14A	
			S12M-SCLP$^{R/L}$09-16E		A12M-SCLP$^{R/L}$09-16AE			S12M-SCLP$^{R/L}$09-16A	
			S16Q-SCLP$^{R/L}$09-18E		A16Q-SCLP$^{R/L}$09-18AE			S16Q-SCLP$^{R/L}$09-18A	
			S16R-SCLP$^{R/L}$09-20E						
			S20X-SCLP$^{R/L}$09-25E		A20R-SCLP$^{R/L}$09-22AE			S20R-SCLP$^{R/L}$09-22A	
		Yes	A10X-SCLP$^{R/L}$08-12E	Yes	A10L-SCLP$^{R/L}$08-12AE	F41	No	S10L-SCLP$^{R/L}$08-12A	F41
			A12X-SCLP$^{R/L}$08-14E		A12M-SCLP$^{R/L}$08-14AE			S12M-SCLP$^{R/L}$08-14A	
			A12X-SCLP$^{R/L}$09-16E		A12M-SCLP$^{R/L}$09-16AE			S12M-SCLP$^{R/L}$09-16A	
			A16M-SCLP$^{R/L}$09-18E		A16Q-SCLP$^{R/L}$09-18AE			S16Q-SCLP$^{R/L}$09-18A	
			A16M-SCLP$^{R/L}$09-20E						
			A20Q-SCLP$^{R/L}$09-25E		A20R-SCLP$^{R/L}$09-22AE			S20R-SCLP$^{R/L}$09-22A	
	DC..	No	S10M-SDUC$^{R/L}$07-14E	Yes	A10L-SDUC$^{R/L}$07-14AE	F43	No	S10L-SDUC$^{R/L}$07-14A	F43
			S12M-SDUC$^{R/L}$07-16E		A12M-SDUC$^{R/L}$07-16AE			S12M-SDUC$^{R/L}$07-16A	
			S16Q-SDUC$^{R/L}$07-20E		A16Q-SDUC$^{R/L}$07-20AE			S16Q-SDUC$^{R/L}$07-20A	
			S16Q-SDUC$^{R/L}$11-25E		A16Q-SDUC$^{R/L}$11-23AE			S16Q-SDUC$^{R/L}$11-23A	
			S20Q-SDUC$^{R/L}$11-32E		A20R-SDUC$^{R/L}$11-27AE			S20R-SDUC$^{R/L}$11-27A	
		No	S10M-SDZC$^{R/L}$07-14E	Yes	A10L-SDZC$^{R/L}$07-14AE	F45	No	S10L-SDZC$^{R/L}$07-14A	F45
			S12M-SDZC$^{R/L}$07-16E		A12M-SDZC$^{R/L}$07-16AE			S12M-SDZC$^{R/L}$07-16A	
			S16Q-SDZC$^{R/L}$07-20E		A16Q-SDZC$^{R/L}$07-20AE			S16Q-SDZC$^{R/L}$07-20A	
			S16Q-SDZC$^{R/L}$11-25E		A16Q-SDZC$^{R/L}$11-23AE			S16Q-SDZC$^{R/L}$11-23A	
			S20Q-SDZC$^{R/L}$11-32E		A20R-SDZC$^{R/L}$11-27AE			S20R-SDZC$^{R/L}$11-27A	
	TB..	No	S06H-STUB$^{R/L}$06-08E	No	S06H-STLB$^{R/L}$06-08AE	F49	No	S06H-STLB$^{R/L}$06-08A	F49
	TP..	No	S08K-STUP$^{R/L}$08-10E	Yes	A08X-STLP$^{R/L}$08-10AE	F49	No	S08X-STLP$^{R/L}$08-10A	F49
			S10M-STUP$^{R/L}$09-12E		A10L-STLP$^{R/L}$09-12AE			S10L-STLP$^{R/L}$09-12A	
			S10M-STUP$^{R/L}$11-12E		A10L-STLP$^{R/L}$11-12AE			S10L-STLP$^{R/L}$11-12A	
			S12M-STUP$^{R/L}$09-16E		A12M-STLP$^{R/L}$09-16AE			S12M-STLP$^{R/L}$09-16A	
			S12M-STUP$^{R/L}$11-14E		A12M-STLP$^{R/L}$11-14AE			S12M-STLP$^{R/L}$11-14A	
			S12M-STUP$^{R/L}$11-16E						
			S16R-STUP$^{R/L}$11-18E		A16Q-STLP$^{R/L}$11-18AE			S16Q-STLP$^{R/L}$11-18A	
			S16R-STUP$^{R/L}$11-20E						
			S20X-STUP$^{R/L}$11-25E		A20R-STLP$^{R/L}$11-22AE			S20R-STLP$^{R/L}$11-22A	
			S20X-STUP$^{R/L}$16-25E		A20R-STLP$^{R/L}$16-25AE		-	-	-
			S25X-STUP$^{R/L}$16-32E		A25S-STLP$^{R/L}$16-27AE		No	S25S-STLP$^{R/L}$16-27A	F49
		Yes	A08H-STUP$^{R/L}$08-10E	Yes	A08X-STLP$^{R/L}$08-10AE	F49	No	S08X-STLP$^{R/L}$08-10A	F49
			A10X-STUP$^{R/L}$09-12E		A10L-STLP$^{R/L}$09-12AE			S10L-STLP$^{R/L}$09-12A	
			A10X-STUP$^{R/L}$11-12E		A10L-STLP$^{R/L}$11-12AE			S10L-STLP$^{R/L}$11-12A	
			A12X-STUPR09-16E		A12M-STLPR09-16AE			S12M-STLPR09-16A	
			A12X-STUP$^{R/L}$11-14E		A12M-STLP$^{R/L}$11-14AE			S12M-STLP$^{R/L}$11-14A	
			A12X-STUPR11-16E		A12M-STLPR11-14AE			S12M-STLPR11-14A	
			A16M-STUP$^{R/L}$11-18E		A16Q-STLP$^{R/L}$11-18AE			S16Q-STLP$^{R/L}$11-18A	
			A16M-STUP$^{R/L}$11-20E						
			A20Q-STUP$^{R/L}$11-25E		A20R-STLP$^{R/L}$11-22AE			S20R-STLP$^{R/L}$11-22A	
			A20Q-STUP$^{R/L}$16-25E		A20R-STLP$^{R/L}$16-25AE		-	-	-
			A25R-STUP$^{R/L}$16-32E		A25S-STLP$^{R/L}$16-27AE		No	S25S-STLP$^{R/L}$16-27A	F49
	VB..	No	S20R-SVJB$^{R/L}$11-25E	Yes	A20R-SVJB$^{R/L}$11-25AE	F52	No	S20R-SVJB$^{R/L}$11-25A	F52
			S25S-SVJB$^{R/L}$11-30E		A25S-SVJB$^{R/L}$11-30AE			S25S-SVJB$^{R/L}$11-30A	
			S32S-SVJB$^{R/L}$16-40EN		A32S-SVJB$^{R/L}$16-40AE			S32S-SVJB$^{R/L}$16-40A	
			S40T-SVJB$^{R/L}$16-50EN		A40T-SVJB$^{R/L}$16-50AE			S40T-SVJB$^{R/L}$16-50A	

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	Ref. to Page	Coolant Hole	Description	Ref. to Page
Excellent Bar	VB..	No	S12M-SVPB$^{R/L}$11-20E	Yes	A12M-SVPB$^{R/L}$11-18AE	F54	No	S12M-SVPB$^{R/L}$11-18A	F54
			S16Q-SVPB$^{R/L}$11-25E		A16Q-SVPB$^{R/L}$11-22AE			S16Q-SVPB$^{R/L}$11-22A	
			S25X-SVPB$^{R/L}$16-34EN		A25S-SVPB$^{R/L}$16-31AE			S25S-SVPB$^{R/L}$16-31A	
			S32S-SVPB$^{R/L}$16-40EN		A32S-SVPB$^{R/L}$16-40AE			S32S-SVPB$^{R/L}$16-40A	
		No	S16Q-SVUB$^{R/L}$11-20E	Yes	A16Q-SVUB$^{R/L}$11-20AE	F57	No	S16Q-SVUB$^{R/L}$11-20A	F57
			S20R-SVUB$^{R/L}$11-25E		A20R-SVUB$^{R/L}$11-25AE			S20R-SVUB$^{R/L}$11-25A	
			S25X-SVUB$^{R/L}$16-34EN		A25S-SVUB$^{R/L}$16-34AE			S25S-SVUB$^{R/L}$16-34A	
			S32S-SVUB$^{R/L}$16-40EN		A32S-SVUB$^{R/L}$16-40AE			S32S-SVUB$^{R/L}$16-40A	
		No	S16Q-SVZB$^{R/L}$11-20E	Yes	A16Q-SVZB$^{R/L}$11-20AE	F57	No	S16Q-SVZB$^{R/L}$11-20A	F57
			S20R-SVZB$^{R/L}$11-25E		A20R-SVZB$^{R/L}$11-25AE			S20R-SVZB$^{R/L}$11-25A	
			S25X-SVZB$^{R/L}$16-34EN		A25S-SVZB$^{R/L}$16-34AE			S25S-SVZB$^{R/L}$16-34A	
			S32S-SVZB$^{R/L}$16-40EN		A32S-SVZB$^{R/L}$16-40AE			S32S-SVZB$^{R/L}$16-40A	
	VC..	No	S12M-SVJC$^{R/L}$08-16E	Yes	A12M-SVJC$^{R/L}$08-16AE	F52	No	S12M-SVJC$^{R/L}$08-16A	F52
			S16Q-SVJC$^{R/L}$08-20E		A16Q-SVJC$^{R/L}$08-20AE			S16Q-SVJC$^{R/L}$08-20A	
		No	S10M-SVPC$^{R/L}$08-16E	Yes	A10L-SVPC$^{R/L}$08-14AE	F54	No	S10L-SVPC$^{R/L}$08-14A	F54
		No	S12M-SVUC$^{R/L}$08-16E	Yes	A12M-SVUC$^{R/L}$08-16AE	F57	No	S12M-SVUC$^{R/L}$08-16A	F57
		No	S12M-SVZC$^{R/L}$08-16E	Yes	A12M-SVZC$^{R/L}$08-16AE	F57	No	S12M-SVZC$^{R/L}$08-16A	F57
	VP..	No	S12M-SVJP$^{R/L}$08-16E	Yes	A12M-SVJP$^{R/L}$08-16AE	F52	No	S12M-SVJP$^{R/L}$08-16A	F52
	WB..	No	S08K-SWUB$^{R/L}$08-10E	Yes	A08X-SWUB$^{R/L}$08-10AE	F59	No	S08X-SWUB$^{R/L}$08-10A	F59
			S10M-SWUB$^{R/L}$08-12E		A10L-SWUB$^{R/L}$08-12AE			S10L-SWUB$^{R/L}$08-12A	
			S10H-SWUB$^{R/L}$06-06E	No	S10H-SWUB$^{R/L}$06-06AE			S10H-SWUB$^{R/L}$06-06A	
			S10H-SWUB$^{R/L}$06-07E		S10H-SWUB$^{R/L}$06-07AE			S10H-SWUB$^{R/L}$06-07A	
			S10J-SWUB$^{R/L}$08-08E		S10H-SWUB$^{R/L}$08-08AE			S10H-SWUB$^{R/L}$08-08A	
	WP..	No	S12M-SWUP$^{R/L}$11-14E	Yes	A12M-SWUP$^{R/L}$11-14AE	F59	No	S12M-SWUP$^{R/L}$11-14A	F59
			S12M-SWUP$^{R/L}$11-16E						
			S16N-SWUP$^{R/L}$11-18E		A16Q-SWUP$^{R/L}$11-18AE			S16Q-SWUP$^{R/L}$11-18A	
			S16Q-SWUP$^{R/L}$16-20E		A16Q-SWUP$^{R/L}$16-18AE			S16Q-SWUP$^{R/L}$16-18A	
			S20R-SWUP$^{R/L}$16-25E		A20R-SWUP$^{R/L}$16-22AE			S20R-SWUP$^{R/L}$16-22A	
Steel Bar	CC..	No	S08X-SCLC$^{R/L}$06-10	No	S08X-SCLC$^{R/L}$06-10A	F39	-	-	-
	CP..	No	S10M-SCLP$^{R/L}$08-12	No	S10L-SCLP$^{R/L}$08-12A	F41	-	-	-
			S12M-SCLP$^{R/L}$08-14		S12M-SCLP$^{R/L}$08-14A				
			S12M-SCLP$^{R/L}$09-16		S12M-SCLP$^{R/L}$09-16A				
			S16N-SCLP$^{R/L}$09-18		S16Q-SCLP$^{R/L}$09-18A				
			S16Q-SCLP$^{R/L}$09-20						
			S20R-SCLP$^{R/L}$09-25		S20R-SCLP$^{R/L}$09-22A				
			S25S-SCLP$^{R/L}$09-30		S25S-SCLP$^{R/L}$09-27A				
	DC..	No	S16Q-SDUC$^{R/L}$07-14	No	S16Q-SDUC$^{R/L}$07-14A	F43	-	-	-
			S16Q-SDUC$^{R/L}$07-16						
			S20R-SDUC$^{R/L}$11-20		S20R-SDUC$^{R/L}$11-20A				
			S25X-SDUC$^{R/L}$11-25		S16Q-SDUC$^{R/L}$11-23A		No	S25S-SDUC$^{R/L}$11-32A	F43
		No	S16Q-SDZC$^{R/L}$07-14	No	S16Q-SDZC$^{R/L}$07-14A	F45	-	-	-
			S16Q-SDZC$^{R/L}$07-16						
			S20R-SDZC$^{R/L}$11-20		S20R-SDZC$^{R/L}$11-20A				
			S25X-SDZC$^{R/L}$11-25		S16Q-SDZC$^{R/L}$11-23A		No	S25S-SDZC$^{R/L}$11-32A	F45

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	Ref. to Page	Coolant Hole	Description	Ref. to Page
Steel Bar	TB..	No	S06H-STUB$^{R/L}$06-08	No	S06H-STLB$^{R/L}$06-08A	F49	-	-	-
	TP..	No	S08K-STUP$^{R/L}$08-10	No	S08X-STLP$^{R/L}$08-10A	F49	-	-	-
			S10M-STUP$^{R/L}$09-12		S10L-STLP$^{R/L}$09-12A				
			S12M-STUP$^{R/L}$09-16		S12M-STLP$^{R/L}$09-16A				
			S16Q-STUP$^{R/L}$11-20		S16Q-STLP$^{R/L}$11-18A				
			S20R-STUP$^{R/L}$11-25		S20R-STLP$^{R/L}$11-22A				
			S25X-STUP$^{R/L}$16-32		S25S-STLP$^{R/L}$16-27A				
	WB..	No	S10H-SWUB$^{R/L}$06-06	No	S10H-SWUB$^{R/L}$06-06A	F59	-	-	-
			S10H-SWUB$^{R/L}$06-06-15						
			S10H-SWUB$^{R/L}$06-07		S10H-SWUB$^{R/L}$06-07A				
			S10J-SWUB$^{R/L}$08-08		S10H-SWUB$^{R/L}$08-08A				
			S10J-SWUB$^{R/L}$08-08-20						
Carbide Shank Boring Bar	CC..	No	C04G-SCLC$^{R/L}$03-05	No	C04G-SCLC$^{R/L}$03-05AN	F39	-	-	-
			C05H-SCLC$^{R/L}$03-06		C05H-SCLC$^{R/L}$03-06AN				
			C06J-SCLC$^{R/L}$04-07		C06J-SCLC$^{R/L}$04-07AN				
			C07K-SCLC$^{R/L}$04-08		C07K-SCLC$^{R/L}$04-08AN				
			C08L-SCLC$^{R/L}$06-10	Yes	E08L-SCLC$^{R/L}$06-10AN				
		Yes	E08L-SCLC$^{R/L}$06-10						
	CP..	No	C10N-SCLP$^{R/L}$08-12	Yes	E10N-SCLP$^{R/L}$08-12AN	F41	-	-	-
			C10N-SCLPR08-12-1/2		E10N-SCLPR08-12AN1/2				
			C10N-SCLPR08-12-2/3		E10N-SCLPR08-12AN2/3				
			C12Q-SCLP$^{R/L}$09-16		E12Q-SCLP$^{R/L}$09-16A				
			C12Q-SCLPR09-16-1/2		E12Q-SCLPR09-16A-1/2				
			C12Q-SCLPR09-16-2/3		E12Q-SCLPR09-16A-2/3				
			C16X-SCLP$^{R/L}$09-20		E16X-SCLP$^{R/L}$09-18A				
			C16X-SCLPR09-20-1/2		E16X-SCLPR09-18A-1/2				
			C16X-SCLPR09-20-2/3		E16X-SCLPR09-18A-2/3				
			C20S-SCLP$^{R/L}$09-25		E20S-SCLP$^{R/L}$09-22A				
			C20S-SCLPR09-25-1/2		E20S-SCLPR09-22A-1/2				
			C20S-SCLPR09-25-2/3		E20S-SCLPR09-22A-2/3				
		Yes	E10N-SCLP$^{R/L}$08-12	Yes	E10N-SCLP$^{R/L}$08-12AN	F41	-	-	-
			E12Q-SCLP$^{R/L}$09-16		E12Q-SCLP$^{R/L}$09-16A				
			E16X-SCLP$^{R/L}$09-20		E16X-SCLP$^{R/L}$09-18A				
			E20S-SCLP$^{R/L}$09-25		E20S-SCLP$^{R/L}$09-22A				
	DC..	No	C10N-SDUC$^{R/L}$07-14	Yes	E10N-SDUC$^{R/L}$07-14A	F43	-	-	-
			C12Q-SDUC$^{R/L}$07-16		E12Q-SDUC$^{R/L}$07-16A				
			C12Q-SDUC$^{R/L}$11-20						
			C16X-SDUC$^{R/L}$11-25		E16X-SDUC$^{R/L}$11-23A				
			C20S-SDUC$^{R/L}$11-32		E20S-SDUC$^{R/L}$11-27A				
	TB..	No	C10L-STUB$^{R/L}$06-08	No	C06J-STLB$^{R/L}$06-08AN	F49	-	-	-
	TP..	No	C08L-STUP$^{R/L}$08-10	Yes	E08L-STLP$^{R/L}$08-10AN				
			C10N-STUP$^{R/L}$09-12		E10N-STLP$^{R/L}$09-12AN				
			C10N-STUPR09-12-1/2		E10N-STLPR09-12AN1/2				
			C10N-STUPR09-12-2/3		E10N-STLPR09-12AN2/3				
			C10N-STUP$^{R/L}$11-12		E10N-STLP$^{R/L}$11-12AN				
			C10N-STUPR11-12-1/2		E10N-STLPR11-12AN1/2				
			C10N-STUPR11-12-2/3		E10N-STLPR11-12AN2/3				
			C12Q-STUP$^{R/L}$09-16		E12Q-STLP$^{R/L}$09-16A				
			C12Q-STUPR09-16-1/2		E12Q-STLPR09-16A-1/2				
			C12Q-STUPR09-16-2/3		E12Q-STLPR09-16A-2/3				
			C12Q-STUP$^{R/L}$11-14		E12Q-STLP$^{R/L}$11-14A				
			C12Q-STUPR11-14-1/2		E12Q-STLPR11-14A-1/2				
			C12Q-STUPR11-14-2/3		E12Q-STLPR11-14A-2/3				
			C12Q-STUP$^{R/L}$11-16		E12Q-STLP$^{R/L}$11-14A				
			C12Q-STUPR11-16-1/2		E12Q-STLPR11-14A-1/2				
			C12Q-STUPR11-16-2/3		E12Q-STLPR11-14A-2/3				

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	Ref. to Page	Coolant Hole	Description	Ref. to Page
Carbide Shank Boring Bar	TP..	No	C16X-STUP$^{R}_{L}$11-18	Yes	E16X-STLP$^{R}_{L}$11-18A	F49	-	-	-
			C16X-STUPR11-18-1/2		E16X-STLPR11-18A-1/2				
			C16X-STUPR11-18-2/3		E16X-STLPR11-18A-2/3				
			C16X-STUP$^{R}_{L}$11-20		E16X-STLP$^{R}_{L}$11-18A				
			C16X-STUPR11-20-1/2		E16X-STLPR11-18A-1/2				
			C16X-STUPR11-20-2/3		E16X-STLPR11-18A-2/3				
			C20S-STUP$^{R}_{L}$11-25		E20S-STLP$^{R}_{L}$11-22A				
			C20S-STUPR11-25-1/2		E20S-STLPR11-22A-1/2				
			C20S-STUPR11-25-2/3		E20S-STLPR11-22A-2/3				
			C20S-STUP$^{R}_{L}$16-25		E20S-STLP$^{R}_{L}$16-25A				
			C20S-STUPR16-25-1/2		E20S-STLPR16-25A-1/2				
			C20S-STUPR16-25-2/3		E20S-STLPR16-25A-2/3				
		Yes	E08L-STUP$^{R}_{L}$08-10	Yes	E08L-STLP$^{R}_{L}$08-10AN	F49	-	-	-
			E10N-STUP$^{R}_{L}$09-12		E10N-STLP$^{R}_{L}$09-12AN				
			E10N-STUP$^{R}_{L}$11-12		E10N-STLP$^{R}_{L}$11-12AN				
			E12Q-STUP$^{R}_{L}$09-16		E12Q-STLP$^{R}_{L}$09-16A				
			E12Q-STUP$^{R}_{L}$11-14		E12Q-STLP$^{R}_{L}$11-14A				
			E12Q-STUP$^{R}_{L}$11-16						
			E16X-STUP$^{R}_{L}$11-18		E16X-STLP$^{R}_{L}$11-18A				
			E16X-STUP$^{R}_{L}$11-20						
			E20S-STUPR11-25		E20S-STLPR11-22A				
			E20S-STUPR16-25		E20S-STLPR16-25A				
	WB..	No	C05H-SWUB$^{R}_{L}$06-06	No	C05H-SWUB$^{R}_{L}$06-06AN	F59	-	-	-
			C06J-SWUB$^{R}_{L}$06-07		C06J-SWUB$^{R}_{L}$06-07AN				
			C07K-SWUB$^{R}_{L}$08-08		C07K-SWUB$^{R}_{L}$08-08AN				
			C08L-SWUB$^{R}_{L}$08-10	Yes	E08L-SWUB$^{R}_{L}$08-10AN				
			C10N-SWUB$^{R}_{L}$08-12		E10N-SWUB$^{R}_{L}$08-12AN				
			C10N-SWUBR08-12-1/2		E10N-SWUBR08-12AN1/2				
			C10N-SWUBR08-12-2/3		E10N-SWUBR08-12AN2/3				
	WP..	No	C12Q-SWUP$^{R}_{L}$11-14	Yes	E12Q-SWUP$^{R}_{L}$11-14A	F59	-	-	-
			C12Q-SWUPR11-14-1/2		E12Q-SWUPR11-14A-1/2				
			C12Q-SWUPR11-14-2/3		E12Q-SWUPR11-14A-2/3				
			C12Q-SWUP$^{R}_{L}$11-16		E12Q-SWUP$^{R}_{L}$11-14A				
			C12Q-SWUPR11-16-1/2		E12Q-SWUPR11-14A-1/2				
			C12Q-SWUPR11-16-2/3		E12Q-SWUPR11-14A-2/3				
			C16X-SWUP$^{R}_{L}$11-18		E16X-SWUP$^{R}_{L}$11-18A				
			C16X-SWUPR11-18-1/2		E16X-SWUPR11-18A-1/2				
			C16X-SWUPR11-18-2/3		E16X-SWUPR11-18A-2/3				
			C16X-SWUP$^{R}_{L}$16-20		E16X-SWUP$^{R}_{L}$16-18A				
			C16X-SWUPR16-20-1/2		E16X-SWUPR16-18A-1/2				
			C16X-SWUPR16-20-2/3		E16X-SWUPR16-18A-2/3				
			C20S-SWUP$^{R}_{L}$16-25		E20S-SWUP$^{R}_{L}$16-22A				
			C20S-SWUPR16-25-1/2		E20S-SWUPR16-22A-1/2				
			C20S-SWUPR16-25-2/3		E20S-SWUPR16-22A-2/3				

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

System Tip-Bars Recommended Cutting Conditions

◆ Recommended Cutting Conditions (VNB-S)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						VNB01-S type VNB015-S type		VNB02-S type ≀ VNB04-S type		Remarks
	MEGA	PVD	Carbide	CBN	PCD		ap (mm), f (mm/rev)				
	PR1225	PR930	KW10	KBN510	KPD001	KPD010	ap	f	ap	f	
Carbon Steel / Alloy Steel	★ 30~120	☆ 30~100					~0.1	~0.01	~0.2	~0.03	Coolant
Stainless Steel	★ 30~100	☆ 30~80					~0.1	~0.01	~0.2	~0.02	

★ :1st Recommendation ☆ :2nd Recommendation

◆ Recommended Cutting Conditions (VNB / VNB-NB / VNBT)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						VNB02 type		VNB03 type		VNB04 VNBT04 type		VNB05 VNB06 VNB07 VNBT05 type		Remarks
	MEGA	PVD	Carbide	CBN	PCD		ap (mm), f (mm/rev)								
	PR1225	PR930	KW10	KBN510	KPD001	KPD010	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	★ 30~120	☆ 30~100					~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	★ 30~100	☆ 30~80					~0.3	~0.02	~0.4	~0.03	~0.45	~0.05	~0.5	~0.07	
Non-ferrous Metals			☆ ~100		★ ~300	☆ ~300	~0.3	~0.05	~0.4	~0.06	~0.45	~0.1	~0.5	~0.15	

★ :1st Recommendation ☆ :2nd Recommendation

◆ Recommended Cutting Conditions (VNBX-S)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)							VNBX01-S type VNBX015-S type		VNBX02-S type ≀ VNBX04-S type		Remarks
	PVD Coated Carbide			Carbide	CBN	PCD		ap (mm), f (mm/rev)				
	PR630	PR915	PR930	KW10	KBN510	KPD001	KPD010	ap	f	ap	f	
Carbon Steel / Alloy Steel			★ 30~100					~0.1	~0.01	~0.2	~0.03	Coolant
Stainless Steel			★ 30~80					~0.1	~0.01	~0.2	~0.02	

★ :1st Recommendation

Recommended Cutting Conditions - Boring (Positive Insert: Cutting Dia. under 10mm) [ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grades	Corner-R (rε)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
*P	Low-carbon Steel Low-carbon Alloy	HB ≤ 300	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 70 - 110 30 - 60 - 90	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.04 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	PR1425	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing-Medium	Continuous Interruption	CF	PR1425	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	Medium-carbon Steel Medium-carbon Alloy	HB ≤ 300	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 70 - 110 30 - 60 - 90	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.04 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	PR1425	0.1 0.2	40 - 80 - 120 40 - 70 - 120	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing-Medium	Continuous Interruption	CF	PR1425	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	High-carbon Alloy	HB ≤ 280	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 70 - 110 30 - 60 - 90	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.04 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	PR1425	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing-Medium	Continuous Interruption	CF	PR1425	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
M	Stainless Steel	HB ≤ 220	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 60 - 80 30 - 60 - 80	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.03 - 0.05 0.02 - 0.05 - 0.07
			Finishing	Continuous Interruption	F	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing-Medium	Continuous Interruption	CF	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	Stainless Steel	HB ≤ 300	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 60 - 80 30 - 60 - 80	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.03 - 0.05 0.02 - 0.05 - 0.07
			Finishing	Continuous Interruption	F	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing-Medium	Continuous Interruption	CF	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
K	Gray Cast Iron	HB ≤ 250	Finishing (Solid Type)	Continuous Interruption	(VNB) (VNB-NB)	KW10	0.03 0.2	30 - 60 - 100 30 - 60 - 100	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	KW10	0.1 0.2	30 - 60 - 100 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing-Medium	Continuous Interruption	Without Chipbreaker	KW10	0.2 0.4	30 - 60 - 100 30 - 60 - 80	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	Nodular Cast Iron	HB ≤ 270	Finishing (Solid Type)	Continuous Interruption	(VNB) (VNB-NB)	KW10	0.03 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F,U	KW10	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing-Medium	Continuous Interruption	Without Chipbreaker	KW10	0.2 0.4	30 - 60 - 100 30 - 60 - 80	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys	HB ≤ 100	High Speed Finishing (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.05	150 - 200 - 300	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			Finishing (Long Tool Life)	Continuous Interruption	F,U	PDL025	0.1 0.2	100 - 150 - 200 100 - 150 - 200	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
			Finishing	Continuous Interruption	F,U	KW10	0.1 0.2	100 - 150 - 200 100 - 150 - 200	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
S	Titanium Alloys	HB ≤ 400	Precision Finishing (Rainbow Surface Gloss)	Continuous Interruption	Without Chipbreaker	KPD001	0.1 0.2	100 - 120 - 150 70 - 100 - 120	0.05 - 0.1 - 0.3 0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F,U	KW10	0.1 0.2	20 - 40 - 60 20 - 40 - 60	0.05 - 0.2 - 0.5 0.05 - 0.2 - 0.5	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
	Heat-resistant Alloys	HB ≤ 350	Finishing (Solid Type)	Continuous Interruption	(VNB)	KW10	0.2 0.2	10 - 30 - 50 10 - 30 - 50	0.05 - 0.1 - 0.3 0.05 - 0.1 - 0.3	0.03 - 0.05 - 0.1 0.03 - 0.05 - 0.08
			Finishing	Continuous Interruption	F,U	KW10	0.2 0.2	10 - 30 - 50 10 - 30 - 50	0.05 - 0.2 - 0.4 0.05 - 0.2 - 0.4	0.03 - 0.05 - 0.1 0.03 - 0.05 - 0.1
H	Hardened Steel Hard Materials	40~50 HRC	Finishing	Continuous Interruption	(VNB)	PR930	0.2 0.2	30 - 50 - 70 30 - 50 - 70	0.05 - 0.1 - 0.4 0.05 - 0.1 - 0.2	0.01 - 0.02 - 0.05 0.01 - 0.02 - 0.03
		45~68 HRC	Finishing	Continuous Interruption	ME MES	KBN05M	0.2 0.4	60 - 100 - 140 60 - 80 - 120	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.02 - 0.05 - 0.1 0.02 - 0.05 - 0.1

* Please use it with PR1005 set to Vc=150m/min or below, for machining of free-cutting steel such as small size SUM. For ap and f, refer to specs for low carbon steels.

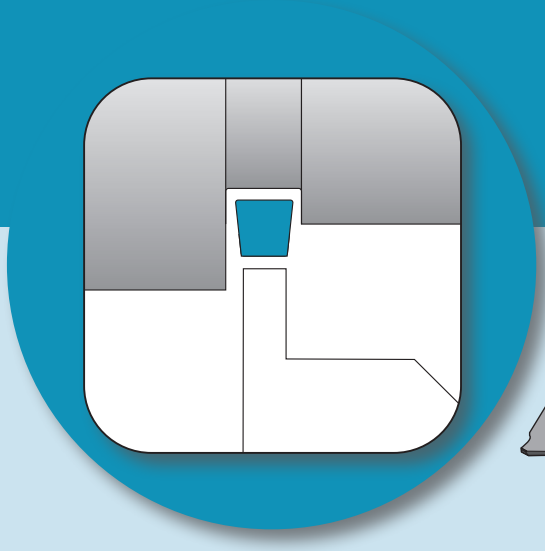
Recommended Cutting Conditions

Recommended Cutting Conditions - Boring (Positive Insert: Cutting Dia. over 10mm)

[ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grades	Corner-R (rε)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
*P	Low-carbon Steel Low-carbon Alloy	HB ≤ 300	Precision Finishing	Continuous Interruption	F,U	TN620 PR1425	0.1 0.2	250 - 300 - 350 120 - 170 - 220	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15 0.03 - 0.1 - 0.15
			Finishing	Continuous Interruption	XP	PV710 CA525	0.4 0.4	200 - 250 - 300 150 - 200 - 250	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous Interruption	XQ	PV710 CA525	0.4 0.4	150 - 200 - 250 100 - 150 - 200	0.5 - 1.0 - 2.0 0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Medium	Continuous Interruption	Standard	PV720 CA525	0.8 0.8	100 - 150 - 200 80 - 120 - 150	1.0 - 1.5 - 2.5 1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.3 0.1 - 0.15 - 0.2
	Medium-carbon Steel Medium-carbon Alloy	HB ≤ 300	Precision Finishing	Continuous Interruption	F,U	TN620 PR1425	0.2 0.4	150 - 200 - 250 120 - 140 - 170	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15 0.03 - 0.1 - 0.15
			Finishing	Continuous Interruption	PP	PV710 CA525	0.4 0.4	150 - 200 - 250 120 - 180 - 200	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous Interruption	HQ	PV710 CA525	0.4 0.4	120 - 180 - 220 100 - 150 - 200	0.5 - 1.0 - 2.0 0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Medium	Continuous Interruption	Standard	PV720 CA525	0.8 0.8	100 - 150 - 200 80 - 120 - 150	1.0 - 1.5 - 2.5 1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.3 0.1 - 0.15 - 0.2
	High-carbon Alloy	HB ≤ 280	Precision Finishing	Continuous Interruption	F,U	TN620 PR1425	0.2 0.4	120 - 150 - 180 110 - 130 - 160	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15 0.03 - 0.1 - 0.15
			Finishing	Continuous Interruption	PP	PV710 CA525	0.4 0.4	120 - 150 - 180 100 - 120 - 150	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous Interruption	HQ	PV710 CA525	0.4 0.4	120 - 150 - 180 100 - 120 - 150	0.5 - 1.0 - 2.0 0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Medium	Continuous Interruption	Standard	CA515 CA525	0.8 0.8	100 - 120 - 150 80 - 100 - 120	1.0 - 1.5 - 2.5 1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.3 0.1 - 0.15 - 0.2
M	Stainless Steel	HB ≤ 220	Finishing	Continuous Interruption	MQ	CA6525 PR1535	0.4 0.8	120 - 150 - 180 100 - 120 - 150	0.2 - 0.5 - 0.8 0.2 - 0.5 - 0.8	0.05 - 0.08 - 0.1 0.05 - 0.08 - 0.1
			Medium	Continuous Interruption	Standard	CA6525 PR1535	0.4 0.8	120 - 150 - 180 100 - 120 - 150	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
	Stainless Steel	HB ≤ 300	Finishing	Continuous Interruption	MQ	CA6525 PR1535	0.4 0.8	80 - 100 - 120 60 - 80 - 100	0.2 - 0.7 - 1.0 0.2 - 0.7 - 1.0	0.05 - 0.1 - 0.15 0.05 - 0.1 - 0.15
			Medium	Continuous Interruption	Standard	CA6525 PR1535	0.4 0.8	80 - 100 - 120 60 - 80 - 100	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
K	Gray Cast Iron	HB ≤ 250	High Speed Finishing	Continuous Interruption	Without Chipbreaker	KBN475 PT600M	0.4 0.8	400 - 500 - 600 200 - 250 - 350	0.05 - 0.2 - 0.5 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15 0.05 - 0.1 - 0.15
			Finishing (Gloss Oriented)	Continuous Interruption	Standard	PV7005 TN620	0.8 0.8	200 - 250 - 300 120 - 180 - 230	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing	Continuous Interruption	Standard	CA4505 CA4515	0.4 0.8	150 - 180 - 200 100 - 150 - 180	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Medium	Continuous Interruption	Standard Without Chipbreaker	CA4505 CA4515	0.8 0.8	100 - 150 - 200 80 - 120 - 150	0.5 - 1.0 - 2.0 0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2 0.05 - 0.1 - 0.15
	Nodular Cast Iron	HB ≤ 270	High Speed Finishing	Continuous Interruption	Without Chipbreaker	KBN60M PT600M	0.4 0.8	200 - 300 - 400 150 - 200 - 250	0.05 - 0.2 - 0.5 0.2 - 0.5 - 1.0	0.03 - 0.05 - 0.1 0.05 - 0.1 - 0.15
			Finishing (Gloss Oriented)	Continuous Interruption	Standard	PV7005 TN620	0.8 0.8	150 - 200 - 250 120 - 150 - 200	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing	Continuous Interruption	Standard	CA4505 CA4515	0.4 0.8	120 - 150 - 180 100 - 120 - 150	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Medium	Continuous Interruption	Standard	CA4505 CA4515	0.8 0.8	100 - 120 - 150 80 - 100 - 120	0.5 - 1.0 - 2.0 0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.15
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys	HB ≤ 100	High Speed Finishing (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.2	200 - 400 -1,000	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			Finishing (Long Tool Life)	Continuous Interruption	F,U	PDL025	0.4 0.4	100 - 200 - 400 100 - 200 - 400	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
			Finishing	Continuous Interruption	F,U	KW10	0.4 0.4	100 - 200 - 400 100 - 200 - 400	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
S	Titanium Alloys	HB ≤ 400	Precision Finishing (Rainbow Surface Gloss)	Continuous Interruption	Without Chipbreaker	KPD001	0.2 0.4	100 - 120 - 150 70 - 100 - 120	0.05 - 0.1 - 0.3 0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F,U	KW10	0.2 0.4	30 - 50 - 70 30 - 50 - 70	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
	Heat-resistant Alloys	HB ≤ 350	Finishing	Continuous Interruption	F,U	KW10	0.4 0.4	10 - 30 - 50 10 - 30 - 50	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
			Finishing	Continuous Interruption	MQ	PR1310	0.4 0.8	40 - 60 - 80 40 - 60 - 80	0.1 - 0.3 - 0.5 0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1 0.03 - 0.05 - 0.1
H	Hardened Steel Hard Materials	40~50 HRC	Finishing	Continuous Interruption	HQ Standard	CA515	0.8 0.8	60 - 80 - 100 30 - 50 - 70	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1 0.05 - 0.08 - 0.1
		45~68 HRC	Finishing	Continuous Interruption	ME MET	KBN05M	0.4 0.8	100 - 140 - 180 90 - 120 - 160	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	0.02 - 0.07 - 0.1 0.02 - 0.07 - 0.1
			Medium	Continuous	Without Chipbreaker (Negative)	KBN900	0.8	60 - 80 - 100	0.3 - 0.7 - 1.0	0.03 - 0.1 - 0.15

* When machining free-cutting steel such as SUM, please use PR1005 for Vc=200m/min or under and use PV720 / CA515, etc.



Grooving

G1~G108

G

External Grooving G2~G40

Summary of External Grooving		G2
KGBA / KGBAS		G9
KGB / KGBS → Will be switched to KGBA / KGBAS		G11
KGBF-F		G12
KTGF-F / KTGF		G14
S...KTGF	Sleeve Holder	G15
KTG → Will be switched to KGBA		G16
KGD (Integral Type for Automatic Lathe)		G21
KGD (Integral Type)		G22
KGD-S (0° Separate Type)		G23
KGDS-S (90° Separate Type)		G24
KGM (For automatic lathe)		G34
KGM-T		G35
KGMM / KGMS		G36
KGMU		G37
KGH / KGHS		G38
KGA		G39
KGMW (For Aluminum Wheel)		G40

Internal Grooving G41~G63

Summary of Internal Grooving		G41
EZG	EZ Bars	G43
VNG	System Tip-Bars	G45
HPG	2-Edge Tip-Bars	G46
PSG-S → Will be switched to EZG	Tip-Bars	G46
SIGE-EH / SIGE-WH / SIGE-WH-90		G49
GIV / GIV-E / GIV-W		G54
KIGBA		G56
KITG → Will be switched to KIGBA		G57
KIGM-V		G60
KIGH		G61
KIGM-8 / KIGMU-8		G62
KGIA		G63

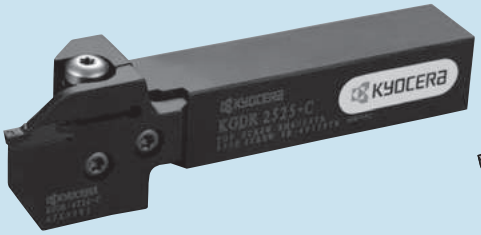
Face Grooving G64~G100

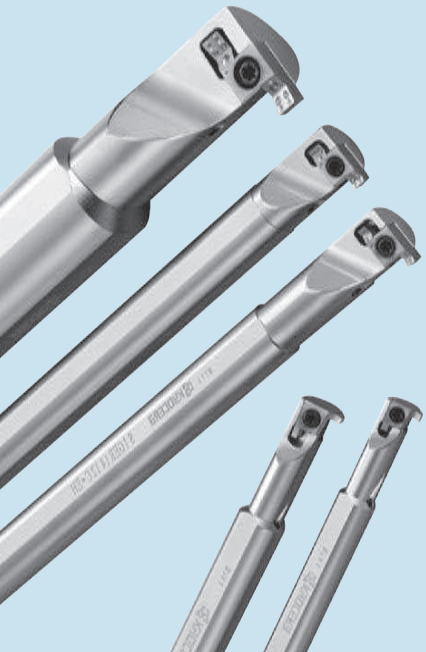
Summary of Face Grooving		G64
EZFG		G68
VNFG	System Tip-Bars	G70
HPFG	2-Edge Tip-Bars	G71
PSFG-S → Will be switched to EZFG	Tip-Bars	G71
TWFG / TWFGT	Twin-Bars	G72
KGDF (0° Separate Type)		G78
KGDF-Z (Integral Type)		G82
KGDF (90° Separate Type)		G83
GFVS-AA / GFVT-AA		G88
GFV		G90
GFVS / GFVT		G92
KFMS		G96
KFMS-8		G98
KFTB-S		G99
GIFV (Boring Bar Type)		G100

Technical Information G101~G108

Recommended Cutting Conditions	G101
Guide for Grooving	G106

Alternative Toolholder Reference Table for Grooving Toolholder G108





Summary of External Grooving

KGD Grooving (External Grooving & Turning) (G17~G29)

· **Integral Type**

Type	KGD
Edge Width (mm)	2.0~8.0
Grooving Depth (mm)	6~30
Ref. to Page	**G22**

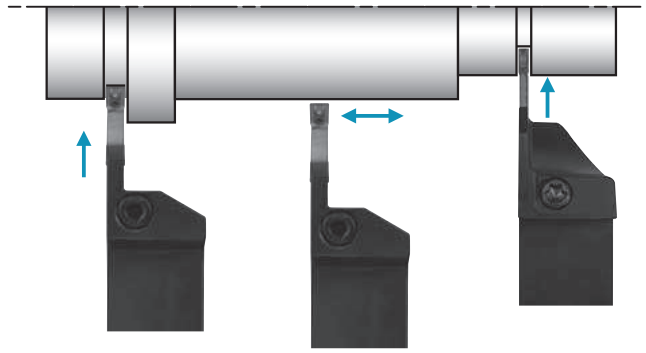
· **Integral Type for Automatic Lathe**

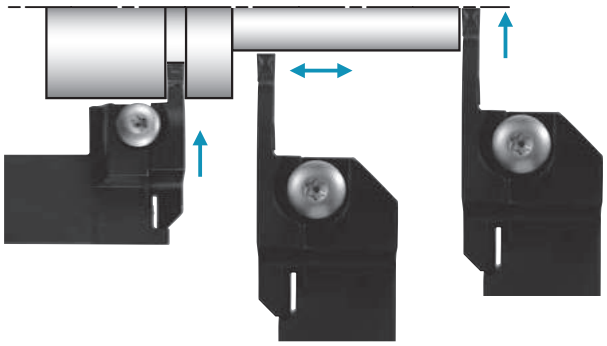
Type	KGD
Edge Width (mm)	2.0~4.0
Grooving Depth (mm)	10~21
Ref. to Page	**G21**

· **Separate Type**

Type	*KGDS-S
Edge Width (mm)	3.0
Grooving Depth (mm)	10
Ref. to Page	**G24**

* The separate type toolholders can accept all the blades if their hand is matching.



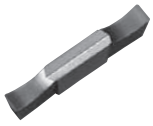


· **Separate Type**

Type	*KGD-S
Edge Width (mm)	2.0~5.0
Grooving Depth (mm)	10~25
Ref. to Page	**G23**

* The separate type toolholders can accept all the blades if their hand is matching.

Low Cutting Force **GS**



Low Feed **GL**

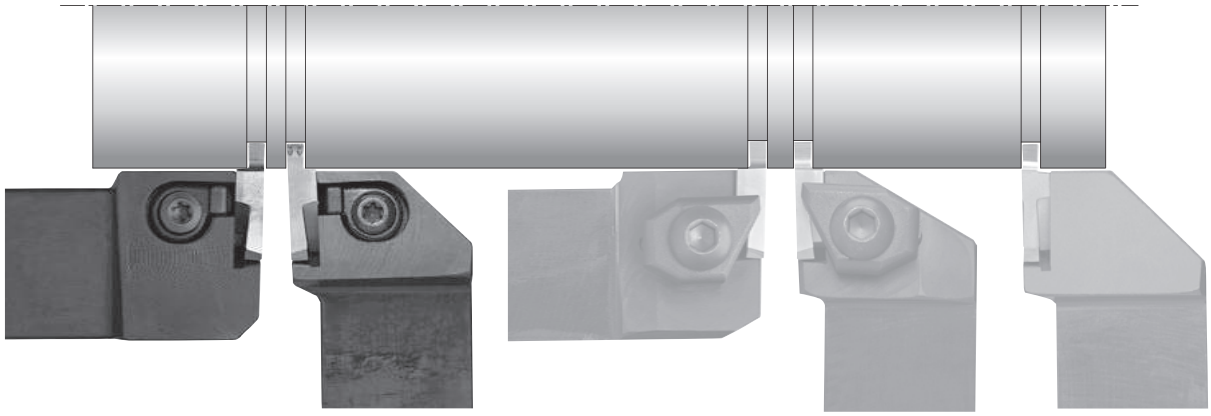
General purpose **GM**

High Feed **PH**

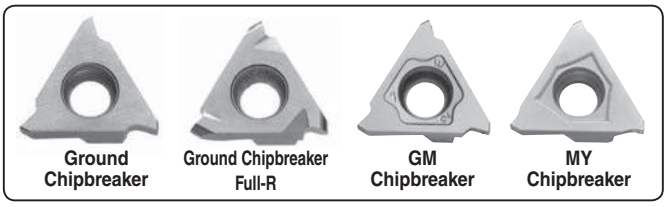
Copying **CM**

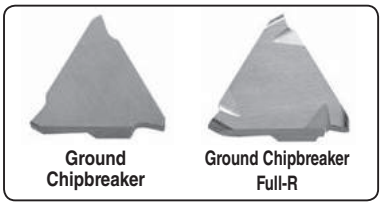
External Grooving (G6~G16, G38, G39)

Shallow Grooving (Grooving Depth: ~5mm)



Type	KGBAS	KGBA	KGBS	KGB	KTG
Edge Width (mm)	0.33~4.8	0.33~4.8	0.5~4.8	0.5~4.8	0.75~4.5
Grooving Depth (mm)	0.8~5.0	0.8~5.0	1.0~5.0	1.0~5.0	2.0~5.0
Ref. to Page	G9	G9	G11	G11	G16



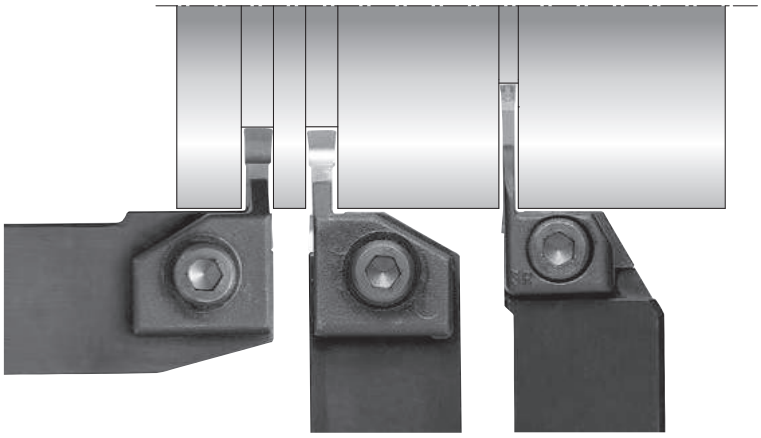


Edge Shape	General (Square)	Full-R (Round)	GM Chipbreaker	MY Chipbreaker

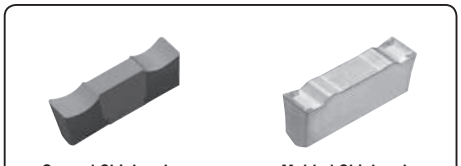
* These shallow groove types of the previous system will be switched to the system on the left.

KGBS → KGBAS
KGB, KTG → KGBA

Deep Grooving (Grooving Depth: ~25mm)



Type	KGHS	KGH	KGA
Edge Width (mm)	4.0~8.0	4.0~12.0	3.0~5.0
Grooving Depth (mm)	13	13~17	20~25
Ref. to Page	G38	G38	G39

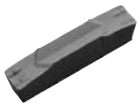


Summary of External Grooving

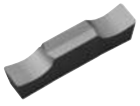
KGM Grooving (External Grooving & Turning) (G30~G37)

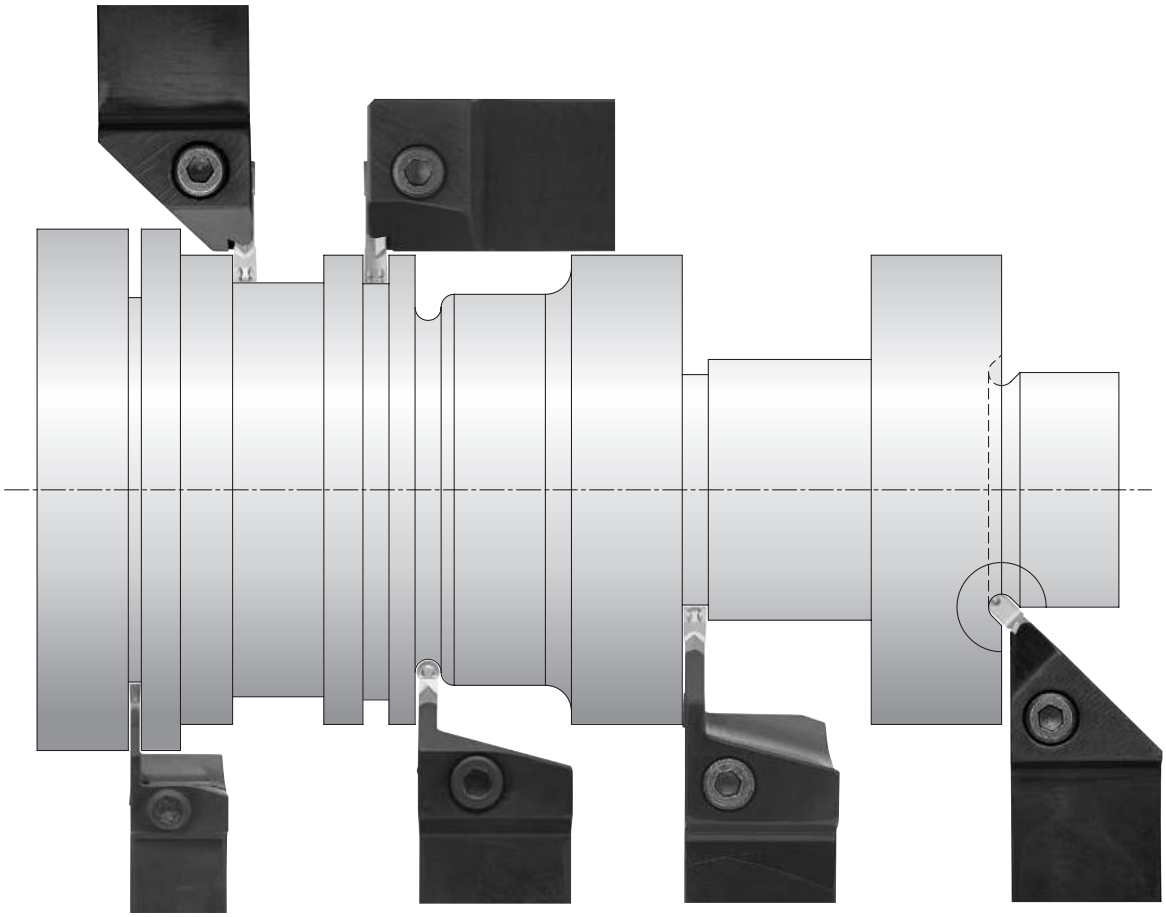
Type	KGMM
Edge Width (mm)	3.0~5.0
Grooving Depth (mm)	4.8
Ref. to Page	**G36**

KGMS
3.0~5.0
4.8
G36


Molded Chipbreaker

Molded Chipbreaker Full-R


Ground Chipbreaker

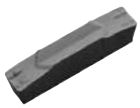


Type	KGM
Edge Width (mm)	1.5~4.0
Grooving Depth (mm)	10~16
Ref. to Page	**G34**

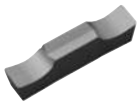
KGM
3.0~8.0
9~25
G34

KGM-T
2.0~6.0
17~30
G35

KGMU
3.0~5.0
3.5~4.5
G37


Molded Chipbreaker

Molded Chipbreaker Full-R


Ground Chipbreaker

Deep Grooving / Cut-off

Molded Chipbreaker Full-R

External Grooving of Precision Parts (G14, G15, G21, G34)

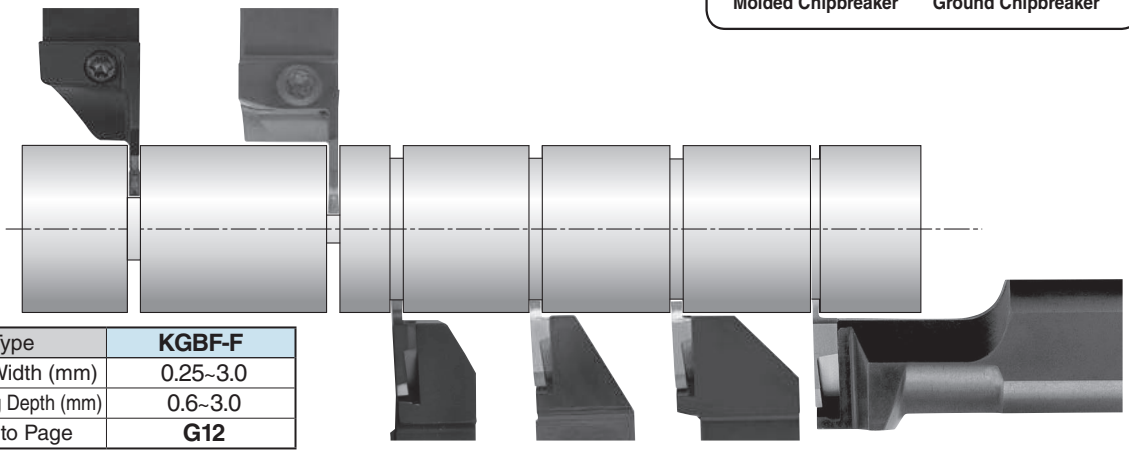
For Automatic Lathe

Type	KGD
Edge Width (mm)	2.0~4.0
Grooving Depth (mm)	10~21
Ref. to Page	G21

Type	KGM
Edge Width (mm)	1.5~4.0
Grooving Depth (mm)	10~16
Ref. to Page	G34

Molded Chipbreaker

Ground Chipbreaker



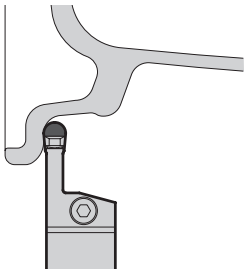
Type	KGBF-F
Edge Width (mm)	0.25~3.0
Grooving Depth (mm)	0.6~3.0
Ref. to Page	G12

Type	KTGF-F	KTGF
Edge Width (mm)	0.33~2.5	
Grooving Depth (mm)	0.8~2.5	
Ref. to Page	G14	

S-KTGF
0.33~2.5
0.8~2.5
G15

Ground Chipbreaker

For Aluminum Wheel External Grooving (External / Facing / Copying) (G40)



Type	KGMW
Edge Width (mm)	6.0~8.0
Grooving Depth (mm)	25
Ref. to Page	G40

1-edge
PCD

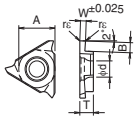
Applicable Inserts

(mm)

Description	A	T	ϕd
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

		MEGACOAT Cermet	Cermet			MEGA COAT	PVD Coated Carbide				Carbide	
		PV7040	TC40N		TN90	PR1215	PR1115		PR905		PR930		KW10	
		R	R	L	R	L	R	L	R	L	R	L	R	L
P	Carbon steel / Alloy steel	●					◕	◔				◔		
M	Stainless Steel						●	◕				◔		
K	Cast Iron								◕				◔	
N	Non-ferrous Metals												◕	
S	Titanium Alloys												◕	
H	Hard materials (~40HRC)					●	○				○			
	Hard materials (40HRC~)													

Classification of usage
◕ : Continuous-Light Interruption / 1st Choice
◔ : Continuous-Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)	Description	W	B	rε	Applicable Toolholders	Ref. to Page for Applicable Toolholders
	GBA32R/L 033-005 *1	0.33	0.8	0.05	KGBAR/L...16 KGBASL/R...16 KIGBAL/R...16 (Internal)	G9 G11 G56 (Internal)
	050-005 *2	0.50	1.0			
			1.2			
	075-005	0.75	2.0			
	095-005	0.95				
	100-005	1.00				
	110-005	1.10				
	120-005	1.20				
	125-020	1.25		0.2		
	130-020	1.30				
	140-020	1.40	2.5			
	145-020	1.45	2.0			
			2.5			
	150-020	1.50	2.0			
			2.5			
	160-020	1.60				
	170-020	1.70				
	175-020	1.75	2.0			
			2.5			
	200-020	2.00				
	225-020	2.25				
	250-020	2.50				
	300-020	3.00				
	GBA43R/L 125-010	1.25	2.0	0.1	★1	
	125-020			0.2	★2	
	140-020	1.40	3.5			
	145-020	1.45	2.0			
			3.5			
	150-010	1.50		0.1	★1	
	150-020			0.2	★2	
	170-020	1.70			★1	
	175-020	1.75			★2	
	185-020	1.85				
	195-020	1.95			★1	
	200-010	2.00		0.1		
	200-020			0.2	★2	
	225-020	2.25			★1	
	230-020	2.30			★2	
	250-010	2.50	5.0	0.1	★1	
	250-030		4.0	0.3	★2	
			5.0		★1	
	265-030	2.65	4.0		★2	
			5.0		★1	
	280-030	2.80	4.0		★2	
			5.0		★1	
	300-010	3.00		0.1	★1	
	300-030		4.0	0.3	★2	
			5.0		★1	
	325-030	3.25			★2	
	330-030	3.30	4.0		★2	
			5.0		★1	
	350-010	3.50		0.1	★1	
	350-030			0.3	★2	
	400-010	4.00		0.1	KGBAR/L...22-35 KGBASL/R...22-35 KIGBAL/R...22 (Internal)	
	400-040			0.4		
	430-040	4.30				
	450-040	4.50				
	480-040	4.80				

· Dimension B shows available grooving depth.

Recommended Cutting Conditions ⇒ G101

*1. The edge width tolerance of GBA32R/L 033-005: +0.02 +0.03
*2. The edge width tolerance of GBA32R/L 050-005: +0 +0.05

★Applicable Toolholders
1:KGBAR/L...22-25T5,KGBASL/R...22-25T5, KIGBAL/R...22
2:KGBAR/L...22-25T5,KGBASL/R...22-25T5, KGBAR/L...22-25, KGBASL/R...22-25, KIGBAL/R...22

● : Std. Item

Inserts are sold in 10 piece boxes.

Applicable Inserts

(mm)

Description	A	T	ϕd
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

		NEW					
P	Carbon steel / Alloy steel	●	○	◕	◔	◔	Classification of usage
M	Stainless Steel			●	◕	◔	◕ : Continuous-Light Interruption / 1st Choice
K	Cast Iron						◔ : Continuous-Light Interruption / 2nd Choice
N	Non-ferrous Metals						● : Continuous / 1st Choice
S	Titanium Alloys						○ : Continuous / 2nd Choice
H	Hard materials (~40HRC)			●	○	○	
	Hard materials (40HRC~)						

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)			Cermet				MEGACOAT		PVD Coated Carbide				Applicable Toolholders	Ref. to Page for Applicable Toolholders
				W	B	rε	TN620		TN6020		PR1215		PR1115		PR930			
							R	L	R	L	R	L	R	L	R	L		
NEW		GBA32R/L	050-005F *	0.50	1.0	0.05	●	●									KGBAR/L...16 KGBASL/R...16 KIGBAL/R...16 (Internal)	G9 G11
			075-005F	0.75	2.0		●	●										
			095-005F	0.95			●	●										
			100-005F	1.00			●	●										
			125-020F	1.25		0.2	●	●										
			145-020F	1.45			●	●										
			150-020F	1.50			●	●										
			175-020F	1.75			●	●										
			200-020F	2.00	2.5		●	●										
			250-020F	2.50			●	●										
		GBA43R/L	125-020F	1.25	2.0	0.2	●	●									KGBAR/L...22-15 KGBASL/R...22-15 KIGBAL/R...22 (Internal)	
			145-020F	1.45			●	●										
			150-020F	1.50	3.5		●	●										
			175-020F	1.75			●	●										
			185-020F	1.85			●	●										
			200-020F	2.00			●	●										
Sharp Edge			230-020F	2.30			●	●										
			250-030F	2.50	4.0	0.3	●	●									KGBAR/L...22-25T5 KGBASL/R...22-25T5 KIGBAL/R...22 (Internal)	
			265-030F	2.65			●	●										
			280-030F	2.80			●	●										
			300-030F	3.00			●	●										
			330-030F	3.30			●	●										
			350-030F	3.50	5.0		●	●									KGBAR/L...22-35 KGBASL/R...22-35 KIGBAL/R...22 (Internal)	
			400-040F	4.00		0.4	●	●										
			430-040F	4.30			●											
			450-040F	4.50			●											
			480-040F	4.80			●											
NEW		GBA43R/L	140-010GM	1.40	3.5	0.1	●	●			●	●					KGBAR/L...22-15 KGBASL/R...22-15 KIGBAL/R...22 (Internal)	G56 (Internal)
			150-020GM	1.50		0.2	●	●			●	●						
			175-020GM	1.75			●	●			●	●						
			185-020GM	1.85			●	●			●	●						
			200-020GM	2.00			●	●			●	●						
Molded Chipbreaker			230-020GM	2.30			●	●			●	●						
			250-030GM	2.50	5.0	0.3	●	●			●	●					KGBAR/L...22-25T5 KGBASL/R...22-25T5 KIGBAL/R...22 (Internal)	
GM Chipbreaker			265-030GM	2.65			●	●			●	●						
			300-030GM	3.00			●	●			●	●						
			330-030GM	3.30			●	●			●	●						
			350-030GM	3.50			●	●			●	●					KGBAR/L...22-35 KGBASL/R...22-35 KIGBAL/R...22 (Internal)	
			400-040GM	4.00		0.4	●	●			●	●						
		GBA43R/L	175-020MY	1.75	3.5	0.2			●	●	●	●	●	●	●	●	KGBAR/L...22-15 KGBASL/R...22-15 KIGBAL/R...22 (Internal)	
			185-020MY	1.85					●	●	●	●	●	●	●	●		
			200-020MY	2.00					●	●	●	●	●	●	●	●		
			230-020MY	2.30					●	●	●	●	●	●	●	●		
			250-030MY	2.50	4.0	0.3			●	●							★2	
					5.0						●	●	●	●	●	●	★1	
			265-030MY	2.65	4.0				●	●							★2	
					5.0						●	●	●	●	●	●	★1	
Molded Chipbreaker			300-030MY	3.00	4.0				●	●							★2	
					5.0						●	●	●	●	●	●	★1	
MY Chipbreaker			330-030MY	3.30	4.0				●								★2	
					5.0						●	●	●	●	●		★1	
			350-030MY	3.50	5.0				●	●	●	●	●	●	●	●	KGBAR/L...22-35 KGBASL/R...22-35	
			400-040MY	4.00		0.4			●	●	●	●	●	●	●	●	KIGBAL/R...22 (Internal)	

· Dimension B shows available grooving depth.

* The edge width tolerance of GBA32R/L 050-005F $^{+0.05}_{-0}$

Recommended Cutting Conditions ⇒ G101

★Applicable Toolholders

1:**KGBAR/L...22-25T5, KGBASL/R...22-25T5, KIGBAL/R...22**

2:**KGBAR/L...22-25T5, KGBASL/R...22-25T5, KGBAR/L...22-25, KGBASL/R...22-25, KIGBAL/R...22**

● Rake Angle (α) after Installment of GBA-GM type

α	Insert Description
10°	GBA43R/L150-020GM
15°	GBA43R/L175-020GM ~ GBA43R/L265-030GM
12°	GBA43R/L300-030GM ~ GBA43R/L400-040GM

α indicates the rake angle at the center of the edge width, after installing insert.

● Rake Angle (α) after Installment of GBA-MY type

α	Insert Description
15°	GBA43R/L175-020MY ~ GBA43R/L350-030MY
14°	GBA43R/L400-040MY

α indicates the rake angle at the center of the edge width, after installing insert.

● : Std. Item

Inserts are sold in 10 piece boxes.

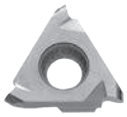
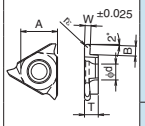
Applicable Inserts

NEW

P	Carbon steel / Alloy steel	●	○		◕	◔		◔		Classification of usage	Ref. to Page for Applicable Toolholders
M	Stainless Steel				●	◕		◔		◕: Continuous-Light Interruption / 1st Choice	
K	Cast Iron						◕		◔	◔: Continuous-Light Interruption / 2nd Choice	
N	Non-ferrous Metals								◕	●: Continuous / 1st Choice	
S	Titanium Alloys								◕	○: Continuous / 2nd Choice	
H	Hard materials (~40HRC)				●	○		○			
	Hard materials (40HRC~)										

(mm)

Description	A	T	ϕd
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) W	B	rε	MEGACOAT Cermet PV7040 R	PV7040 L	Cermet TN620 R	TN620 L	TN90 R	TN90 L	MEGA COAT PR1215 R	PR1215 L	PVD Coated Carbide PR1115 R	PR1115 L	PR905 R	PR905 L	PR930 R	PR930 L	Carbide KW10 R	KW10 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
 Full-R	GBA32R	200-100R	2.00	2.5	1.00							●		●								KGBAR/L...16 KGBASR/L...16 KIGBAR/L...16 (Internal)	G9 G11 G56 (Internal)
Full-R (Round)		300-150R	3.00		1.50							●		●									
	GBA43R/L	100-050R	1.00	2.0	0.50	●	●			●	●	●	●	●	●	●	●	●	●	●	●	KGBAR/L...22-15 KGBASL/R...22-15	
		150-075R	1.50	3.5	0.75	●	●			●	●	●	●	●	●	●	●	●	●	●	●		
		200-100R	2.00		1.00	●	●			●	●	●	●	●	●	●	●	●	●	●	●	KIGBAL/R...22 (Internal)	
		250-125R	2.50	4.0	1.25					●	●	●	●	●	●	●	●	●	●	●	●	★2	
		300-150R	3.00		1.50					●	●	●	●	●	●	●	●	●	●	●	●		
		400-200R	4.00	5.0	2.00					●		●	●	●	●	●	●	●	●	●	●	KGBAR/L...22-35 KGBASL/R...22-35 KIGBAL/R...22 (Internal)	
	GBA43R/L	100-050RF	1.00	2.0	0.50			●	●													KGBAR/L...22-15 KGBASL/R...22-15	
		150-075RF	1.50	3.5	0.75			●	●														
		200-100RF	2.00		1.00			●	●													KIGBAL/R...22 (Internal)	
		250-125RF	2.50	4.0	1.25			●	●													★2	
		300-150RF	3.00		1.50			●	●														
		400-200RF	4.00	5.0	2.00			●														KGBAR/L...22-35 KGBASL/R...22-35 KIGBAL/R...22 (Internal)	

· Dimension B shows available grooving depth.

Recommended Cutting Conditions G101

★Applicable Toolholders

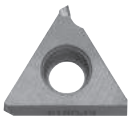
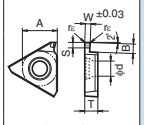
2:KGBAR/L...22-25T5, KGBASL/R...22-25T5, KGBAR/L...22-25, KGBASL/R...22-25, KIGBAL/R...22

Applicable Inserts

P	Carbon steel / Alloy steel									Classification of usage	Ref. to Page for Applicable Toolholders
M	Stainless Steel									◕: Continuous-Light Interruption / 1st Choice	
K	Cast Iron									◔: Continuous-Light Interruption / 2nd Choice	
N	Non-ferrous Metals					●				●: Continuous / 1st Choice	
S	Titanium Alloys					●				○: Continuous / 2nd Choice	
H	Hard materials (~40HRC)										
	Hard materials (40HRC~)		○		●						

(mm)

Description	A	T	ϕd
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) W	B	rε	CBN KBN510 R	KBN510 L	KBN525 R	KBN525 L	PCD KPD001 R	KPD001 L	KPD010 R	KPD010 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
 1-edge	GBA32R	125-010	1.25	2.0	0.1							●		KGBAR/L...16 KGBASR/L...16 KIGBAR/L...16 (Internal)	G9 G11 G56 (Internal)
 GBA32 S=1.7 GBA43 S=1.9		150-010	1.50							●		●			
	GBA43R/L	125-010	1.25	2.0	0.1							●	●		
		125-020			0.2	●	●	●	●						
		150-010	1.50	3.5	0.1					●	●	●	●	KGBAR/L...22-15 KGBASL/R...22-15 KIGBAL/R...22 (Internal))	
		150-020			0.2	●	●	●	●						
		200-010	2.00		0.1					●	●	●	●		
		200-020			0.2	●	●	●	●						
		250-010	2.50	4.0	0.1					●	●	●	●	★2	
		250-020			0.2	●	●	●	●						
		300-010	3.00		0.1					●	●	●	●		
		300-020			0.2	●	●	●	●						

· Dimension B shows available grooving depth.

Recommended Cutting Conditions G101

★Applicable Toolholders

2:KGBAR/L...22-25T5, KGBASL/R...22-25T5, KGBAR/L...22-25, KGBASL/R...22-25, KIGBAL/R...22

GBA type applicable for KGBA / KGBAS type toolholders is also usable for KGB / KGBS type toolholders.

● Rake Angle (α) after Installment of GBA type

GBA32R/L○○○-○○○		GBA43R/L○○○-○○○		GBA43R/L○○○-○○○R (Full-R)		
α	Insert Grades	α	Insert Grades	α	Insert Grades	Full-R Description
10°	TN620, TN90, PV7040, PR930 PR1115, PR1215, PR905 KPD001, KPD010	0°	KBN510, KBN525	10°	TN620, TN90, PV7040, PR930 PR1115, PR1215, PR905	050R~150R
		10°	TN620, TC40N, TN90, PV7040 PR930, PR1115, PR1215, PR905 KPD001, KPD010	14°	TN620, TN90, PV7040, PR930 PR1115, PR1215, PR905	200R
20°	KW10	20°	KW10		KW10	050R~200R

·For GM Chipbreaker and MY Chipbreaker, ref. to page **G7**.

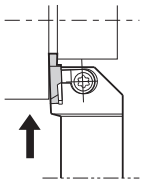
Inserts are sold in 10 piece boxes.

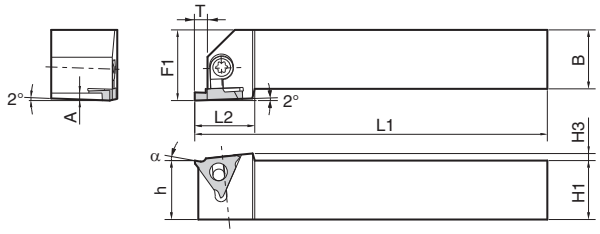
CBN & PCD Inserts are sold in 1 piece boxes.

●: Std. Item

External Shallow Grooving Toolholders

KGBA





• Right-hand shown

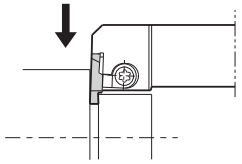
Right-hand Insert for Right-hand Toolholder,
Left-hand Insert for Left-hand Toolholder.

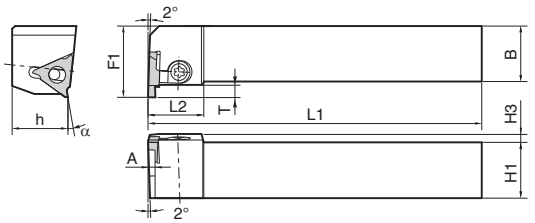
Alternative Toolholder Reference Table

KGBA ←	(KGB)
KGBA R/L ...22-15	KGB R/L ...22-15
KGBA R/L ...22-25	KGB R/L ...22-25
KGBA R/L ...22-35	KGB R/L ...22-35
KGBA R/L ...22-25T5	KGB R/L ...22-25 (Available grooving depth has a limit)

· Short shank type is not available for KGB / KGBS.

KGBAS





• Right-hand shown

Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

Alternative Toolholder Reference Table

KGBAS ←	(KGBS)
KGBAS R/L ...22-15	KGBS R/L ...22-15
KGBAS R/L ...22-25	KGBS R/L ...22-25
KGBAS R/L ...22-35	KGBS R/L ...22-35
KGBAS R/L ...22-25T5	KGBS R/L ...22-25 (Available grooving depth has a limit)

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	A	T			Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts ⇒ G6~G8
KGBA R/L	2020K-16	●	●	20	4.0	20	125	24	25	-	2.5			LGBA-16 R/L S	FT-15	GBA32 R/L type
	2525M-16	●	●	25		25	150		30							
	2020K22-15	●	●	20	4.0	20	125	25.5	25	1.0	4.0			LGBA-22 R/L S		GBA43 R/L type
	2525M22-15	●	●	25		25	150		30							
	2020K22-25	●	●	20	4.0	20	125	25.5	25	2.0	4.5					
	2525M22-25	●	●	25		25	150		30							
	2020K22-25T5	●	●	20	4.0	20	125	25.5	25	2.0	5.5					
	2525M22-25T5	●	●	25		25	150		30							
	2020K22-35	●	●	20	4.0	20	125	25.5	25	3.0						
	2525M22-35	●	●	25		25	150		30							
	2020H22-15*	●		20	4.0	20	100	25.5	25	1.0	4.0					
	2020H22-25*	●								2.0	4.5					
	2020H22-35*	●								3.0	5.5					
KGBAS R/L	2020K-16	●	●	20	4.0	20	125	25	25	-	2.5			LGBA-16 L/R S	FT-15	GBA32 L/R type
	2525M-16	●	●	25	4.5	25	150		30							
	2020K22-15	●	●	20	4.5	20	125	25	27	1.0	4.0			LGBA-22 L/R S		GBA43 L/R type
	2525M22-15	●	●	25	5.0	25	150		32							
	2020K22-25	●	●	20	4.5	20	125	25	27	2.0	4.5					
	2525M22-25	●	●	25	5.0	25	150		32							
	2020K22-25T5	●	●	20	4.5	20	125	25	27	2.0	5.5					
	2525M22-25T5	●	●	25	5.0	25	150		32							
	2020K22-35	●	●	20	4.5	20	125	25	27	3.0						
	2525M22-35	●	●	25	5.0	25	150		32							

· Dimension T shows the distance from the toolholder to the cutting edge. Available Groove Depth: "B" Dimension of Insert.

* mark indicates short shank type

· Clamp Set : KGBA R/L...LGBA-○○RS for Right-hand Toolholder, and LGBA-○○LS for Left-hand Toolholder.
KGBAS R/L...LGBA-○○LS for Right-hand Toolholder, and LGBA-○○RS for Left-hand Toolholder.

External Grooving Toolholders KGBA Short Shank types are available

For NC lathe and HSK tooling, KGBAR2020K-○○ (Overall length 125mm) short shank type KGBAR2020H22-○○ (Overall length 100mm) is available.
No longer required for the users to cut the shank portion.

● : Std. Item

Grooving Inserts

GB inserts will be switched to GBA (G6~G8)

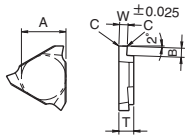
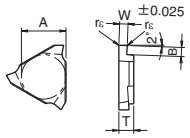
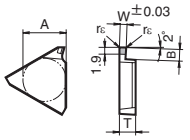
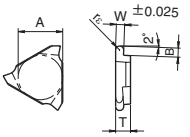
Applicable Inserts

(mm)

Description	A	T
GB32_	9.525	3.18
GB43_	12.70	4.76
GB43R/L480	12.70	5.00

P	Carbon steel / Alloy steel						
M	Stainless Steel						
K	Cast Iron						
N	Non-ferrous Metals						
S	Titanium Alloys						
H	Hard materials (~40HRC)						
	Hard materials (40HRC~)						

Classification of usage
- ◕ : Continuous-Light Interruption / 1st Choice
- ◔ : Continuous-Light Interruption / 2nd Choice
- ● : Continuous / 1st Choice
- ○ : Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) W	B	C or rε	Cermet TC40N R	TC40N L	TC60M R	TC60M L	PVD Coated Carbide PR630 R	PR630 L	PR930 R	PR930 L	PCD KPD010 R	KPD010 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
General (Square) (Corner is Chamfered) GB32 type	 (Corner is Chamfered)	GB32R/L 050*	0.50	1.0	C0.05			○	○	○						KGBR/L ···16 KGBSL/R ···16	G11
		075	0.75	2.0	C0.10			○	○	○							
		095	0.95					○		○							
		100	1.00					○	○	○	○						
		125	1.25					○	○	○							
		145	1.45					○		○							
		150	1.50					○	□	○							
		200	2.00	2.5				○	○	○							
		250	2.50					○		○							
General (Square) (Corner is R shape) GB43 type	 GB insert will be switched to GBA. Check the corner-R(rε) of the insert when changing.	GB43R/L 125	1.25	2.0	0.1							○	○			KGBR/L ···22-15 KGBSL/R ···22-15	
					0.2	○	○	○	○	○	□						
		145	1.45		0.2	○	○	○		○							
		150	1.50	3.5	0.1							○	○				
					0.2	○	○	○	○	○	○						
		175	1.75		0.2	○	○	○	○	○							
		185	1.85		0.2	○	○	○	○	○							
		200	2.00		0.1							○	○				
					0.2	○	○	○	○	○	○						
		230	2.30		0.2	○	○	○	○	○							
		250	2.50	4.0	0.1							○	○			KGBR/L ···22-25 KGBSL/R ···22-25	
					0.3	○	○	○	○	○	□						
		265	2.65		0.3	○	○	○		○							
		280	2.80		0.3	○	○	○	□	○							
		300	3.00		0.1							○	○				
					0.3	○	○	○	○	○	○						
		330	3.30		0.3	○	□	○	□	○							
		350	3.50	5.0	0.1							○	○			KGBR/L ···22-35 KGBSL/R ···22-35	
					0.3	○	○	○	○	○	□						
		400	4.00		0.1							○	○				
					0.4	○	○	○	○	○	□						
		430	4.30		0.4	□	□	□		○							
		450	4.50		0.4	○	□	○		○	□						
		480	4.80		0.4	□		○		○	□						
1-edge		GB43R/L 125	1.25	2.0	0.1									○		KGBR/L ···22-15 KGBSL/R ···22-15	
		150	1.50	3.5										○			
		200	2.00											○			
		250	2.50	4.0										○		KGBR/L ···22-25 KGBSL/R ···22-25	
		300	3.00											○	○		
Full-R		GB43R/L 050R	1.00	2.0	0.50			○	○	○	○					KGBR/L ···22-15 KGBSL/R ···22-15	
		075R	1.50	3.5	0.75			○	○	○	○						
		100R	2.00		1.00			○	○	○	○						
		125R	2.50	4.0	1.25			○	○	○	○					KGBR/L ···22-25 KGBSL/R ···22-25	
		150R	3.00		1.50			○	○	○	□						
		200R	4.00	5.0	2.00			○	○	○	□					KGBR/L ···22-35 KGBSL/R ···22-35	

· Dimension B shows available grooving depth.
· The edge width tolerance of GB32R/L050 is different $0.50^{+0.05}_{-0}$ (*)

Recommended Cutting Conditions ➡ G101

* Insert grades selection standard when changing to GBA.

GB Inserts ➡	GBA Inserts
TC40N	TC40N / PV7040
TC60M	TN620 / TN90
PR630	PR1215 / PR1115
PR930	PR1215 / PR1115
KPD010	KPD001(KPD010)

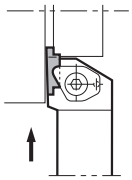
* Check the corner-R(rε) of the insert when changing.

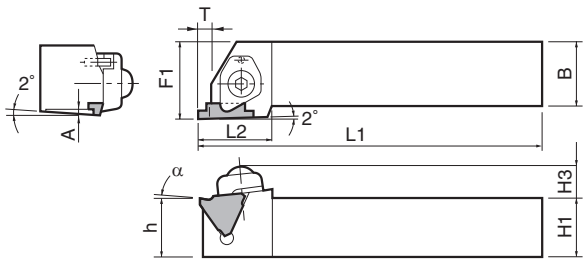
○ : Check Availability
□ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

KGB (Will be switched to KGBA G9)

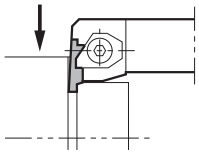


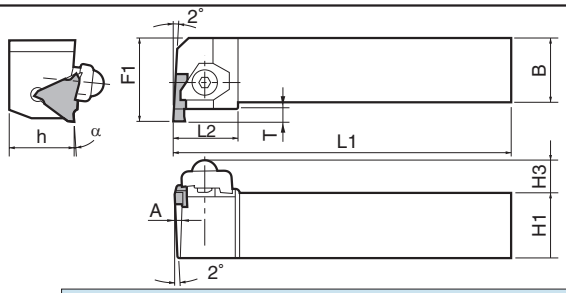


•Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

KGBS (Will be switched to KGBAS G9)





•Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

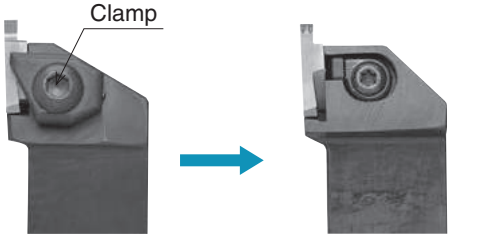
Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	A	T	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench	Applicable Inserts G6~G8 G10
KGB$^{R}_{L}$	2020K-16	○	○	20	11	20	125	24	25	-	2.5	CGB$^{R}_{L}$	BH6X25	SP-6	LW-4	GB32$^{R}_{L}$ type GBA32$^{R}_{L}$ type
	2525M-16	○	○	25		25	150		30							
	2020K22-15	○	○	20	11.5	20	125	25.5	25	1.0	4.0					GB43$^{R}_{L}$ type GBA43$^{R}_{L}$ type
	2525M22-15	○	○	25		25	150		30							
	2020K22-25	○	○	20	11.5	20	125	25.5	25	2.0	4.5					
	2525M22-25	○	○	25		25	150		30							
	2020K22-35	○	○	20	11.5	20	125	25.5	25	3.0	5.5					
	2525M22-35	○	○	25		25	150		30							
KGBS$^{R}_{L}$	2020K-16	○	○	20	11	20	125	25	25	-	2.5	CGB$^{L}_{R}$	BH6X25	SP-6	LW-4	GB32$^{L}_{R}$ type GBA32$^{L}_{R}$ type
	2525M-16	○	○	25		25	150		30							
	2020K22-15	○	○	20	11.5	20	125	25	27	1.0	4.0					GB43$^{L}_{R}$ type GBA43$^{L}_{R}$ type
	2525M22-15	○	○	25		25	150		32							
	2020K22-25	○	○	20	11.5	20	125	25	27	2.0	4.5					
	2525M22-25	○	○	25		25	150		32							
	2020K22-35	○	○	20	11.5	20	125	25	27	3.0	5.5					
	2525M22-35	○	○	25		25	150		32							

- Dimension T shows the distance from the toolholder to the cutting edge. Available Groove Depth: "B" Dimension of Insert.

·Clamp : KGB$^{R}_{L}$ ... CGBR for Right-hand Toolholder, and CGBL for Left-hand Toolholder.
KGBS$^{R}_{L}$ ... CGBL for Right-hand Toolholder, and CGBR for Left-hand Toolholder.

Rake Angle(α) after Installment of GB type

GB32$^{R}_{L}$○○○		GB43$^{R}_{L}$○○○		GB43$^{R}_{L}$○○○R (Full-R)	
α	Insert Grades	α	Insert Grades	α	Insert Grades
5°	TC60M PR630	5°	TC40N TC60M PR630 PR930	5°	TC60M PR630 } 050R~150R
20°	KW10	10°	KPD010	14°	TC60M PR630 } 200R KW10···050R~200R
		20°	KW10		



KGB Toolholder → KGBA Toolholder

* KGB / KGBS toolholder will be switched to KGBA / KGBAS.
Better Chip flow.
* For applicable insert, GB insert will be switched to GBA.
There are various types of GBA insert grades available dependent on the user's cutting condition requirements.

○ : Check Availability

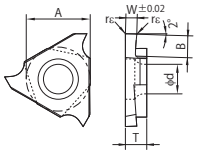
GBF

(mm)

Description	A	T	ϕd
GBF32_	9.525	3.18	4.4

P	Carbon steel / Alloy steel	●	◔	
M	Stainless Steel	○	●	
K	Cast Iron			●
N	Non-ferrous Metals			●
S	Titanium Alloys			●
H	Hard materials (~40HRC)			
	Hard materials (40HRC~)			

Classification of usage
- ●: Continuous-Light Interruption / 1st Choice
- ◔: Continuous-Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) W	B	rε	MEGACOAT PR1215 R	MEGACOAT PR1215 L	MEGACOAT NANO PR1535 R	MEGACOAT NANO PR1535 L	Carbide GW15 R	Carbide GW15 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
	GBF32R/L 025-005	0.25	0.6	0.05	●	●	●	●	●	●	KGBFR/L···16F	G13
	030-005	0.30	0.8		●	●	●	●	●	●		
	033-005	0.33			●	●	●	●	●	●		
	043-005	0.43	1.0		●	●	●	●	●	●		
	050-005	0.50	1.2		●	●	●	●	●	●		
	053-005	0.53			●	●	●	●	●	●		
	065-005	0.65			●	●	●	●	●	●		
	075-005	0.75	2.0		●	●	●	●	●	●		
	080-005	0.80			●	●	●	●	●	●		
	095-005	0.95			●	●	●	●	●	●		
	100-005	1.00			●	●	●	●	●	●		
	110-005	1.10			●	●	●	●	●	●		
	120-005	1.20			●	●	●	●	●	●		
	125-010	1.25		0.1	●	●	●	●	●	●		
	130-010	1.30			●	●	●	●	●	●		
	140-010	1.40	2.7		●	●	●	●	●	●		
	145-010	1.45			●	●	●	●	●	●		
	150-010	1.50			●	●	●	●	●	●		
	165-010	1.65			●	●	●	●	●	●		
	170-010	1.70	3.0		●	●	●	●	●	●		
	175-010	1.75			●	●	●	●	●	●		
	200-010	2.00			●	●	●	●	●	●		
	225-010	2.25			●	●	●	●	●	●		
	250-010	2.50			●	●	●	●	●	●		
	300-010	3.00			●	●	●	●	●	●		

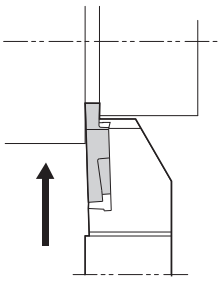
Recommended Cutting Conditions

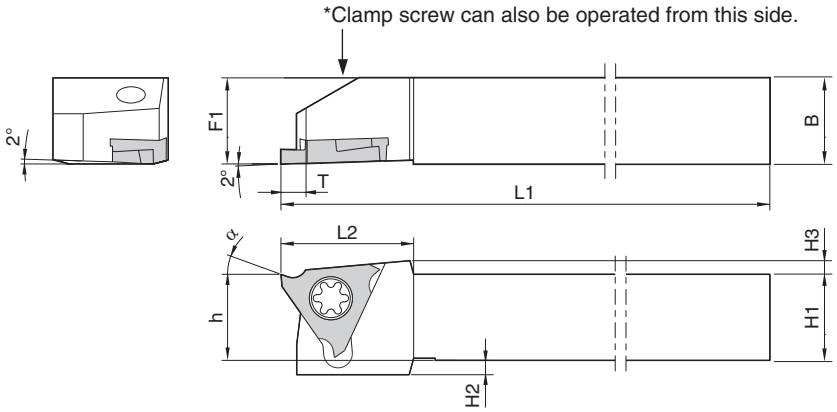
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT PR1215	MEGACOAT NANO PR1535	Carbide GW15	(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm) GBF32R/L025–053	GBF32R/L065–095	GBF32R/L100–145	GBF32R/L150–300	Remarks
Carbon Steel	★ 80~180	☆ 70~160	-	(1) 0.01~0.05	(1) 0.02~0.07	(1) 0.03~0.08	(1) 0.03~0.08	Coolant
				(2) Not recom.	(2) Not recom.	(2) 0.03~0.06	(2) 0.03~0.06	
				(3) Not recom.	(3) Not recom.	(3) MAX. 0.2	(3) MAX. 0.2	
Alloy Steel	★ 80~180	☆ 70~160	-	(1) 0.01~0.04	(1) 0.02~0.06	(1) 0.03~0.07	(1) 0.03~0.07	
				(2) Not recom.	(2) Not recom.	(2) 0.02~0.05	(2) 0.02~0.05	
				(3) Not recom.	(3) Not recom.	(3) MAX. 0.2	(3) MAX. 0.2	
Stainless Steel	☆ 60~130	★ 50~120	-	(1) 0.01~0.04	(1) 0.02~0.06	(1) 0.03~0.07	(1) 0.03~0.07	
				(2) Not recom.	(2) Not recom.	(2) 0.02~0.05	(2) 0.02~0.05	
				(3) Not recom.	(3) Not recom.	(3) MAX. 0.2	(3) MAX. 0.2	
Cast Iron	-	-	★ 60~100	(1) 0.01~0.05	(1) 0.02~0.07	(1) 0.03~0.08	(1) 0.03~0.08	
				(2) Not recom.	(2) Not recom.	(2) 0.03~0.06	(2) 0.03~0.06	
				(3) Not recom.	(3) Not recom.	(3) MAX. 0.2	(3) MAX. 0.2	
Aluminum	-	-	★ 150~400	(1) 0.01~0.05	(1) 0.02~0.07	(1) 0.03~0.08	(1) 0.03~0.08	
				(2) Not recom.	(2) Not recom.	(2) 0.03~0.06	(2) 0.03~0.06	
				(3) Not recom.	(3) Not recom.	(3) MAX. 0.2	(3) MAX. 0.2	
Brass	-	-	★ 150~300	(1) 0.01~0.04	(1) 0.02~0.06	(1) 0.03~0.07	(1) 0.03~0.07	
				(2) Not recom.	(2) Not recom.	(2) 0.02~0.05	(2) 0.02~0.05	
				(3) Not recom.	(3) Not recom.	(3) MAX. 0.2	(3) MAX. 0.2	

★:1st Recommendation ☆:2nd Recommendation

● : Std. Item

KGBF-F (without offset)





• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std.		Dimension (mm)							Spare Parts	
											Clamp Screw	Wrench
		R	L	H1=h	H2	H3	B=F1	L1	L2	T		
KGBF R/L	1010JX-16F	●	●	10	4	2.1	10	120	18.5	3	SB-4070TRW	FT-8
	1212JX-16F	●	●	12	2		12					
	1616JX-16F	●	●	16	-		16					
	2020JX-16F	●	●	20	-		20					

* Dimension T shows the distance from the toolholder to the cutting edge. Available Groove Depth: "B" Dimension of Insert.
Max. cutting dia. is ϕ51mm
The rake angle after installation in the toolholder is 20˚.

Compatiblity with GBF and GBA

1 GBF will fit KGBA / KGBAS toolholders

Caution: The maximum groove depth for KGBA / KGBAS toolholders is 2.5 mm

2 GBA inserts will also fit KGBF-F toolholders

Caution: The rake angle after installation in the toolholder is 11°

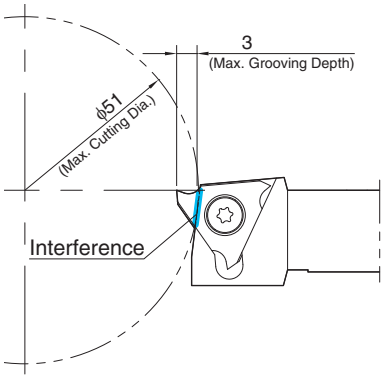
2.5 mm groove depth is available on workpiece diameters up to 200 mm max.

2.2 mm groove depth is available on workpiece diamaters over 200 mm

Max. Cutting Dia.

Max. cutting dia. is ϕ51mm

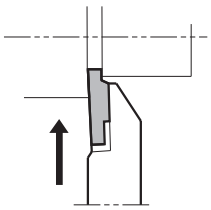
The workpiece interferes with the holder at ϕ51 mm workpiece diameter or larger

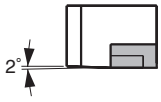


● : Std. Item

External Shallow Grooving Toolholders [for TGF Insert]

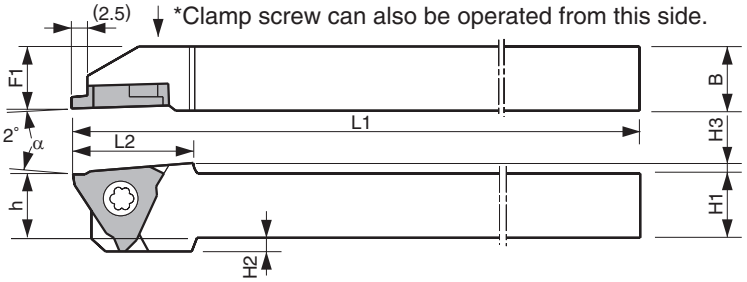
KTGF-F (without offset)





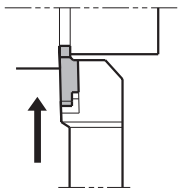
α	Insert Grades
20°	PR1115, PR1215 PR930, KW10
11°	KPD001
6°	TC40N

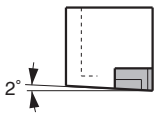
• Right-hand shown



Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

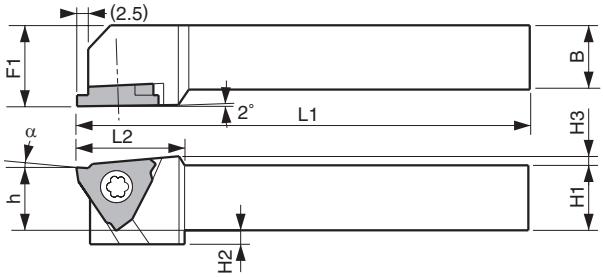
KTGF (with offset)





α	Insert Grades
20°	PR1115, PR1215 PR930, KW10
11°	KPD001
6°	TC40N

• Right-hand shown



Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	Spare Parts: Clamp Screw	Spare Parts: Wrench
KTGF R/L	1010JX-16F	●	●	10	2	2.5	10	120	18.5	10	SB-4070TRW	FT-8
	1212JX-16F	●	●	12	-		12			12		
	1616JX-16F	●	●	16			16			16		
KTGF R/L	1212F-16F	●	●	12	-	2.5	12	85	18.5	12	SB-4070TRW	FT-8
KTGF R/L	1010F-16	●	●	10	4	2.5	10	80	18.5	12	SB-4070TRS	FT-10
	1212H-16	●	●	12	2		12	100		16		
	1616H-16	●	●	16	-		16	100		20		
	2020K-16	●	●	20			20	125	20	25		
	2525M-16	●	●	25			25	150		32		

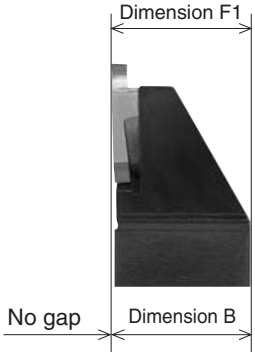
KTGF-F / KTGF Selection Reference

Q : What is the difference between "Without Offset" and "With Offset " of KTGF toolholders for external grooving?

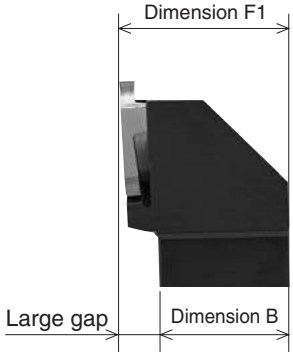
A : When operating the automatic lathe, the toolholder come very close to the chuck.

In such cases, the "With Offset" toolholder sometimes interferes with the chuck due to the large gap between B and F1 dimensions as shown below.

It is necessary to use "Without Offset" in such cases.



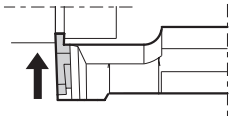
KTGF-F (without offset)

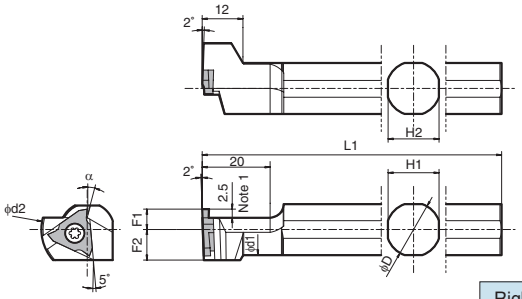


KTGF (with offset)

● : Std. Item

S-KTGF (Sleeve Holder)





α	Insert Grades
20°	PR1115, PR1215 PR930, KW10
11°	KPD001
6°	TC40N

• Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Note 1) Dimension B shows available grooving depth.

Toolholder Dimensions

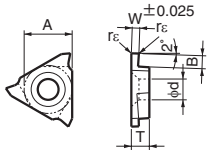
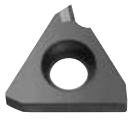
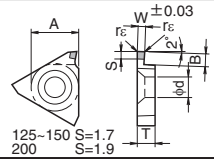
Description	Std.	Dimension (mm)							Spare Parts	
									Clamp Screw	Wrench
		φD	L1	F1	F2	φd1	φd2	H1=H2		
S12F-KTGFL16	●	12	80	6	9.0	11.0	27	11	SB-4070TRS	FT-10
S14H-KTGFL16	●	14	100			13.0		13		
S15F-KTGFL16	●	15.875	85			14.6		15		
S16F-KTGFL16	●	16								
S19G-KTGFL16	●	19.05	90		10.5	17.6		17		
S19K-KTGFL16	●		120							
S20G-KTGFL16	●	20	90		11.0	18.6		18		
S20K-KTGFL16	●		120							
S25.0H-KTGFL16	●	25	100	10	14.0	23.6	32	23		
S25K-KTGFL16	●	25.4	120							

Applicable Inserts

(mm)

Description	A	T	φd
TGF32_	9.525	3.18	4.6

		Classification of usage
P	Carbon steel / Alloy steel	● : Continuous-Light Interruption / 1st Choice
M	Stainless Steel	◔ : Continuous-Light Interruption / 2nd Choice
K	Cast Iron	● : Continuous / 1st Choice
N	Non-ferrous Metals	○ : Continuous / 2nd Choice
S	Titanium Alloys	
H	Hard materials (~40HRC)	
	Hard materials (40HRC~)	

Insert (Handed Insert shows Right-hand)		Description	Dimension(mm)			Cermet	MEGACOAT	PVD Coated Carbide		Carbide	PCD	Applicable Toolholders	Ref. to Page for Applicable Toolholders
			W	B	rε	TC40N	PR1215	PR930	PR1115	KW10	KPD001		
						R L	R L	R L	R L	R L	R L		
		TGF32R/L 033-005	0.33	0.8	0.05		●	●	●	●		KTGFR/L...16F KTGFR/L...16 S...KTGFLL/-16	G14 G15
		050-005	0.50	1.2		●	● ●	● ●	● ●	●			
		075-010	0.75	2.0	0.1	●	● ●	● ●	● ●	●			
		095-010	0.95			●	● ●	● ●	● ●	●			
		100-010	1.00			●	● ●	● ●	● ●	●			
		120-010	1.20				● ●		● ●				
		125-010	1.25			●	● ●	● ●	● ●	●			
		140-010	1.40				● ●		● ●				
		145-010	1.45			●	● ●	● ●	● ●	●			
		150-010	1.50			●	● ●	● ●	● ●	●			
		175-010	1.75			●	● ●	● ●	● ●	●			
		200-010	2.00	2.5		●	● ●	● ●	● ●	●			
		250-010	2.50			●	● ●	● ●	● ●	●			
 1-edge	 125~150 S=1.7 200 S=1.9	TGF32R/L 125-010	1.25	2.0	0.1						●		
		150-010	1.50								●		
		200-010	2.00	2.5							●		

· Dimension B shows available grooving depth.

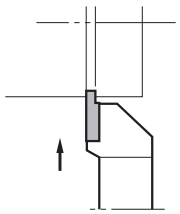
Recommended Cutting Conditions G102

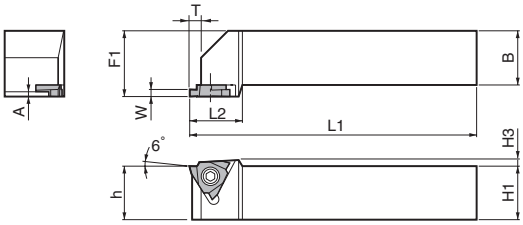
● : Std. Item

Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

KTG (Will be switched to KGBA G9)





• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	A	T	Spare Parts: Clamp Screw		Wrench		
KTG$^{R}_{L}$	2020K-16	○	○	20	3.0	20	125	20	25	-	2.5	SB-4TR	-	FT-15	-	
	2525M-16	○	○	25		25	150		30							
	2020K22-15	○	○	20	3.0	20	125	25	25	1.0	4.0	-	GS-50	-	LW-3	
	2525M22-15	○	○	25		25	150		30							
	2020K22-25	○	○	20	3.0	20	125	25	25	2.0	4.5					
	2525M22-25	○	○	25		25	150		30							
	2020K22-35	○	○	20	3.0	20	125	25	25	3.0	5.5					
	2525M22-35	○	○	25		25	150		30							

· Dimension T shows the distance from the toolholder to the cutting edge. Available groove depth: "B" dimension of insert.

* GBA insert cannot be installed to this toolholder.

Applicable Inserts

(TG insert will be switched to GBA G6~G8)

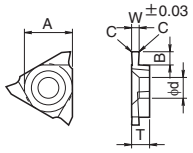
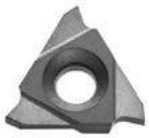
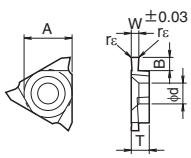
(mm)

Description	A	T	φd
TG32_	9.525	3.18	4.5
TG43_	12.70	4.76	5.5

P	Carbon steel / Alloy steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metals	
S	Titanium Alloys	
H	Hard materials (~40HRC)	
	Hard materials (40HRC~)	

Classification of usage

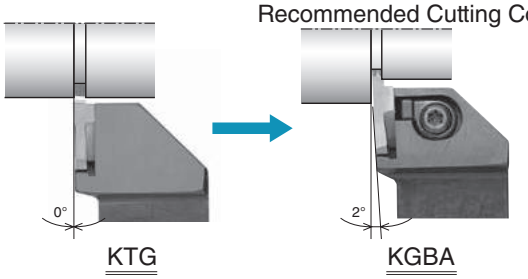
●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) W	B	C or rε	Cermet TN60 R	L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
General (Square) (Corner is Chamfered) TG32 type	 (Corner is Chamfered)	TG32$^{R}_{L}$	075	0.75	2.0	C0.1	○	○	KTG$^{R}_{L}$...16	G16
			095	0.95			○	○		
			125	1.25			○	○		
			145	1.45			○	○		
			150	1.50			○	○		
			175	1.75			○	○		
			200	2.00			○	○		
 General (Square) (Corner is R shape) TG43 type		TG43$^{R}_{L}$	150	1.50	3.5	0.2	○	○	KTG$^{R}_{L}$...22-15	G16
			175	1.75			○	○		
			200	2.00			○	○		
			230	2.30			○	○		
			250	2.50	4.0	0.3	○	○	KTG$^{R}_{L}$...22-25	
			265	2.65			○	○		
			280	2.80			○	○		
			300	3.00			○	○		
			330	3.30			○	○		
			350	3.50	5.0	0.4	○	○	KTG$^{R}_{L}$...22-35	
			400	4.00			○	○		
			430	4.30			○	○		
			450	4.50			○	○		

· Dimension B shows available grooving depth.

Recommended Cutting Conditions G102

* KTG will be switched to KGBA. Machining against the wall is available.
* For applicable insert, TG insert will be switched to GBA.
  Change Insert Grade TN60 for TN90.
  There are various types of GBA insert grades available dependent on the user's cutting condition requirements.
* Check the corner-R(rε) of the insert when changing.



○ : Check Availability

Inserts are sold in 10 piece boxes.

Features

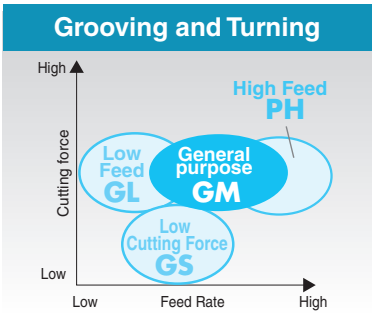
1 Various insert lineup

● Smooth chip control
➡ Newly-introduced chipbreakers designed to cover a variety of workpiece materials.

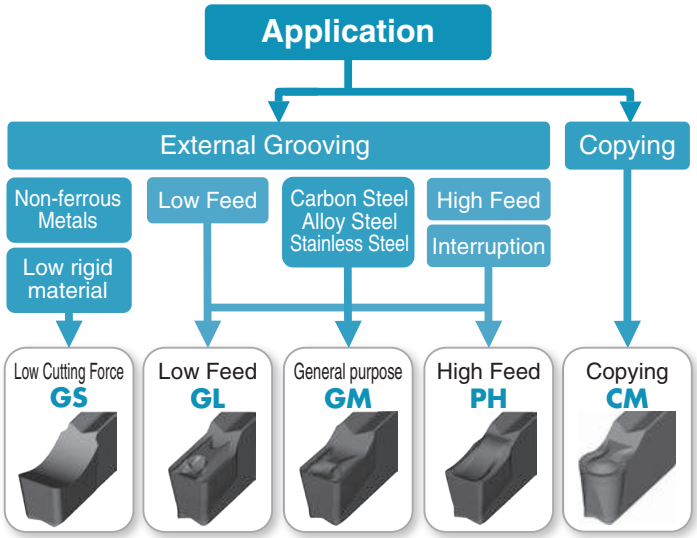
● High precision edge preparation
➡ High precision molding technology with tolerance ±0.03mm (Edge width 2, 3, 4mm types)

● Highly-reputed MEGACOAT technology
➡ Long tool life and high efficiency machining achieved by superior oxidation resistance and wear resistance.

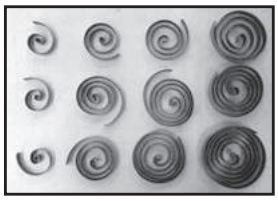
● Application Map



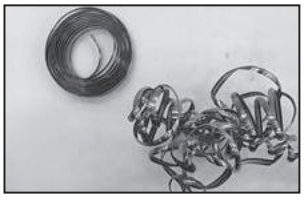
● Chipbreaker Selection



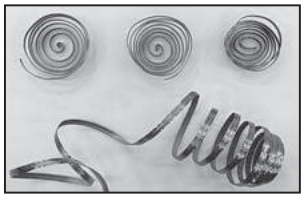
● Comparison of Chip Control (SCM415 Vc=150m/min, f=0.15mm/rev)



GM Chipbreaker



Competitor A

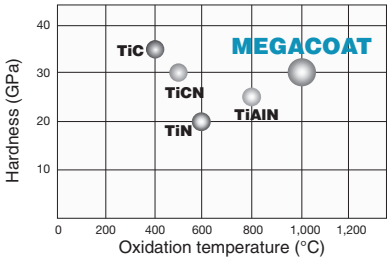


Competitor B

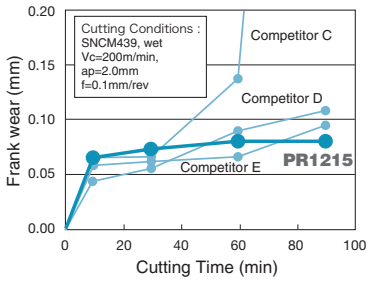
Smooth chip control

Less chip biting troubles

● Features of MEGACOAT



● Comparison of Wear Resistance

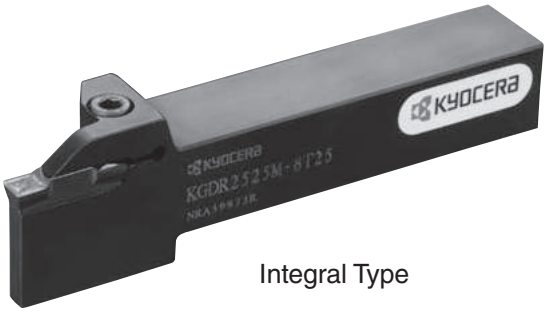


PR1225:
1st choice for cut-off, grooving and turning.

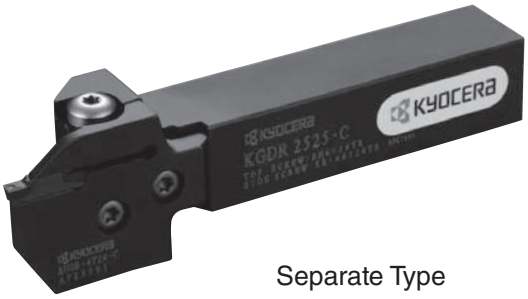
PR1215:
With superior wear resistance, recommended for grooving and cut-off under the stable conditions as well as machining of cast iron.

2 Toolholder

● Integral Type and Separate Type (Toolholder + Blade) are available



Integral Type

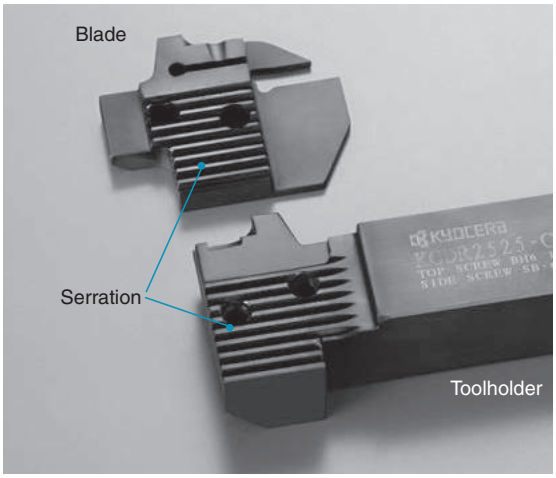


Separate Type

● High rigidity separate type toolholder

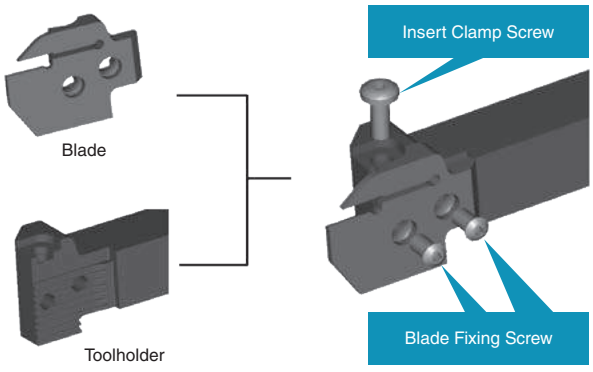
➡ Adaptable to wide applications by changing blades

Deals with various edge widths and cutting depths by changing the blade and toolholder combination.
Even if the blade is broken, you only need to replace the broken part.



■ Structure of toolholder unit (Toolholder + Blade)

● KGD-S (0° Separate Type)

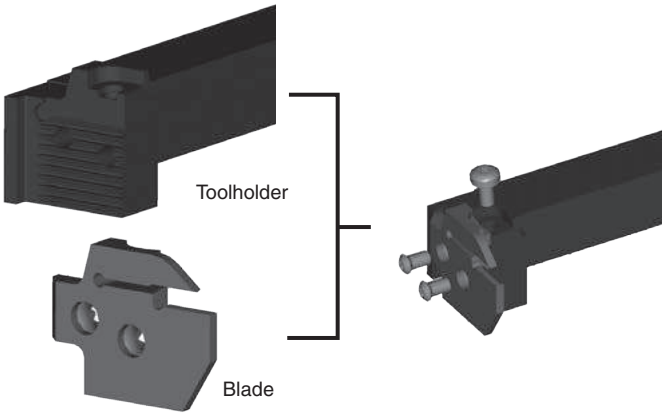


*** Note for the toolholder and blade combination of 0° Separate Type**

Toolholder (KGD$^{R}_{L}$○○○○-C)
+
Blade (KGD$^{R}_{L}$-○T○○-C)

⇒Right-hand Blade for Right-hand Toolholder,
Left-hand Blade for Left-hand Toolholder.

● KGDS-S (90° Separate Type)



*** Note for the toolholder and blade combination of 90° separate type**

Toolholder (KGDS$^{R}_{L}$○○○○-C)
+
Blade (KGD$^{L}_{R}$-○T○○-C)

⇒Left-hand Blade for Right-hand Toolholder,
Right-hand Blade for Left-hand Toolholder.

Inserts for Grooving and Cut-off

GDM / GDMS / GDG

Classification of usage											
●: Continuous-Light Interruption / 1st Choice ◔: Continuous-Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel	●	○		◔	◔		Ref. to Page for Applicable Toolholders
	M	Stainless Steel			◔	◔	◔		
	K	Cast Iron					◔		
	N	Non-ferrous Metals						◔	
	S	Titanium Alloys			◔			◔	
	H	Hard materials (~40HRC)				○			
		Hard materials (40HRC~)							

Insert			Description		Dimension (mm)						Cermet		MEGACOAT NANO	MEGACOAT		Carbide	Ref. to Page for Applicable Toolholders
					W	Tolerance	rε	M	L	H	TN620	TN90	PR1535	PR1225	PR1215	GW15	
Grooving and Turning	General purpose		GDM	2420N-020GM	2.4	±0.03	0.2	1.95	20	4.3	●	●	●	●	●		G21
				3020N-020GM	3.0			2.3			●	●	●	●	●		G21
				3020N-040GM			0.4				●	●	●	●	●		G22
				4020N-020GM	4.0		0.2	3.3			●	●	●	●	●		G23
				4020N-040GM			0.4				●	●	●	●	●		G24
				4020N-080GM			0.8				●	●	●	●	●		G24
				5020N-040GM	5.0	±0.04	0.4	4.2			●	●	●	●	●		G22
				5020N-080GM			0.8				●	●	●	●	●		G23
				6020N-040GM	6.0		0.4	5.2			●	●	●	●	●		G24
				6020N-080GM			0.8				●	●	●	●	●		G24
				8030N-080GM	8.0	±0.05		6.0	30	5.5			●	●	●		G22
	General purpose 1-edge		GDMS	2220N-020GM	2.2	±0.03	0.2	1.75	20	4.3	○	●	○	●	●		G21
				3020N-040GM	3.0		0.4	2.3			○	●	●	●	●		G22
				4020N-040GM	4.0			3.3			○	●	●	●	●		G23 G24
				5020N-080GM	5.0	±0.04	0.8	4.2			○	●	○	●	●		G22
				6020N-080GM	6.0			5.2			○	●	○	●	●		G23 G24
	Low Feed		GDM	2420N-020GL	2.4	±0.03	0.2	1.95	20	4.3	○	●	●	●	●		G21
				3020N-020GL	3.0			2.3			○	●	●	●	●		G22
				3020N-040GL			0.4				○	●	●	●	●		G23
				4020N-020GL	4.0		0.2	3.3			○	●	●	●	●		G24
				4020N-040GL							○	●	●	●	●		G24
				5020N-040GL	5.0	±0.04	0.4	4.2			○	●	○	●	●		G22
				6020N-040GL	6.0			5.2			○	●	○	●	●		G23 G24
Grooving	Low Cutting Force		GDG	2520N-020GS	2.5	±0.02	0.2	2.0	20	4.3	●	●	●	●	●	●	G21
				3020N-020GS	3.0			2.3			●	●	●	●	●	●	G22
				3520N-020GS	3.5			2.8			●	●	●	●	●	●	G23
				4020N-040GS	4.0		0.4	3.3			●	●	●	●	●	●	G24
				5020N-040GS	5.0			4.2			●	●	●	●	●	●	G22
				6020N-040GS	6.0			5.2			○	●	○	●	●	●	G23 G24
				8030N-040GS	8.0			6.0	30	5.5	○	●	○	●	●	●	G22
Full-R / Copying			GDM	3020N-150R-CM	3.0	±0.03	1.5	2.3	20	4.3	○	●	○	●	●		G21 G22
				4020N-200R-CM	4.0		2.0	3.3			○	●	○	●	●		G23 G24
				5020N-250R-CM	5.0	±0.04	2.5	4.2	*21		○	●	○	●	●		G22
				6020N-300R-CM	6.0		3.0	5.2			○	●	○	●	●		G23 G24
Grooving / Cut-off	High Feed		GDM	2020N-020PH	2.0	±0.03	0.2	1.5	20	4.3			●	●	●		G21 G22 G23 G24
				3020N-030PH	3.0		0.3	2.3					●	●	●		
				4020N-030PH	4.0		0.3	3.3					●	●	●		
	High Feed 1-edge		GDMS	2020N-020PH	2.0	±0.03	0.2	1.5	20				●	●	●		
				3020N-030PH	3.0		0.3	2.3					●	●	●		
				4020N-030PH	4.0		0.3	3.3					●	●	●		

*GDM50/60-CM differes from other descriptions in length (L) to avoid interference of a toolholder with workpiece.

Recommended Cutting Conditions ⊕ G27,G28

Inserts Identification System

(2)Tolerance Symbol	(4) Edge Width	(6) Hand of Tool	(8) Chipbreaker Symbol	
M : M Class G : G Class	20 : 2mm 30 : 3mm 40 : 4mm	N:Neutral	GM : Grooving and Turning GL : Low Feed GS : Low Cutting Force	CM : Copying PH : High Feed NB : Without Chipbreaker

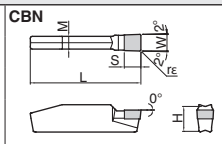
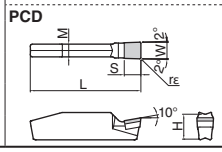
G D	M	S	30	20	N	–	040	GM
(1) Series	(3) No. of edge (Without Indication) : 2-edge S : 1-edge			(5) Insert Length 20 : 20mm 30 : 30mm			(7) Corner-R(rε) 020:0.2mm 040:0.4mm 150R:1.5mm(Full-R)	

●: Std. Item
○: Check Availability

Inserts are sold in 10 piece boxes.

● GDGS (CBN / PCD)

Classification of usage						
◕: Continuous-Light Interruption / 1st Choice	P	Carbon steel / Alloy steel				Ref. to Page for Applicable Toolholders
◔: Continuous-Light Interruption / 2nd Choice	M	Stainless Steel				
●: Continuous / 1st Choice	K	Cast Iron				
○: Continuous / 2nd Choice	N	Non-ferrous Metals			●	
	S	Titanium Alloys			●	
	H	Hard materials (~40HRC)				
		Hard materials (40HRC~)	●			
		Sintered Steel		●		

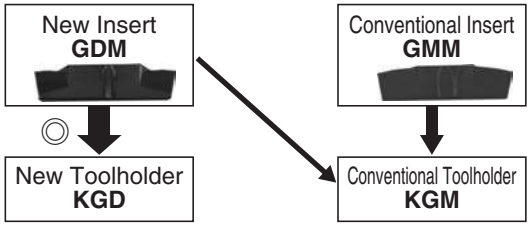
Insert			Description	Dimension (mm)							Angle	MEGA CBN	CBN	PCD	Ref. to Page for Applicable Toolholders
				W	Tolerance	rε	M	L	H	S	θ	KBN05M	KBN570	KPD001	
Grooving	1-edge	CBN  PCD 	GDGS 2020N-020NB	2.0	±0.03	0.2	1.8	20	4.3	2.9	-	●	●	●	G21
			3020N-020NB	3.0		0.2	2.3							●	G22
			3020N-040NB			0.4						●	●		G23
			4020N-020NB	4.0		0.2	3.3							●	G24
			4020N-040NB			0.4						●	●		
			5020N-020NB	5.0		0.2	4.2							●	G22
			5020N-040NB			0.4						●	●		G23
			6020N-020NB	6.0		0.2	5.2							●	G24
			6020N-040NB			0.4						●	●		

Recommended Cutting Conditions ➔ G27,G28

◆ Note for the toolholder and insert combination of KGD type (new) and KGM type (conventional)

● Insert setting angle for grooving toolholders

KGD...0°	Conventional tools KGM...5°



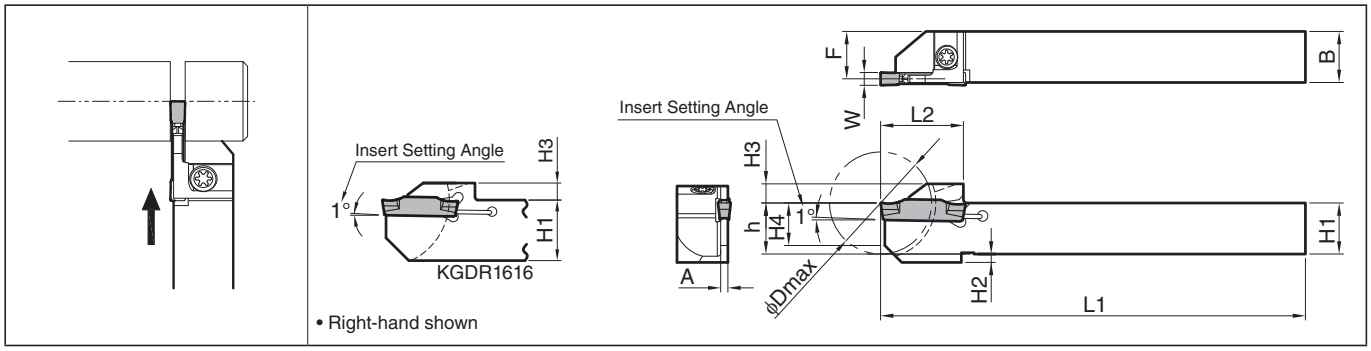
Installing conventional inserts to the new toolholder is not recommended.

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item

KGD (Integral Type for Automatic Lathe)

Edge Width: 2.0~4.0mm



Toolholder Dimensions

Description		Std. R	Std. L	Cutting Dia. φDmax	Dimension (mm) H1=h	H2	H3	H4	B	L1	L2	F	A	Angle θ	Edge Width W(mm) MIN.	MAX.	Spare Parts: Clamp Screw	Spare Parts: Wrench
KGDR/L	1010JX-2	●	●	20	10	2	4.5	8	10	120	18	9.15	1.7	1°	2.0	3.0	SB-40120TR	LTW-15S
	1212F-2	●	●	24	12			10	12	85	19.5	11.15						
	1212JX-2	●	●							120								
	1616JX-2	●	●	32	16	-			16		24.5	15.15						
	2012K-2D34	●	●	34	20		9.5	20	12	125	32.5	11.2	1.6	0°			HH5X16	LW-4
	2020K-2D34	●	●						20			19.2						
KGDR/L	1010JX-2.4	●	●	20	10	2	4.5	8	10	120	18	9	2.0	1°	2.4	3.0	SB-40120TR	LTW-15S
	1212F-2.4	●	●	24	12			10	12	85	19.5	11						
	1212JX-2.4	●	●							120								
	1616JX-2.4	●	●	32	16	-			16		24.5	15						
	2012K-2.4D34	●	●	34	20		9.5	20	12	125	32.5	11		0°			HH5X16	LW-4
	2020K-2.4D34	●	●						20			19						
KGDR/L	1212JX-3	●	●	24	12	2	4.5	10	12	120	19.5	10.8	2.4	1°	3.0	3.0	SB-40120TR	LTW-15S
	1616JX-3	●	●	32	16	-			16		24.5	14.8				4.0		
	1616JX-3D38	●	●	38			6				29						SE-50125TR	LTW-20
	1913K-3D38	●	●		19			13	13	125		11.8						
	2012JX-3D42	●	●	42	20			14	12	120	31	10.8						
	2012JX-3D51	●	●	51			7.5				36							
	2020JX-3D42	●	●	42			6		20		31	18.8						
	2020JX-3D51	●	●	51			7.5				36							

Note) 1. 4mm width Insert can be installed in KGDR/L1212JX-3, but is not recommended due to the toolholder's rigidity.
2. Recommended tightening torque of clamp screw : 2.0N·m(SB-40120TR), 2.5N·m(SE-50125TR), 6.5N·m(HH5X16)
3. When machining the material greater than φ36mm with KGDR/L…-3D38, KGDR/L…-3D42 or KGDR/L…-3D51 toolholders, please use 1-edge inserts.

Applicable Inserts ➡ G19,G20

Toolholder Identification System

K G D | R | 1616 | JX | - | 3 | T | 06 |

Toolholder Hand	Shank Size	Toolholder Length	Applicable Inserts	Max. depth of cut
R: Right-hand L : Left-hand	16×16mm	120mm	GDM/GDMS 3~4mm	06 : 6mm

Cutting Dia. φDmax 38mm → D38 (Integral Type for Automatic Lathe)

06 (Integral Type)

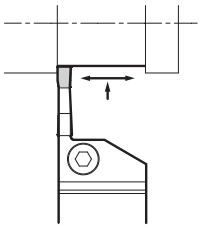
K G D
KGDS | R | 2020 | X | - | 3 | T | 10 | S |

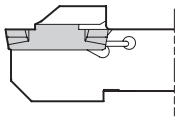
Toolholder Hand	Shank Size	Toolholder Type	Applicable Inserts	Max. depth of cut
R: Right-hand L : Left-hand	20×20mm	Unit Description	GDM/GDMS 3~4mm	10 : 10mm

S (Separate Type / Unit Description)

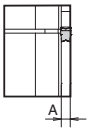
● : Std. Item

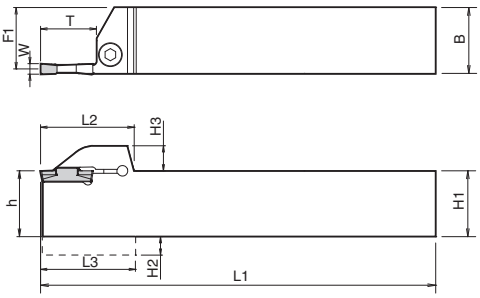
KGD (Integral Type)





KGD□1216JX-3T06
KGD□1216JX-4T06
are above shape.





• Right-hand shown

Toolholder Dimensions

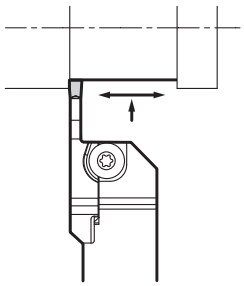
Width (mm)	Max. depth of cu (mm)	Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	L3	F1	A	T	Edge Width W (mm) MIN.	Edge Width W (mm) MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
2	6	KGD□	1616H-2T06	●	●	16	4.0	9.5	16	100	27.7	28.0	15.2	1.7	6	2.0	3.0	HH5X16	LW-4
			2020K-2T06	●	●	20	-		20	125	28.0	-	19.2						
			2525M-2T06	●	●	25			25	150			24.2					HH5X25	
	10	KGD□	1616H-2T10	●	●	16	4.0		16	100	30.2	30.5	15.2		10			HH5X16	
			2020K-2T10	●	●	20	-		20	125	30.5	-	19.2						
			2525M-2T10	●	●	25			25	150			24.2					HH5X25	
	17	KGD□	1616H-2T17	●	●	16	4.0		16	100	31.2	31.5	15.2		17			HH5X16	
			2012K-2T17	●	●	20	-		12	125	32.5	-	11.2						
			2020K-2T17	●	●				20	125			19.2						
			2525M-2T17	●	●	25			25	150			24.2					HH5X25	
2.4	17	KGD□	2012K-2.4T17	●	●	20	-		12	125	32.5	-	11.0	2.0	17	2.4	3.0	HH5X16	LW-4
			2020K-2.4T17	●	●				20	125			19.0						
3	6	KGD□	1216JX-3T06	●	●	12	2.0	5.5	16	120	19.5	19	14.8	2.4	6	3.0	4.0	SE-50125TR	LTW-20
			1616H-3T06	●	●	16	4.0	9.5		100	27.7	28.0						HH5X16	LW-4
			2020K-3T06	●	●	20	-		20	125	28.0	-	18.8						
			2525M-3T06	●	●	25			25	150			23.8					HH5X25	
	10	KGD□	1616H-3T10	●	●	16	4.0		16	100	30.2	30.5	14.8		10			HH5X16	
			2020K-3T10	●	●	20	-		20	125	30.5	-	18.8						
			2525M-3T10	●	●	25			25	150			23.8					HH5X25	
	20	KGD□	1616H-3T20	●	●	16	4.0		16	100	34.2	34.5	14.8		20			HH5X16	
			2012K-3T20	●	●	20	-		12	125	34.5	-	10.8						
			2020K-3T20	●	●				20	125			18.8						
			2525M-3T20	●	●	25			25	150	35.5		23.8					HH5X25	
4	6	KGD□	1216JX-4T06	●	●	12	2.0	5.5	16	120	19.5	19	14.3	3.4	6	4.0	5.0	SE-50125TR	LTW-20
	10	KGD□	2020K-4T10	●	●	20	-	9.5	20	125	30.5	-	18.3		10			HH5X16	LW-4
			2525M-4T10	●	●	25			25	150			23.3					HH5X25	
	20	KGD□	2020K-4T20	●	●	20	-		20	125	34.5	-	18.3		20			HH5X16	
			2525M-4T20	●	●	25			25	150	35.5		23.3					HH5X25	
	25	KGD□	2525M-4T25	●	●	25			25	150	40.5		23.3		25				
5	10	KGD□	2020K-5T10	●	●	20	-		20	125	30.5	-	17.8	4.4	10	5.0	6.0	HH5X16	LW-4
			2525M-5T10	●	●	25			25	150			22.8					HH5X25	
	17	KGD□	2020K-5T17	●	●	20			20	125	37.5		17.8		17				
			2525M-5T17	●	●	25			25	150			22.8						
	25	KGD□	2525M-5T25	●	●	25			25	150	40.5		22.8		25				
6	15	KGD□	2525M-6T15	●	●	25	-		25	150	32.5	-	22.4	5.3	15	6.0	6.0	HH5X25	LW-4
	30	KGD□	2525M-6T30	●	●	25			25	150	45.5		22.4		30				
8	25	KGD□	2525M-8T25	●	●	25	7.0		25	150	43.3	44.2	22.0	6.0	25	8.0	8.0	HH6X25	LW-5
			3232P-8T25	●	●	32	-		32	170		-	29.0						

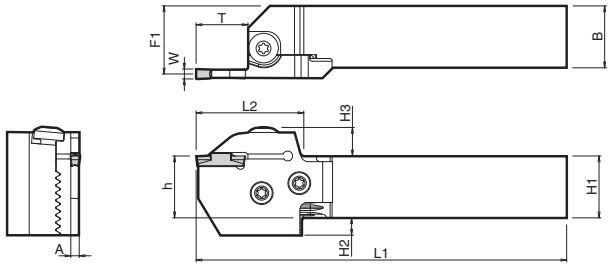
Note) 1. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)
2. Recommended tightening torque of clamp bolt : 6.5N·m(HH5X○○), 2.5N·m(SE-50125TR)
3. Above toolholders are applicable to Cut-off, too.

Applicable Inserts ⇨ G19,G20

●:Std. Item

KGD-S (0° Separate Type)





• Right-hand shown (Right-hand Blade and Right-hand Toolholder)

Toolholder Dimensions (Blade + Toolholder)

Shank Angle	Width (mm)	Max. depth of cut (mm)	Shank Size (mm)	Unit Description (Standard Stock Description)	Std. R	Std. L	Blade Description G25	Toolholder Description G25	Dimension (mm) H1=h	H2	H3	B	L1	L2	L3	F1	A	T	Edge Width W (mm) MIN.	MAX.
0°	2	17	□20	KGDR/L 2020X-2T17S	●	●	KGDR/L-2T17-C	KGDR/L2020-C	20	12	11.6	20	122	40	-	23.4	1.7	17	2.0	3.0
			□25	2525X-2T17S	●	●		KGDR/L2525-C	25	7		25	147			28.4				
			□32	No unit description ➡				KGDR/L3232-C	32	-		32	167			35.4				
	3	10	□20	KGDR/L 2020X-3T10S	●	●	KGDR/L-3T10-C	KGDR/L2020-C	20	12		20	115	33		23.0	2.4	10	3.0	4.0
			□25	2525X-3T10S	●	●		KGDR/L2525-C	25	7		25	140			28.0				
			□32	3232X-3T10S	●	●		KGDR/L3232-C	32	-		32	160			35.0				
		20	□20	KGDR/L 2020X-3T20S	●	●	KGDR/L-3T20-C	KGDR/L2020-C	20	12		20	125	43		23.0		20		
			□25	2525X-3T20S	●	●		KGDR/L2525-C	25	7		25	150			28.0				
			□32	3232X-3T20S	●	●		KGDR/L3232-C	32	-		32	170			35.0				
	4	10	□20	KGDR/L 2020X-4T10S	●	●	KGDR/L-4T10-C	KGDR/L2020-C	20	12		20	115	33		22.5	3.4	10	4.0	5.0
			□25	2525X-4T10S	●	●		KGDR/L2525-C	25	7		25	140			27.5				
			□32	3232X-4T10S	●	●		KGDR/L3232-C	32	-		32	160			34.5				
		20	□20	KGDR/L 2020X-4T20S	●	●	KGDR/L-4T20-C	KGDR/L2020-C	20	12		20	125	43		22.5		20		
			□25	2525X-4T20S	●	●		KGDR/L2525-C	25	7		25	150			27.5				
			□32	3232X-4T20S	●	●		KGDR/L3232-C	32	-		32	170			34.5				
		25	□20	KGDR/L 2020X-4T25S	●	●	KGDR/L-4T25-C	KGDR/L2020-C	20	12		20	130	48		22.5		25		
			□25	2525X-4T25S	●	●		KGDR/L2525-C	25	7		25	155			27.5				
			□32	3232X-4T25S	●	●		KGDR/L3232-C	32	-		32	175			34.5				
	5	10	□20	KGDR/L 2020X-5T10S	●	●	KGDR/L-5T10-C	KGDR/L2020-C	20	12		20	115	33		22.0	4.4	10	5.0	6.0
			□25	2525X-5T10S	●	●		KGDR/L2525-C	25	7		25	140			27.0				
			□32	3232X-5T10S	●	●		KGDR/L3232-C	32	-		32	160			34.0				
		25	□20	KGDR/L 2020X-5T25S	●	●	KGDR/L-5T25-C	KGDR/L2020-C	20	12		20	130	48		22.0		25		
			□25	2525X-5T25S	●	●		KGDR/L2525-C	25	7		25	155			27.0				
			□32	3232X-5T25S	●	●		KGDR/L3232-C	32	-		32	175			34.0				

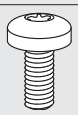
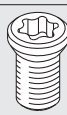
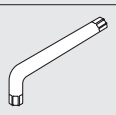
Note) 1. When using the toolholder in normal mounting position, the lower jaw of toolholder may interfere with the tool presetter.

Applicable Inserts ➡ G19,G20

2. The toolholder and blade descriptions are printed on the toolholder body. (Unit description is not printed.)
KGD-S: **Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.**
The toolholder is applicable for all blade with suitable hand.
3. In case the unit description is not available (No unit description), please purchase toolholder and blade separately.
4. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

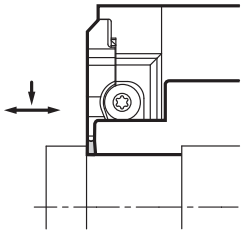
Spare Parts (Common with separate types)

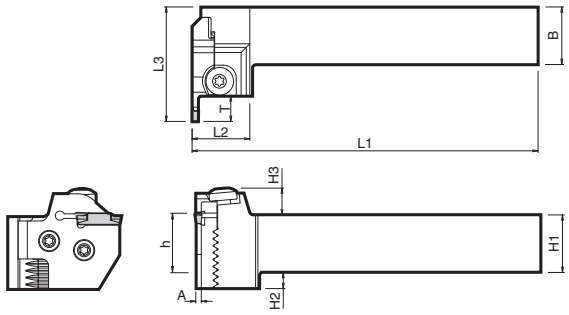
* The parts are included in the toolholder and unit.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Spare Parts: Clamp Screw (for Blade)	Spare Parts: Wrench
			
KGDR/L·····S	BH6X10TR	SB-60120TR	LTW-25

●:Std. Item

KGDS-S (90° Separate Type)





• Right-hand shown (Left-hand Blade and Right-hand Toolholder)

Toolholder Dimensions (Blade + Toolholder)

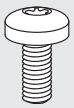
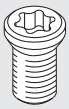
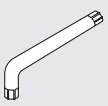
Shank Angle	Width (mm)	Max. depth of cut (mm)	Shank Size (mm)	Blade Description ➡G25	Toolholder Description ➡G25	Unit Description (Standard Stock Description)	Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	L3	F1	A	T	Edge Width W (mm) MIN.	MAX.
90°	2	17	□20	KGD$^{L}_{R}$-2T17-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	12	11.6	20	125	27.7	56.7	-	1.7	17	2.0	3.0
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	7		25	150							
	3	10	□20	KGD$^{L}_{R}$-3T10-C	KGDS$^{R}_{L}$2020-C	KGDS$^{R}_{L}$ 2020X-3T10S	●	●	20	12		20	125		49.7		2.4	10	3.0	4.0
			□25		KGDS$^{R}_{L}$2525-C	2525X-3T10S	●	●	25	7		25	150							
		20	□20	KGD$^{L}_{R}$-3T20-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	12		20	125		59.7			20		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	7		25	150							
	4	10	□20	KGD$^{L}_{R}$-4T10-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	12		20	125		49.7		3.4	10	4.0	5.0
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	7		25	150							
		20	□20	KGD$^{L}_{R}$-4T20-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	12		20	125		59.7			20		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	7		25	150							
		25	□20	KGD$^{L}_{R}$-4T25-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	12		20	125		64.7			25		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	7		25	150							
	5	10	□20	KGD$^{L}_{R}$-5T10-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	12		20	125		49.7		4.4	10	5.0	6.0
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	7		25	150							
		25	□20	KGD$^{L}_{R}$-5T25-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	12		20	125		64.7			25		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	7		25	150							

Applicable Inserts ➡ **G19,G20**

Note) 1. When using the toolholder in normal mounting position, the lower jaw of toolholder may interfere with the tool presetter.
2. The toolholder and blade descriptions are printed on the toolholder body. (Unit description is not printed.)
KGDS-S: **Left-hand Blade for Right-hand Toolholder, Right-hand Blade for Left-hand Toolholder. The toolholder is applicable for all blade with suitable hand.**
3. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Spare Parts (Common with separate types)

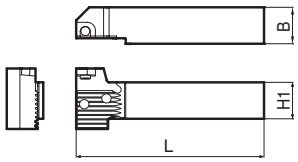
* The parts are included in the toolholder and unit.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
			
KGDS$^{R}_{L}$·····S	BH6X10TR	SB-60120TR	LTW-25

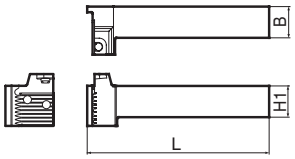
● : Std. Item

Toolholder

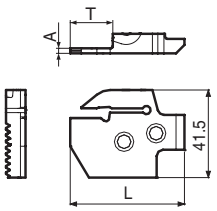
KGD-S (0° Separate Type)

Shape of 0° type Right-hand shown	Toolholder Description	Std. R	Std. L	Dimension L	Dimension B	Dimension H1
	KGD$^{R}_{L}$ **2020-C**	●	●	104	20	20
	2525-C	●	●	129	25	25
	3232-C	●	●	149	32	32

KGDS-S (90° Separate Type)

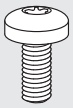
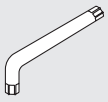
Shape of 90° type Right-hand shown	Toolholder Description	Std. R	Std. L	Dimension L	Dimension B	Dimension H1
	KGDS$^{R}_{L}$ **2020-C**	●	●	122	20	20
	2525-C	●	●	147	25	25

Blade

Shape of Blade Right-hand shown	Blade Description	Std. R	Std. L	Dimension L	Dimension T	Dimension A
	KGD$^{R}_{L}$ **-2T17-C**	●	●	51.2	17.2	1.7
	-3T10-C	●	●	44.2	10.2	2.4
	-3T20-C	●	●	53.2	20.2	
	-4T10-C	●	●	44.2	10.2	3.4
	-4T20-C	●	●	54.2	20.2	
	-4T25-C	●	●	59.2	25.2	
	-5T10-C	●	●	44.2	10.2	4.4
	-5T25-C	●	●	59.2	25.2	

Spare Parts (Common with separate types)

* The parts are included in the toolholder.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Spare Parts: Clamp Screw (for Blade)	Spare Parts: Wrench
			
KGD$^{R}_{L}$·····S **KGDS$^{R}_{L}$·····S**	BH6X10TR	SB-60120TR	LTW-25

● : Std. Item

Setting the inserts and the blade

Setting the inserts

1. Use compressed air or other measures to remove chips from the insert mounting part (Ref. to Fig. 1).
2. Put the insert into the toolholder and push it makes contact with the back end of toolholder's surface (Ref. to Fig. 2 and 3).
3. Keeping the insert fit to the surface, tighten the insert clamp screw at an appropriate torque.
4. Make sure that there is no gap between the insert and the back end of the toolholder's surface and that the insert is set straight (Ref. to Fig. 2 and 3).

Clamp Screw (For Automatic Lathe)	Recommended tightening torque: 2.0N·m (SB-40120TR) 2.5N·m (SE-50125TR)
Clamp Bolt	Recommended tightening torque: 6.5N·m (Width 2~6mm) 8.0N·m (Width 8mm)

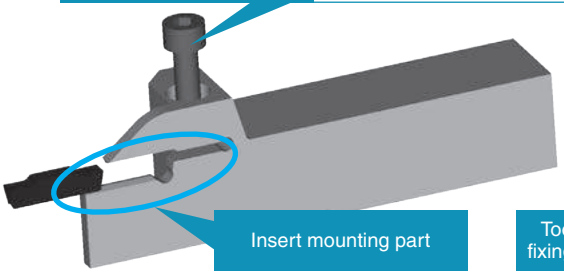


Fig.1

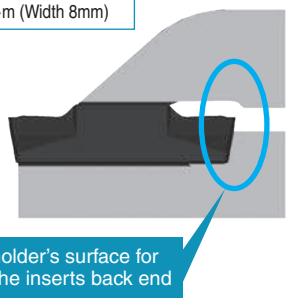


Fig.2

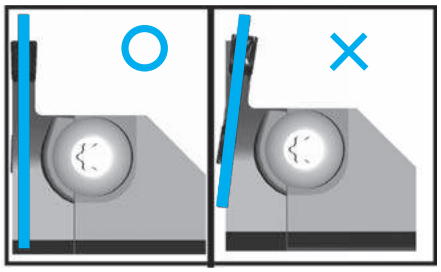


Fig.3

Setting the blade (Separate type toolholder)

1. Use compressed air or other measures to remove chips and dust from the serration part (Ref. to Fig. 1).
2. Mate and fit the serrations of the blade and toolholder, and also fit the blade end to the toolholder. (Ref. to Fig. 2)
3. Tighten the blade fixing screws at an appropriate torque. You can tighten them in any order. (Ref. to Fig. 2)
   (Recommended tightening torque : 8N·m)
4. Set the insert after setting the blade.

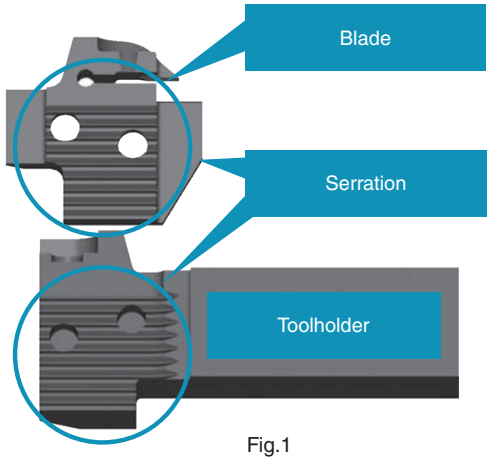


Fig.1

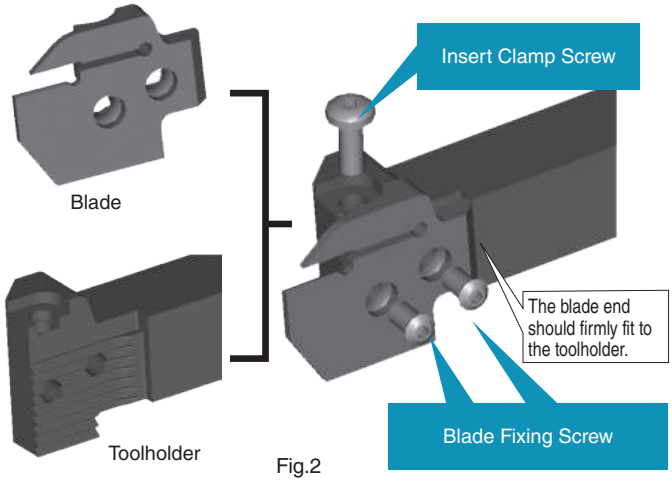
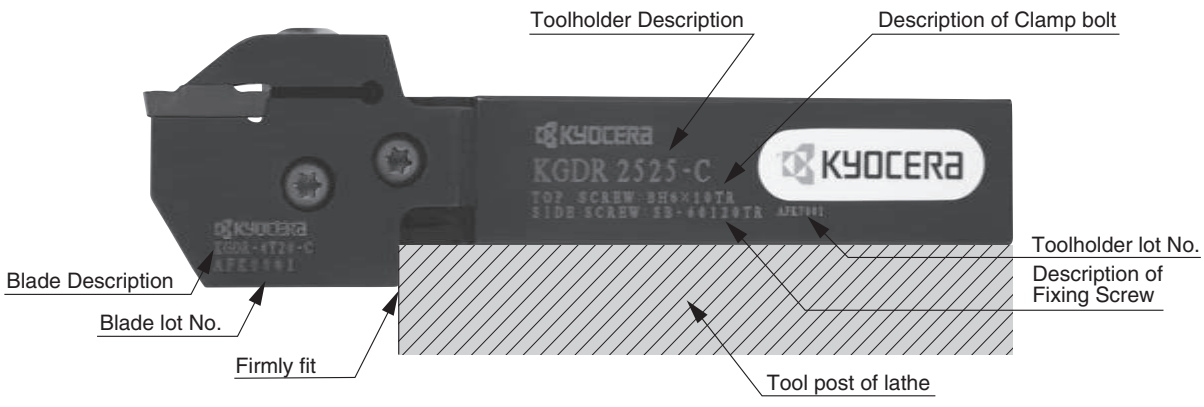


Fig.2

Separate type Toolholder Identification System and Their Setting to Lathe

• Firmly fit the lower jaw to the tool post of the lathe.



Recommended Cutting Conditions

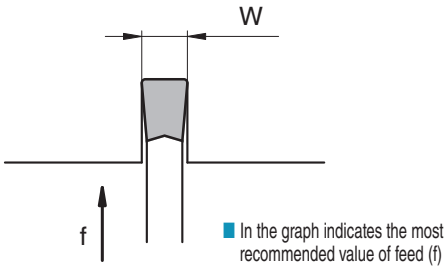
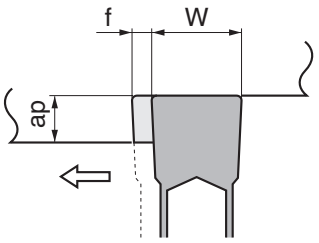
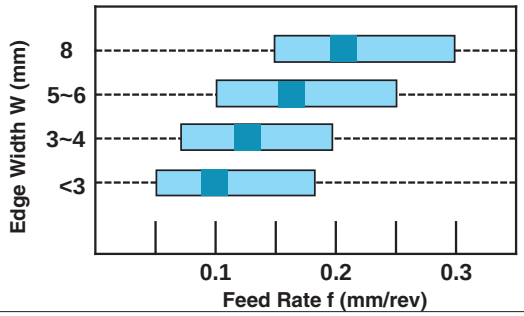
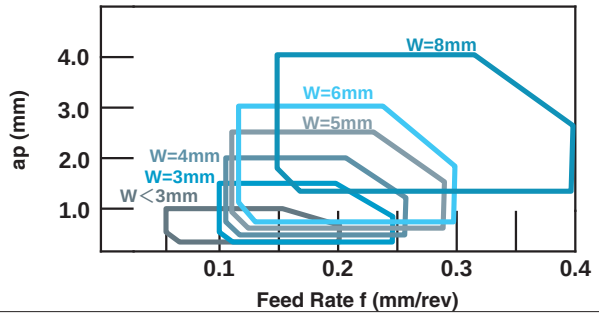
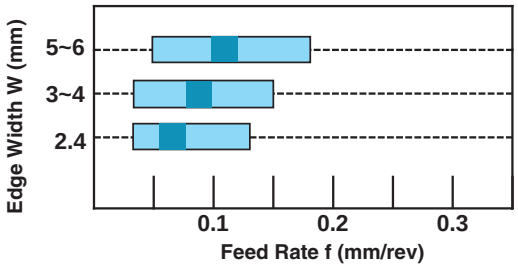
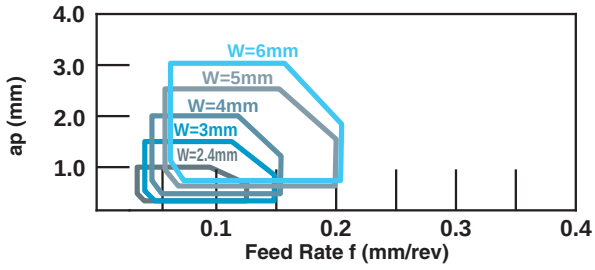
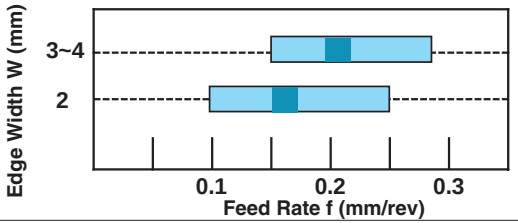
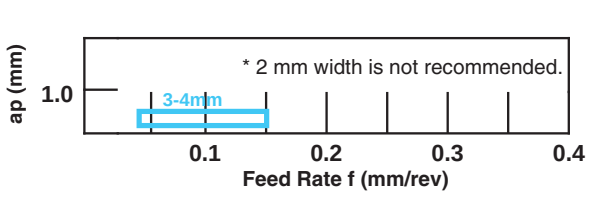
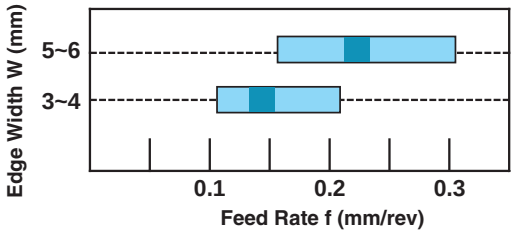
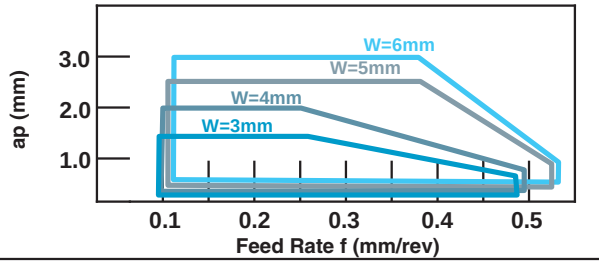
◆ Recommended Cutting Conditions (Vc)

Workpiece Material	Chipbreaker	Recommended Insert Grades (Cutting Speed Vc: m/min)									Remarks
		Cermet		MEGACOAT NANO	MEGACOAT		Carbide	MEGACOAT CBN	CBN	PCD	
		TN620	TN90	PR1535	PR1225	PR1215	GW15	KBN05M	KBN570	KPD001	
Carbon Steel	GM GL CM PH GS	☆ 80~220	☆ 100~220	☆ 80~200	★ 80~200	☆ 100~200	-	-	-	-	Coolant
Alloy Steel		☆ 70~200	☆ 80~200	☆ 70~180	★ 70~180	☆ 80~180	-	-	-	-	
Stainless Steel		-	-	★ 60~150	☆ 60~150	☆ 60~150	-	-	-	-	
Cast Iron		-	-	-	-	★ 100~200	-	-	-	-	
Aluminum	GS NB	-	-	-	-	-	☆ 200~500	-	-	★ 150~2,000	
Brass		-	-	-	-	-	☆ 100~200	-	-	★ 200~800	
Hard materials	NB	-	-	-	-	-	-	★ 80~150	-	-	
Sintered Steel		-	-	-	-	-	-	-	★ 100~250	-	

★ :1st Recommendation ☆ :2nd Recommendation

◆ Recommended Cutting Conditions (Feed Rate / ap)

[Workpiece Material: S50C]

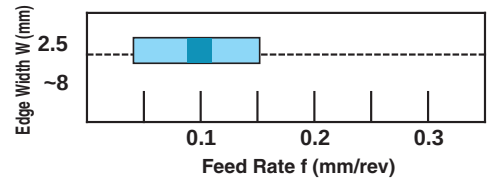
Chipbreaker	Grooving	Turning
		
GM (General purpose)		
GL (Low Feed)		
PH (High Feed)		
CM (Copying)		

Note) 1. The above values are based on the condition that the dimension T of toolholder is 17 mm or less.

2. If the toolholder is not for the 8mm width insert and its dimension T is over 17mm, set the values for turning to less than 90% of those above.

Recommended Cutting Conditions

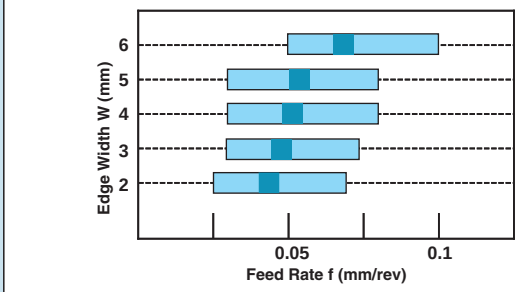
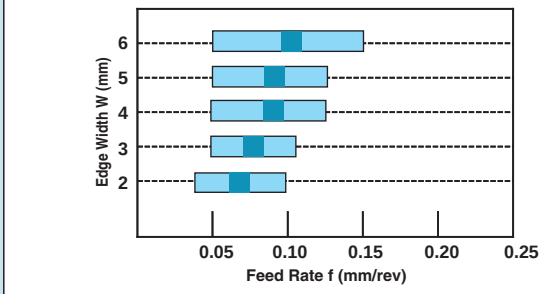
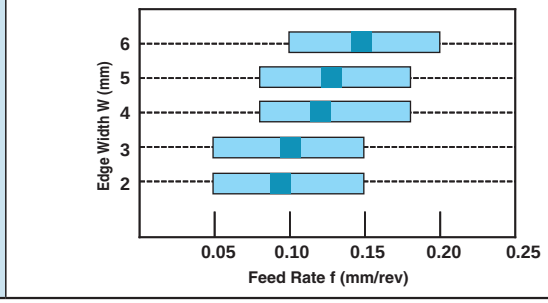
◆ Recommended Cutting Conditions (Feed Rate / ap) [Workpiece Material: S50C]

Chipbreaker	Grooving
GS (Low cutting force)	

* When turning, keep ap less than the corner-R(rε).

Note) 1. The above values are based on the condition that the dimension T of toolholder is 17 mm or less.

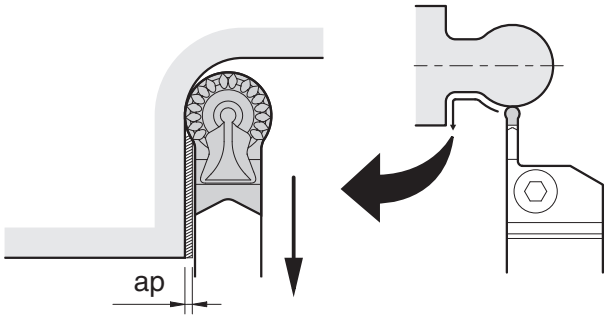
◆ Recommended Cutting Conditions (Feed Rate)

Workpiece Material	Insert Grades	Grooving
Hard Materials	KBN05M	
Sintered Steel	KBN570	
Non-ferrous Metals	KPD001	

◆ CM Chipbreaker [Cutting amount (ap) in back copying]

● Max. ap in back copying

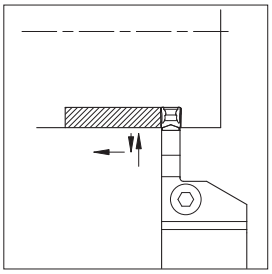
Description		Max. ap (mm)				
		Toolholder Description				
		KGD···-2T···	KGD···-3T···	KGD···-4T···	KGD···-5T···	KGD···-6T···
GDM	3020N-150R-CM	0.24	0.20	-	-	-
	4020N-200R-CM	-	0.24	0.20	-	-
	5020N-250R-CM	-	-	0.30	0.20	-
	6020N-300R-CM	-	-	-	0.30	0.25



Guide for External Grooving

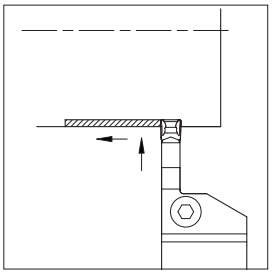
Point (I) (Turning after Grooving)

1) Grooving Depth Over 0.5mm: For roughing (Refer to Fig. 1)
Before turning, pull the tool back about 0.1mm after grooving, instead of turning subsequent to grooving.
(Failure to pull the tool back before traverse machining will result in an unbalanced load applied on only one side of the cutting edge.)



Before turning, pull the tool back about 0.1mm after grooving.
(Grooving Depth Over 0.5mm: At roughing)
Fig.1

2) Grooving Depth under 0.5mm: For finishing (Refer to Fig.2)
Turning subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Retention time is not necessary.)



Turning subsequent to grooving
(Grooving Depth under 0.5mm: At finishing)
Fig.2

Point (II)

1) When widening the groove width (Refer to Fig.3), apply the "Step Turning."
2) The widened groove and side walls should be finished last.
(For better chip control, ap over 0.5mm is recommended.)

Note) If the workpiece is not supported at the center, reduce the feed rate when grooving towards center.

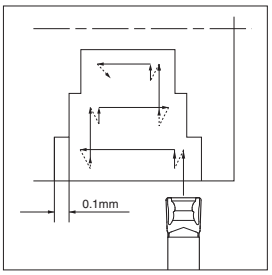
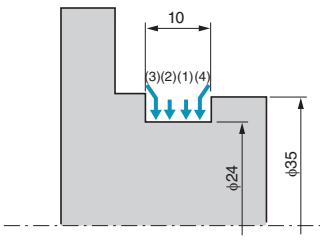


Fig.3

Case Studies

SCr420H (Grooving)

·Gear
·Vc=113~164 m/min
·f=0.06 mm/rev
·Wet
·GDM4020N-040GM
(PR1225)
·KGDL2525X-3T10S



GM Chipbreaker (PR1225)	1,500 pcs/C
Competitor K (PVD Coated Carbide)	250 pcs/C

x6 longer life

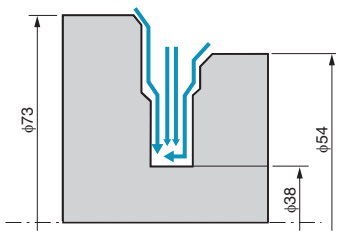
· GM chipbreaker (PR1225) showed 6 times longer tool life than that of Competitor K.
· Good chip control without burned chips.

Competitor K　　GM Chipbreaker

(Evaluation by the user)

SCM420 (Grooving / Turning)

·Gear
·Vc=170 m/min
·f=0.15 mm/rev (Roughing)
0.10 mm/rev (Finishing)
·ap=0.2 mm (Finishing)
·Wet
·GDM4020N-040GM
(PR1215)
·KGDR2525X-4T20S



GM Chipbreaker (PR1215)	250 pcs/C
Competitor L (Roughing: PVD Coated Carbide) (Finishing: Cermet)	200 pcs/C

· GM chipbreaker reduced occurrence rate of tangle of chips (occurrence rate 80% ⇒ 10%). The problem was persistent with Competitor L. Machining productivity is improved.

Competitor L (Finishing)
Chips easily tangled

GM Chipbreaker (Finishing)
Smooth chip control

(Evaluation by the user)

GMM / GMG (Will be switched to GDM / GDG G19~G20)

Classification of usage			Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Ref. to Page for Applicable Toolholders
●: Continuous-Light Interruption / 1st Choice ◔: Continuous-Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel			◔	●			
	M	Stainless Steel			●	◔			
	K	Cast Iron					●	◔	
	N	Non-ferrous Metals						●	
	S	Titanium Alloys						●	
	H	Hard materials (~40HRC)			○	●			
		Hard materials (40HRC~)							

Insert		Description		Dimension (mm)					Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Ref. to Page for Applicable Toolholders
				W	rε	M	L	H	TN90	CR9025	PR915	PR930	PR905	KW10	
Chip Control Oriented / M Class	Shows GMM2420-02	GMM	2420-020MW	2.4	0.2	1.9	20	4.3	●	●	●	●	●	●	G34 G35
			3020-020MW	3.0	0.2	2.3			●	●	●	●	●	●	
			3020-040MW		0.4				●	●	●	●	●	●	
			4020-020MW	4.0	0.2	3.3			●	●	●	●	●	●	
			4020-040MW		0.4				●	●	●	●	●	●	
			4020-080MW		0.8				●	●	●	●	●	●	
			5020-040MW	5.0	0.4	4.2			●	●	●	●	●	●	
			5020-080MW		0.8				●	●	●	●	●	●	
			6020-040MW	6.0	0.4	5.2			●	●	●	●	●	●	
			6020-080MW		0.8				●	●	●	●	●	●	
			8030-080MW	8.0	0.8	6.0	30	5.5		●	●	●	●	●	G34,G62
Sharp-Cutting Oriented / M Class		GMM	3020-020MS	3.0	0.2	2.3	20	4.3	●	●	●	●		●	G34 G35
			3020-040MS		0.4				●	●	●	●		●	
			4020-040MS	4.0	0.4	3.3			●	●	●	●		●	
			5020-040MS	5.0		4.2			●	●	●	●		●	
			6020-040MS	6.0		5.2				●		●		●	
Sharp-Cutting Oriented / Precision Class		GMG	3020-000MS	3.0	0.0	2.3	20	4.3		●	●	●		●	G34 G35
			3020-020MS		0.2				●	●	●	●		●	
			3020-040MS		0.4				●	●	●	●		●	
			4020-020MS	4.0	0.2	3.3			●	●	●	●		●	
			4020-040MS		0.4				●	●	●	●		●	
			4020-080MS		0.8				●	●	●	●		●	
			5020-040MS	5.0	0.4	4.2			●	●	●	●		●	
			5020-080MS		0.8					●	□	●		●	
			6020-040MS	6.0	0.4	5.2				●		●		●	
			6020-080MS		0.8					●		●		●	
Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG	2520-030MG	2.5	0.3	2.0	20	4.3	●	●	●	●	□	●	G34 G35
			3020-030MG	3.0		2.3			●	●	●	●	●	●	
			3520-030MG	3.5		2.8			●	●	●	●	●	●	
			4020-040MG	4.0	0.4	3.3			●	●	●	●	●	●	
			5020-040MG	5.0		4.2			●	●	●	●	●	●	
			6020-040MG	6.0		5.2			●	●		●	●	●	
			8030-050MG	8.0	0.5	6.0	30	5.5	●	●		●	●	●	G34,G62
Chip Control Oriented / M Class Full-R / Copying		GMM	3020-150R	3.0	1.5	2.3	20	4.3	●	●	●	●	●	●	G34 G35
			4020-200R	4.0	2.0	3.3			●	●	●	●	●	●	
			5020-250R	5.0	2.5	4.2			●	●	●	●	●	●	
			6020-300R	6.0	3.0	5.2			●	●	●	●	●	●	
Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMG	3020-150R	3.0	1.5	2.3	20	4.3	●	●		●		●	G34 G35
			4020-200R	4.0	2.0	3.3			●	●		●		●	
			5020-250R	5.0	2.5	4.2				●		●		●	
			6020-300R	6.0	3.0	5.2				●		●		●	
Undercutting Chip Control Oriented		GMG	3020-150RU	3.0	1.5	2.3	20	4.3		●		●		●	G34 G35 G37
			4020-200RU	4.0	2.0	3.3				●		●		●	
			5020-250RU	5.0	2.5	4.2				●		●		●	

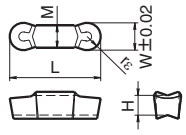
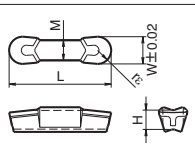
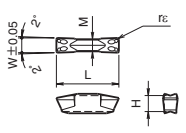
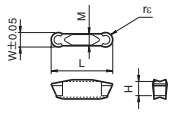
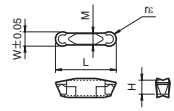
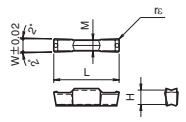
Recommended Cutting Conditions G105

Inserts are sold in 10 piece boxes.

●: Std. Item
□: Deleted from the next catalogue

GMM / GMGA / FGG

Classification of usage							
◕: Continuous-Light Interruption / 1st Choice ◔: Continuous-Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel			◔	◕	
	M	Stainless Steel			◕	◔	
	K	Cast Iron					◕
	N	Non-ferrous Metals					◕
	S	Titanium Alloys					◕
	H	Hard materials (~40HRC)			○	●	
		Hard materials (40HRC~)					

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) W	rε	M	L	H	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	Carbide KW10	Ref. to Page for Applicable Toolholders
Sharp-Cutting Oriented / Precision Class Full-R / Copying	 **GMGA 6020-300R**	6.0	3.0	4.3	20	4.3					●	G34 G35
Sharp-Cutting Oriented / Precision Class Full-R / Copying	 **GMGA 8030-400R**	8.0	4.0	6.0	30	5.5					●	G34 G62
Chip Control Oriented / M Class	 **GMM 3014-04**	3.0	0.4	2.3	14	4.3	●	●	●	●	●	G36
Chip Control Oriented / M Class Full-R / Copying	 **GMM 3014-15R**	3.0	1.5	2.3	14	4.3	●	□		●	●	
Chip Control Oriented Undercutting	 **GMM 3014-15RU**	3.0	1.5	2.3	14	4.3				●		
Chip Control Oriented / Precision Class Face Grooving	 **FGG R/L 3020-02 4020-04 5020-04**	3.0 4.0 5.0	0.2 0.4 0.4	2.3 3.3 4.2	20	4.3	R ● L ●	R ● ● L ● ●	R L	R ● ● L ● ●	R ● ● L ● ●	G36

Recommended Cutting Conditions G105

Features of Chipbreaker

Series	Insert	Features
GMM-MW		Excellent chip evacuation at Grooving, Turning, Cut-off.
GMG-MG		Low cutting force with ground chipbreaker.
GMG-MS GMM-MS		Grooving / Turning / Cut-off operations are minimum cutting force at Positive Edge.
GMM-MT		Small corner-R(rε) and minimize the core which remains in the center of the face.
GMM-TK		Large corner-R(rε) and stable performance at cut-off.
GMM-NB		Flat rake face and non-chipbreaker. It works well for brass

◆ Edge Preparation

Edge Prep.	Chamfer + Honed Corner-R(rε) = 0.05	Chamfer + Honed Sharp Corner
MT Chipbreaker	**CR9025 / PR915**	**PR930 / KW10**
Edge Prep.	Chamfer + Honed Corner-R(rε) = 0.2-0.3	Sharp Edge Corner-R(rε) = 0.2-0.3
TK Chipbreaker	**CR9025 / PR915**	**PR930 / KW10**
Edge Prep.	Honed Corner-R(rε) = 0.05	Sharp Edge Sharp Corner
Without Chipbreaker (-NB)	**CR9025**	**PR930 / KW10**

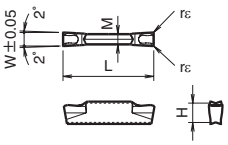
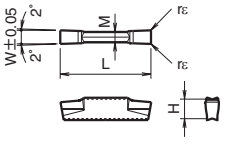
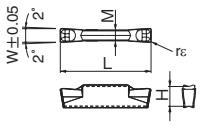
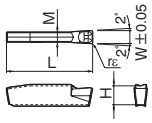
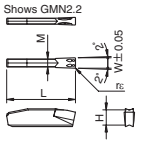
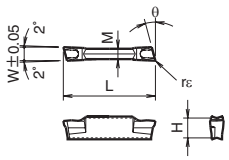
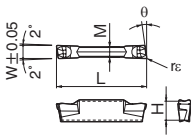
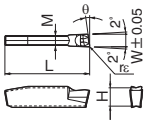
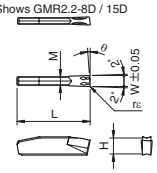
· Sharp Edge Spec. can reduce cutting force by 40% less than that of chamfer edge.

●: Std. Item
□: Deleted from the next catalogue

Inserts are sold in 10 piece boxes.

GMM / GMN

Classification of usage							
●: Continuous-Light Interruption / 1st Choice ◔: Continuous-Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel			◔	●	
	M	Stainless Steel			●	◔	
	K	Cast Iron					●
	N	Non-ferrous Metals					●
	S	Titanium Alloys					●
	H	Hard materials (~40HRC)			○	●	
		Hard materials (40HRC~)					

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) W	rε	M	L	H	Angle θ	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	Carbide KW10	Ref. to Page for Applicable Toolholders
Deep Grooving / Cut-off Sharp-Cutting Oriented		GMM 1520-MT	1.5	0.0 0.05	1.2	20	4.3	-			●	●	●	G34 G35
		2020-MT	2.0	0.0 0.05	1.5					●	●			
		2520-MT	2.5	0.0 0.05	1.9							●	●	
		3020-MT	3.0	0.0 0.05	2.3					●	●			
Deep Grooving / Cut-off Sharp-Cutting Oriented Without Chipbreaker		GMM 1520-NB	1.5	0.0 0.05	1.2	20	4.3	-				●	●	
		2020-NB	2.0	0.0 0.05	1.5					●				
		2520-NB	2.5	0.0 0.05	1.9							●	●	
		3020-NB	3.0	0.0 0.05	2.3					●				
Deep Grooving / Cut-off Stability Oriented		GMM 2020-TK	2.0	0.20	1.5	20	4.3	-			●	●	●	
		2520-TK	2.5		1.9					●	●	●	●	
		3020-TK	3.0	0.30	2.3					●	●	●	●	
Cut-off / Stability Oriented 1-edge		GMN 2-TK	2.0	0.20	1.5	20	4.3	-			●	●	●	
		3-TK	3.0	0.25	2.3					●	●	●	●	
		4-TK	4.0	0.30	3.3					●	●	●	●	
Deep Grooving / Cut-off 1-edge	 Shows GMN2.2	GMN 2.2	2.2	0.17	1.8	20	4.3	-	●	●		●	●	
		3	3.0	0.20	2.3				●	●		●	●	
		4	4.0	0.25	3.3				●	●		●	●	
		5	5.0	0.80	4.2					●		●	●	
		6	6.0	0.80	5.2					●		●	●	
Cut-off Sharp-Cutting Oriented With lead angle									R L	R L	R L	R L	R L	
		GMM 1520R/L-MT-15D	1.5	0 0.05	1.2	20	4.3	15°			●	●	●	
		2020R/L-MT-15D	2.0	0 0.05	1.5					●●		●	●	
		2520R/L-MT-15D	2.5	0 0.05	1.9					●□	●	●	●	
		3020R/L-MT-15D	3.0	0 0.05	2.3					●●	●	●	●	
Cut-off Stability Oriented With lead angle		GMM 2020R-TK-8D	2.0	0.20	1.5	20	4.3	8°			●	●	●	
		2520R-TK-8D	2.5	0.20	1.9					●	●	●	●	
		3020R-TK-8D	3.0	0.25	2.3					●	●	●	●	
Cut-off / Stability Oriented 1-edge / Lead Angle		GMR 2-TK-8D	2.0	0.20	1.5	20	4.3	8°			□	●	●	
		3-TK-8D	3.0	0.25	2.3					□	●	●	●	
		4-TK-8D	4.0	0.30	3.3					□	●	●	●	
Cut-off / Sharp-Cutting Oriented 1-edge / Lead Angle	 Shows GMR2.2-8D / 15D	GM R/L 2.2-8D	2.2	0.17	1.8	20	4.3	8°	●	●		●	●	
		2.2-15D		0.00				15°	●	●		●	●	
		3-4D	3.0	0.20	2.3			4°	●	●●		●	●	
		4-4D	4.0	0.25	3.3					●●		●		

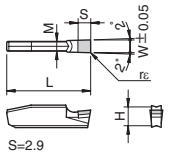
Recommended Cutting Conditions ⓖ G105

●: Std. Item
□: Deleted from the next catalogue

Inserts are sold in 10 piece boxes.

GMN

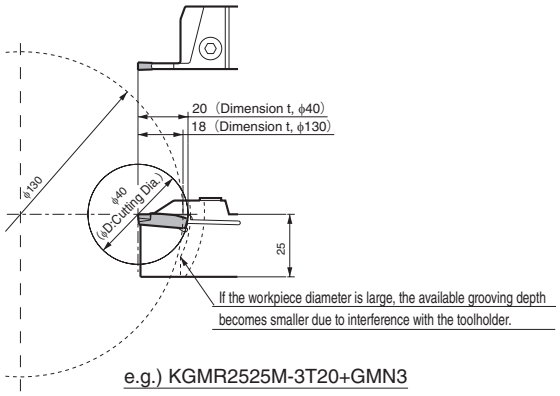
Classification of usage						
◕: Continuous-Light Interruption / 1st Choice ◔: Continuous-Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel				
	M	Stainless Steel				
	K	Cast Iron				
	N	Non-ferrous Metals			●	
	S	Titanium Alloys			●	
	H	Hard materials (~40HRC)				
		Hard materials (40HRC~)	○	●		

Insert		Description	Dimension (mm)					Angle	CBN		PCD		Ref. to Page for Applicable Toolholders
			W	rε	M	L	H	θ	KBN510	KBN525	KPD001	KPD010	
Deep Grooving 1-edge	 S=2.9	GMN 2	2.0	0.2	1.8	20	4.3	-	●	●	●	●	G34 G35
				0.4									
		3	3.0	0.2	2.3						●	●	
				0.4					●	●			
		4	4.0	0.2	3.3						●	●	
				0.4					●	●			
		5	5.0	0.2	4.2						●	●	
				0.4					●	●			
		6	6.0	0.2	5.2							●	
				0.4					●	●			

Recommended Cutting Conditions ➡ G104

Available Cutting Diameter of KGM (For automatic lathe) / KGM-T

· There is a limit to available grooving depth depending on the workpiece diameter.



e.g.) KGMR2525M-3T20+GMN3

◆ KGM (For automatic lathe) Possible Cutting Diameter and Available Grooving Depth Table

Toolholder Description		ϕD (Cutting Dia.)																
KGM R/L	0810K-1.5-125	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	∞
	1010□-1.5…	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212□-1.5…	-	-	-	-	25	26	28	32	36	40	60	100					
	0810K-2-125	-	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	
	1010□-2…	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212□-2…	-	-	-	-	25	26	28	50	∞	∞	∞	∞					
	1616□-2…	32	40	50	60	80	100	∞	∞									
	1010□-2.5…	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212□-2.5…	-	-	-	-	25	26	28	32	36	40	60	100					
	1616□-2.5…	32	40	50	60	80	100	∞	∞	∞	∞	∞	∞					
	1616□-3…	32	40	50	60	80	100											
Available Grooving Depth t (mm)		16	15	14	13	12.5	12	11	10	9	8	7	6	5	4	3	2	1

◆ KGM-T Possible Cutting Diameter and Available Grooving Depth Table (GMN, GM R/L when using 1-edge insert)

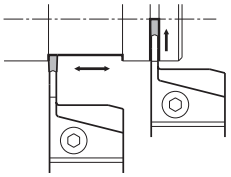
Toolholder Description		ϕD (Cutting Dia.)												
KGM R/L	2012K-2T17 2020K-2T17 2525M-2T17	-	-	-	-	-	-	-	-	66	80	130	260	∞
	1616H-3T20	-	-	-	-	-	40	54	70	100	180	∞	∞	
	2012K-3T20 2020K-3T20 2525M-3T20 2020K-4T20 2525M-4T20	-	-	-	-	-	40	90	130	240	∞			
	2525M-4T25 2525M-5T25	-	-	50	140	240	∞	∞	∞	∞				
	3232P-5T25	-	-	50	280	600								
	2525M-6T30	100	300	∞	∞	∞								
Available Grooving Depth t (mm)		30	27	25	23	22	20	19	18	17	16	15	14	Under 13

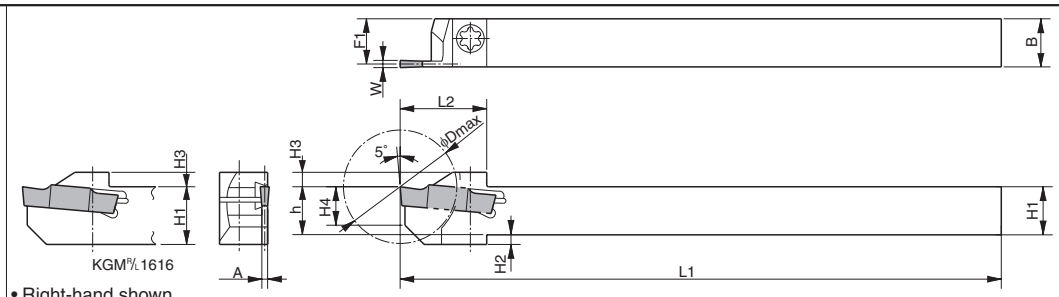
● : Std. Item

CBN & PCD Inserts are sold in 1 piece boxes.

KGM (For Automatic Lathe) (Will be switched to KGD G21)

Edge Width: 1.5~4.0mm





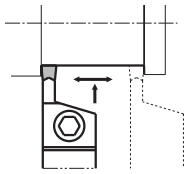
• Right-hand shown

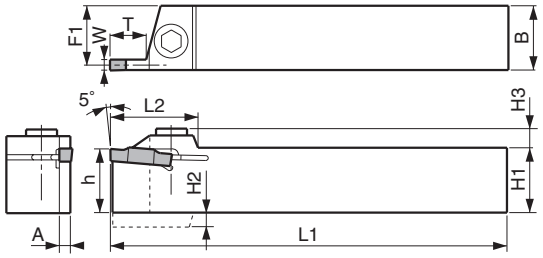
Toolholder Dimensions

Description		Std. R	Std. L	Cutting Dia. φDmax	Dimension (mm) H1=h	H2	H3	H4	B	L1	L2	F1	A	Edge Width W (mm) MIN.	Edge Width W (mm) MAX.	Spare Parts: Clamp Screw	Spare Parts: Wrench
KGMR/L	1010JX-1.5	●	●	20	10	2	3	8	10	120	18	9.4	1.2	1.5	2.0	SE-40120TR	LTW-15S
	1212JX-1.5	●	●	25	12		4	10	12		19	11.4					
KGMR/L	1010JX-2	●	●	20	10	2	3	8	10	120	18	9.15	1.7	2.0	3.0	SE-40120TR	LTW-15S
	1212JX-2	●	●	25	12	4		10	12		19	11.15					
	1616JX-2	●	●	32	16	-		9	16		24.5	15.15				SE-50125TR	LTW-20
KGMR/L	1010JX-2.5	●	●	20	10	2	3	8	10	120	18	9	2.0	2.4	3.0	SE-40120TR	LTW-15S
	1212JX-2.5	●	●	25	12	4		10	12		19	11					
	1616JX-2.5	●	●	32	16	-		9	16		24.5	15				SE-50125TR	LTW-20
KGMR/L	1616JX-3	●	●	32	16	-	4	9	16	120	24.5	14.8	2.4	3.0	4.0	SE-50125TR	LTW-20
KGMR/L	1212F-1.5-85	●		25	12	2	4	10	12	85	19	11.4	1.2	1.5	2.0	SE-40120TR	LTW-15S
KGMR/L	1212F-2-85	●	●	25	12	2	4	10	12	85	19	11.15	1.7	2.0	3.0	SE-40120TR	LTW-15S
KGMR/L	1212F-2.5-85	●	●	25	12	2	4	10	12	85	19	11	2.0	2.4	3.0	SE-40120TR	LTW-15S

KGM (Will be switched to KGD G22~G23)

Edge Width: 3.0~8.0mm





• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T		Edge Width W (mm) MIN.	Edge Width W (mm) MAX.	Spare Parts: Screw		Spare Parts: Wrench	
KGMR/L	1212H-3	●	●	12	4	6	12	100	27	10.8	2.4	9		3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16		7	16			14.8				3.0	4.0	-	HH5X16	-	LW-4
	2020K-3	●	●	20	-	7	20	125		18.8									
	2525M-3	●	●	25			25	150		23.8							HH5X25		
KGMR/L	2020K-4	●	●	20	-	7	20	125	27	18.3	3.4	10		4.0	5.0	-	HH5X16	-	LW-4
	2525M-4	●	●	25			25	150		23.3							HH5X25		
KGMR/L	2020K-5	●	●	20	-	7	20	125	27	17.8	4.4	10		5.0	6.0	-	HH5X16	-	LW-4
	2525M-5	●	●	25			25	150		22.8							HH5X25		
	3232P-5	●	●	32			32	170		29.8									
KGMR/L	2525M-8	●	●	25	7.5	10.5	25	150	40	22.0	6.0	25		8.0	8.0	-	HH6X25	-	LW-5
	3232P-8	●	●	32	-		32	170		29.0									

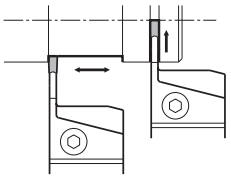
· Dimension T shows available grooving depth.

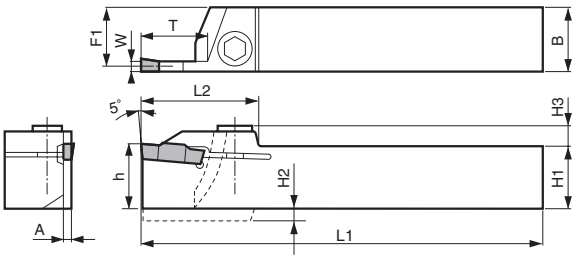
· 4mm width Insert can be installed in KGMR/L1212H-3, but is not recommended due to the toolholder's rigidity.

● : Std. Item

KGM-T (Deep Grooving Type) (Will be switched to KGD → G22)

Edge Width: 2.0~6.0mm





• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T		Edge Width W (mm) MIN.	MAX.	Spare Parts: Screw		Spare Parts: Wrench	
KGM R/L	2012K-2T17	●	●	20	-	7	12	125	33	11.15	1.7	17		2.0	3.0	SB-5TR	-	LTW-20	-
	2020K-2T17	●	●				20			19.15						-	HH5X16	-	LW-4
	2525M-2T17	●	●	25			25	150		24.15							HH5X25		
KGM R/L	1616H-3T20	●	●	16	4	7	16	100	36	14.8	2.4	20		3.0	4.0	-	HH5X16	-	LW-4
	2012K-3T20	●	●	20	-		12	125		10.8						SB-5TR	-	LTW-20	-
	2020K-3T20	●	●				20			18.8						-	HH5X16	-	LW-4
	2525M-3T20	●	●	25			25	150		23.8							HH5X25		
KGM R/L	2020K-4T20	●	●	20	-	7.5	20	125	36	18.3	3.4	20		4.0	5.0	-	HH5X16	-	LW-4
	2525M-4T20	●	●	25			25	150	36	23.3							HH5X25		
	2525M-4T25	●	●						41			25							
KGM R/L	2525M-5T25	●	●	25	-	8.5	25	150	42	22.8	4.4	25		5.0	6.0	-	HH5X25	-	LW-4
	3232P-5T25	●	●	32			32	170		29.8									
KGM R/L	2525M-6T30	●	●	25	-	9.5	25	150	45	22.4	5.3	30		6.0	6.0	-	HH5X25	-	LW-4

· Dimension T shows the distance from the toolholder to the cutting edge. Ref. to the Table (**G33**) for the relationship between the available grooving depth and the cutting dia.
· When using GMG / GMM type (2-edge) insert, set the groove depth under 15mm.

Applicable Inserts

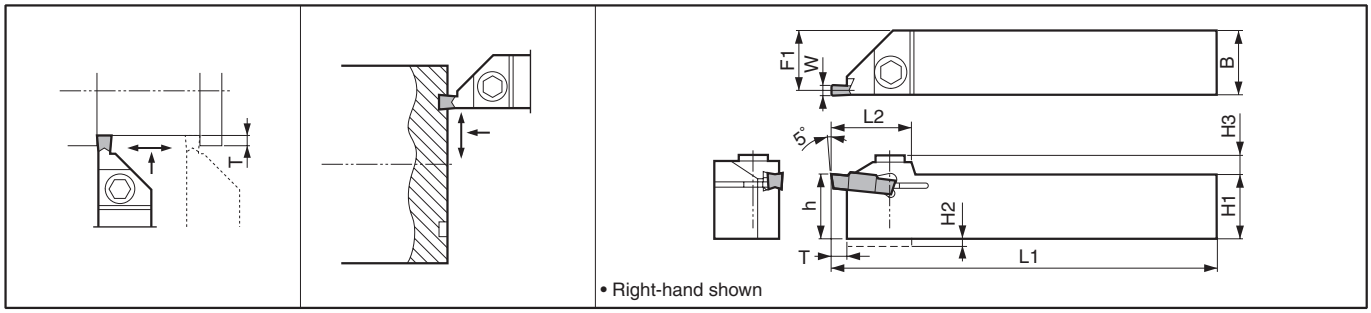
Applications	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Full-R / Copying	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving
Ref. to Page	G30	G30	G30	G30	G31	G32	G32	G32	G32	G32	G33
Insert / Toolholder Description	MW	MS	MG			MT	NB	TK	TK		CBN PCD
KGM R/L…1.5	-	-	-	-	-	GMM1520..MT GMM2020..MT GMM1520R/L..MT GMM2020R/L..MT	GMM1520..NB GMM2020..NB	GMM2020..TK GMM2020R/L..TK	GMN2..TK GMR/L2..TK	-	-
KGM R/L…2(T)	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2020..MT GMM2520..MT GMM3020..MT GMM2020R/L..MT GMM2520R/L..MT GMM3020R/L..MT	GMM2020..NB GMM2520..NB GMM3020..NB	GMM2020..TK GMM2520..TK GMM3020..TK GMM2020R/L..TK GMM2520R/L..TK GMM3020R/L..TK	GMN2..TK GMN3..TK GMR/L2..TK GMR/L3..TK	GMN2.2 GMN3 GMR/L2.2 GMR/L3	GMN2 GMN3
KGM R/L…2.5	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2520..MT GMM3020..MT GMM2520R/L..MT GMM3020R/L..MT	GMM2520..NB GMM3020..NB	GMM2520..TK GMM3020..TK GMM2520R/L..TK GMM3020R/L..TK	GMN3..TK GMR/L3..TK	GMN3 GMR/L3	GMN3
KGM R/L…3(T)	GMM3020..MW GMM4020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS	GMG3020..MG GMG3520..MG GMG4020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R	-	GMM3020..MT GMM3020R/L..MT	GMM3020..NB	GMM3020..TK GMM3020R/L..TK	GMN3..TK GMN4..TK GMR/L3..TK GMR/L4..TK	GMN3 GMN4 GMR/L3 GMR/L4	GMN3 GMN4
KGM R/L…4(T)	GMM4020..MW GMM5020..MW	GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG4020..MG GMG5020..MG	GMG4020..R GMM4020..R GMG5020..R GMM5020..R	-	-	-	-	GMN4..TK GMR/L4..TK	GMN4 GMN5 GMR/L4	GMN4 GMN5
KGM R/L…5(T)	GMM5020..MW GMM6020..MW	GMG5020..MS GMM5020..MS GMG6020..MS GMM6020..MS	GMG5020..MG GMG6020..MG	GMG5020..R GMM5020..R GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN5 GMN6	GMN5 GMN6
KGM R/L…6T	GMM6020..MW	GMG6020..MS GMM6020..MS	GMG6020..MG	GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN6	GMN6
KGM R/L…8	GMM8030..MW	-	GMG8030..MG	-	GMGA8030..R	-	-	-	-	-	-

·If using a full-R insert, you need to modify the corner of insert adapter part (dimension A) of toolholder.

Recommended Cutting Conditions → G105
Recommended Cutting Conditions of CBN / PCD → G104

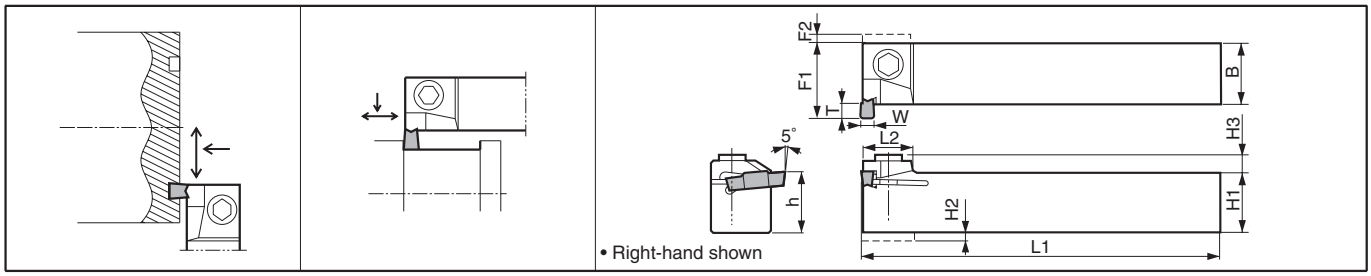
● : Std. Item

KGMM



• Right-hand shown

KGMS



• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	F2	T		Edge Width W (mm) MIN.	MAX.	Spare Parts: Screw	Screw	Wrench	Wrench
KGMM R/L	1212H-3	●	●	12	4	5	12	100	25	10.8	-	4.8		3.0	5.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16	-		16			14.8						-	HH5X16	-	LW-4
	2020K-3	●	●	20		6	20	125		18.8						-		-	
	2525M-3	●	●	25			25	150		23.8						-	HH5X25	-	
KGMS R/L	1212H-3	●	●	12	4	5	12	100	17	17	1.5	4.8		3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16	-		16			21.5				3.0	5.0	GS-50	-	-	LW-3
	2020K-3	●	●	20		6	20	125		25	-					-	HH5X16	-	LW-4
	2525M-3	●	●	25			25	150		30						-	HH5X25	-	

· Dimension T shows available grooving depth. (Ref. to the table **G37** for Face Grooving)

Applicable Inserts [External Grooving]

Applications	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Grooving	Grooving	Grooving	Grooving	Grooving	Grooving
Ref. to Page	G30,G31	G30	G30	G30,G31	G32	G32	G32	G32	G32	G33
Insert / Toolholder Description	(MW)	MS	MG		MT	NB	TK	TK		CBN PCD
KGMS R/L 1212H-3	GMM3014..	-	-	GMM3014..R	-	-	-	-	-	-
KGMM R/L ···3 KGMS R/L ···3	GMM3020..MW GMM4020..MW GMM5020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG3020..MG GMG3520..MG GMG4020..MG GMG5020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R GMG5020..R GMM5020..R	GMM3020..MT	GMM3020..NB	GMM3020..TK	GMN3..TK GMN4..TK	GMN3 GMN4 GMN5	GMN3 GMN4 GMN5

Applicable Inserts [Face Grooving]

Applications	Grooving / Turning	Undercutting	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Grooving	Grooving	Grooving	Grooving
Ref. to Page	G31	G30,G31	G30	G30	G30	G30	G32	G32	G32	G32
Insert / Toolholder Description			MW	MS	MG		MT	NB	TK	
KGMS R/L 1212H-3	-	GMM3014..RU	-	-	-	-	-	-	-	-
KGMM R/L ···3 KGMS R/L ···3	FGG R/L 3020.. FGG R/L 4020.. FGG R/L 5020..	GMG3020..RU GMG4020..RU GMG5020..RU	GMM3020..MW GMM4020..MW GMM5020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG3020..MG GMG3520..MG GMG4020..MG GMG5020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R GMG5020..R GMM5020..R	GMM3020..MT	GMM3020..NB	GMM3020..TK	GMN3 GMN4 GMN5 GMN3..TK GMN4..TK

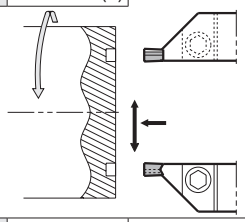
Recommended Cutting Conditions ➡ G105
Recommended Cutting Conditions of CBN / PCD ➡ G104

● : Std. Item

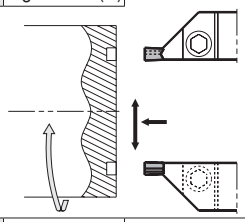
◆ Selection of Insert & Toolholder (Face Grooving)

● Case of KGMM

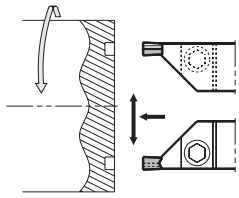
Toolholder	Left-hand (L)
Insert	Left-hand (L)



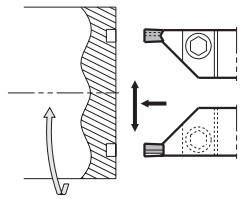
Toolholder	Right-hand (R)
Insert	Right-hand (R)



Toolholder	Right-hand (R)
Insert	Left-hand (L)

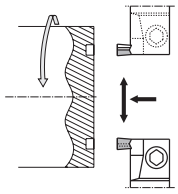


Toolholder	Left-hand (L)
Insert	Right-hand (R)

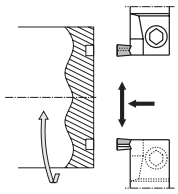


● Case of KGMS

Toolholder	Right-hand (R)
Insert	Left-hand (L)

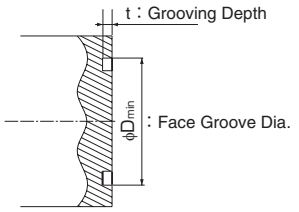


Toolholder	Left-hand (L)
Insert	Right-hand (R)



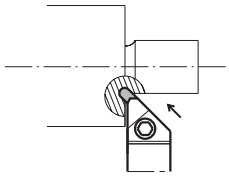
◆ Face Groove Dia. & Grooving Depth (Face Grooving)

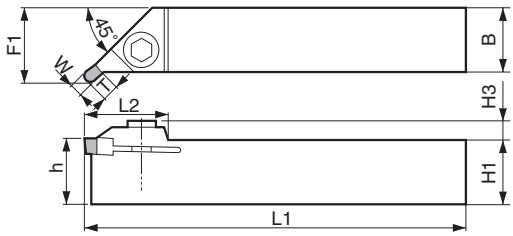
● KGMM / KGMS (Common) (mm)



Description	φDmin	t
GMG/GMM3020-○○○□□	φ100	4.8
GMG/GMM4020-○○○□□		
GMG/GMM5020-○○○□□		
FGGR/L3020-02	φ22	4.3
FGGR/L4020-04	φ28	4.8
FGGR/L5020-04	φ30	
GMG3020-150RU	φ22	4.3
GMG4020-200RU	φ28	4.8
GMG5020-250RU	φ30	

■ KGMU (External Undercutting Toolholder)





• Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	T				Edge Width W (mm) MIN.	Edge Width W (mm) MAX.	Spare Parts: Clamp Bolt		Spare Parts: Wrench	
KGMUR/L	2020K	●	●	20	6	20	125	28.5	23.6	4.8				3.0	5.0	HH5X16		LW-4	
	2525M	●	●	25		25	150		28.6						(6.0)	HH5X25			

· Dimension T shows the distance from the toolholder to the cutting edge. Ref. to the table below for the available grooving depth.

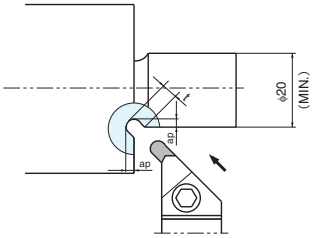
Dimension F1 shows at GMM5020-RU. ( ) indicates external grooving inserts when installed.

● Applicable Inserts

Applications	Undercutting		
Ref. to Page	G30		
Insert / Toolholder Description			
KGMUR/L 2020K 2525M	GMG3020..RU GMG4020..RU GMG5020..RU		

· External grooving inserts (grooving width 3mm~6mm) will be attached.
(In case of using GMG○○20-○○○□□, GMM○○20-○○○□□, GMN○ insert)

◆ Undercut Depth t

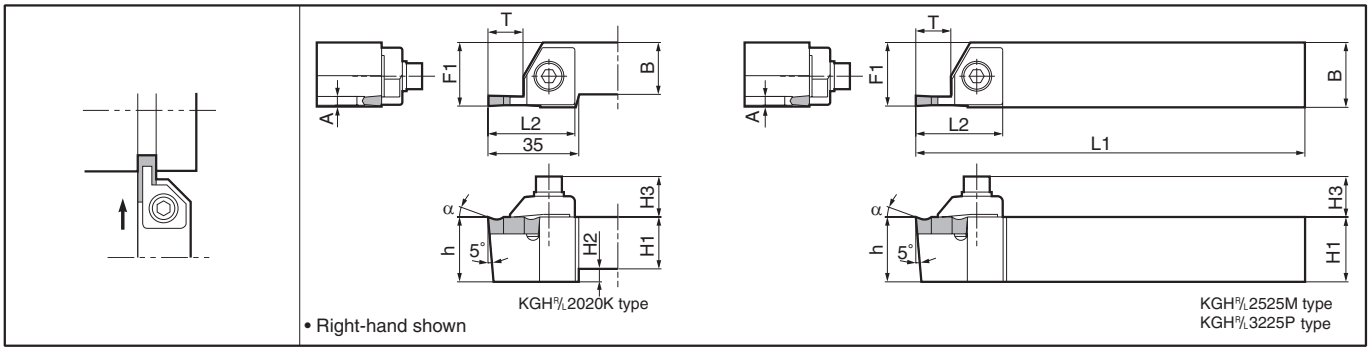


Description	Undercut Depth t (mm)	Distance from the face of the workpiece ap (mm)
GMG3020-150RU	3.5	1.8
GMG4020-200RU	4.0	1.9
GMG5020-250RU	4.5	2.1

* In case of undercutting for the diameter over 100mm, Inserts for External Grooving GMG○○20-○○○□□, GMM○○20-○○○□□, GMN○ are also available.

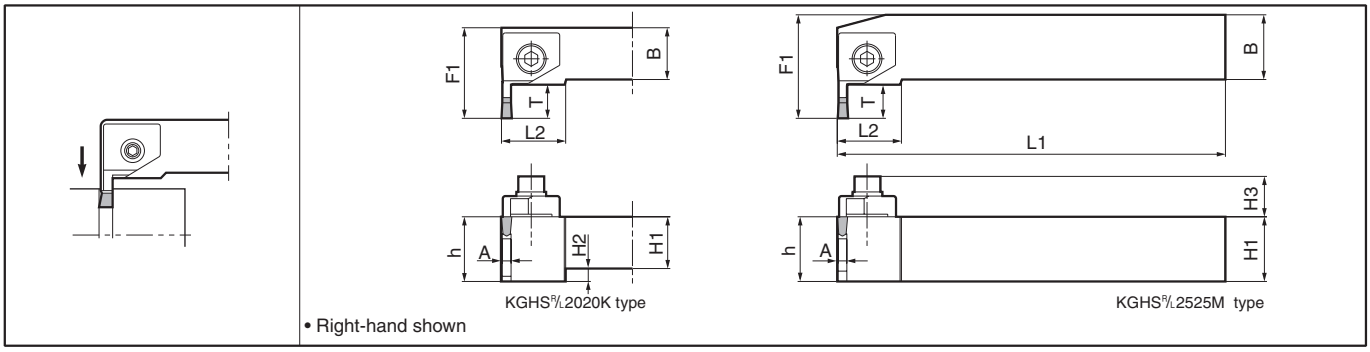
● : Std. Item

KGH



• Right-hand shown

KGHS



• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T	Spare Parts: Clamp	Clamp Bolt	Washer	Spring	Wrench
KGHR/L	2020K-4	●	●	20	5	15.6	20	125	33.5	24.5-24.8	3.4	13	CGH-1R/L	HH6X25	W-6	SP-6	LW-5
	2525M-4	●	●	25	-		25	150		24.5-24.8							
	2020K-5	●	●	20	5	15.6	20	125	33.5	25.0-25.8	4.2	13	CGH-1R/L				
	2525M-5	●	●	25	-		25	150		25.0-25.8							
	3225P-5	●	●	32	-		25	170		25.0-25.8							
	2020K-7	●	●	20	5	15.6	20	125	33.5	24.5-25.0	5.8	13	CGH-2R/L				
	2525M-7	●	●	25	-		25	150		24.5-25.0							
	2525M-10	●	●	25	-	16.1	25	150	41	25.5-26.5	9.0	17	CGH-3R/L				
	3225P-10	●		32	-		25	170		25.5-26.5							
KGHSR/L	2020K-4	●	●	20	5	15.6	20	125	25	35	3.4	13	CGH-1L/R	HH6X25	W-6	SP-6	LW-5
	2525M-4	●	●	25	-		25	150		40							
	2020K-5	●	●	20	5	15.6	20	125	25	35	4.2	13	CGH-1L/R				
	2525M-5	●	●	25	-		25	150		40							

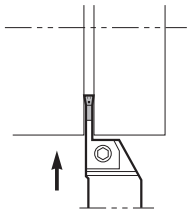
· Dimension T shows available grooving depth.
· Dimension F1 of KGHR/L Toolholder depends on the insert's edge width.
· Clamp KGHR/L ... CGH-○R for Right-hand Toolholder, and CGH-○L for Left-hand Toolholder.
KGHSR/L ... CGH-○L for Right-hand Toolholder, and CGH-○R for Left-hand Toolholder.

Rake Angle (α) after Installment of GH / GHU

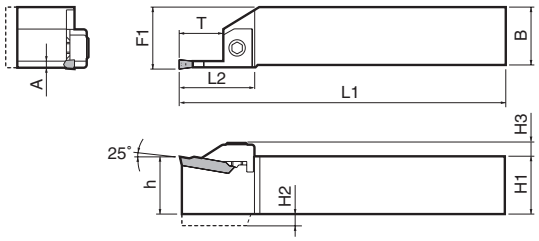
When using GH○○○○-○○		When using GHU○○-○○	
α	Insert Grades	α	Insert Grades
0°	A65, A66N, PT600M	10°	TN60 CR9025
10°	TC40N		
20°	TN90, TC60M PR930 KW10		

● : Std. Item

KGA



• Right-hand shown



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T		Spare Parts: Clamp	Clamp Bolt	Spring	Wrench
KGA R/L	2020K-3	●	●	20	5	6	20	125	37	21.5	2.3	20		CGA-3 R/L	HH6X20	SP-6	LW-5
	2525M-3	●	●	25	-		25	150		26.5							
	2020K-4	●		20	5	6	20	125	37	21.5	3.3	20		CGA-4 R/L			
	2525M-4	●	●	25	-		25	150		26.5							
	2020K-5	●		20	5	6	20	125	42	21.5	4.3	25		CGA-5 R/L			
	2525M-5	●	●	25	-		25	150		26.5							

· Dimension T shows available grooving depth.

· Clamp: CGA-○R for Right-hand Toolholder, and CGA-○L for Left-hand Toolholder.

Applicable Inserts

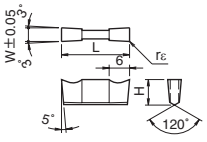
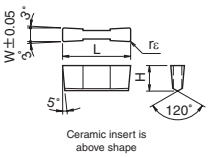
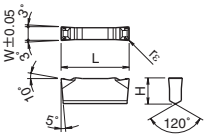
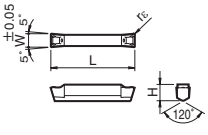
(mm)

Description	L	H
GH4020-○○~GH8020-○○	20	7.5
GH10025-05~GH12025-05	25	
GHU○○-○○	20	
GA30, GA40	25	5.0
GA50	30	

		Cermet TN60	Cermet TN90	Cermet TC40N	Cermet TC60M	CVD Coated Carbide CR9025	PVD Coated Carbide PR930	Carbide KW10	Ceramic A65	Ceramic A66N	Ceramic PT600M
P	Carbon steel / Alloy steel						◕				
M	Stainless Steel						◕				
K	Cast Iron							◕	○		●
N	Non-ferrous Metals							◕			
S	Titanium Alloys							◕			
H	Hard materials (~40HRC)						●				
	Hard materials (40HRC~)									○	●

Classification of usage

●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

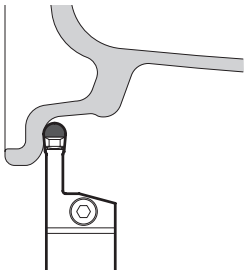
Insert		Description		Dimension (mm) W	Dimension (mm) rε	Cermet TN60	Cermet TN90	Cermet TC40N	Cermet TC60M	CVD Coated Carbide CR9025	PVD Coated Carbide PR930	Carbide KW10	Ceramic A65	Ceramic A66N	Ceramic PT600M	Applicable Toolholders	Ref. to Page for Applicable Toolholders
Ground Chipbreaker		GH	4020-02	4.0	0.2		●	●	●		●	●				KGH R/L...4 KGHS R/L...4	G38
			4020-05		0.5		●	●	●		●	●	●	●	●		
			4520-02	4.5	0.2			●									
			4520-05		0.5			●									
			5020-02	5.0	0.2		●	●	●		●	●				KGH R/L...5 KGHS R/L...5	
			5020-05		0.5		●	●	●		●	●	●	●	●		
			5520-02	5.5	0.2			●									
			5520-05		0.5			●									
			6020-02	6.0	0.2		●	●	●		●	●					
			6020-05		0.5		●	●	●		●	●	●		●		
			6520-02	6.5	0.2			●									
			6520-05		0.5			●									
Ceramic	 Ceramic insert is above shape		7020-02	7.0	0.2		●	●	●		●	●					
			7020-05		0.5		●	●	●		●	●	●		●		
			7520-02	7.5	0.2			●								KGH R/L...7 KGHS R/L...7	
			7520-05		0.5			●									
			8020-02	8.0	0.2		●	●	●		●	●					
			8020-05		0.5		●	●	●		●	●					
			10025-05	10.0	0.5				●		●	●				KGH R/L...10	
			12025-05	12.0	0.5				●		●	●					
Molded Chipbreaker		GHU	40-20	4.0	0.25	●				●						KGH R/L... 4KGHS R/L...4	G38
			50-20	5.0	0.30	●				●						KGH R/L... 5KGHS R/L...5	
			60-20	6.0	0.30	●				●							
		GA	30	3.0	0.20	●				●						KGA R/L...3	G39
			40	4.0	0.25	●				●						KGA R/L...4	
			50	5.0	0.30	●				●						KGA R/L...5	

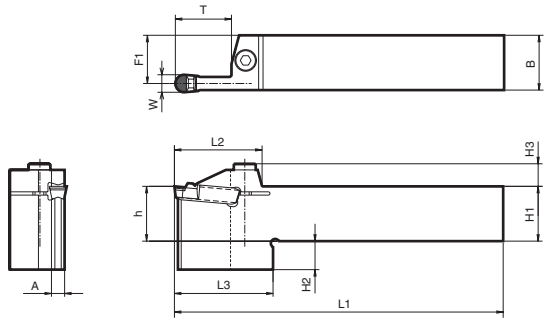
Recommended Cutting Conditions ➔ G102~G103

● : Std. Item

Inserts are sold in 10 piece boxes.

KGMW (External / Facing / Copying)



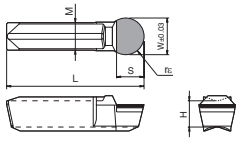
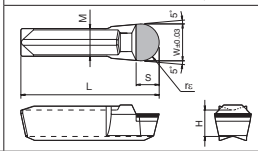


• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	L3	F1	A	T	Spare Parts: Clamp Bolt	Spare Parts: Wrench	Applicable Inserts
KGMW R/L	2525M-6	●	●	25	13	10.3	25	150	40	55	22.8	4.4	25	HH6X25	LW-5	GMGW6030-30R
	2525M-8	●	●								22	6				GMGW8030-40R GMGW8030-40R-HR

Applicable Inserts

Insert		Description		Dimension (mm) W	rε	L	H	M	S	No. of Edge	PCD KPD001
		GMGW	6030-30R	6	3	30	5.5	5	4.5	1	●
			8030-40R	8	4			6	6	1	●
		GMGW	8030-40R-HR	8	4	30	5.5	6	5	1	●

· GMGW inserts are exclusively used for KGMW type toolholder. It cannot be used for other toolholder because of its different installation angle.
· GMGW inserts Edge Preparation: R-honed Cutting Edge.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) PCD KPD001	(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)
Aluminum	★ 150~2,700	(1) 0.05~0.3 (2) 0.2~0.8 (3) MAX. 3

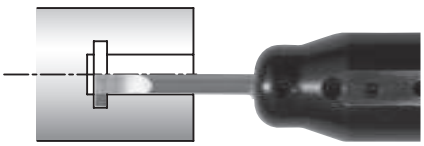
★ : 1st Recommendation

● : Std. Item

Summary of Internal Grooving

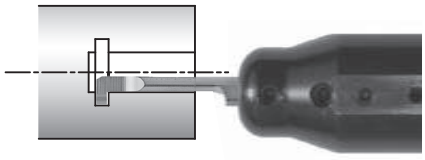
Small Dia. Internal Grooving ϕ3~ (G43~G46)

EZ Bars, 2-Edge Tip-Bars & System Tip-Bars



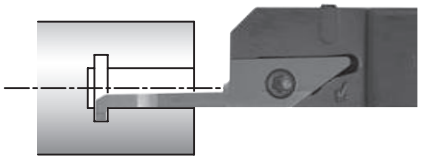
Type	EZG
Min. Bore Dia.	ϕ3~ϕ8
Edge Width (mm)	0.5~2.0
Grooving Depth (mm)	1.0~2.0
Ref. to Page	G43

EZ Bars



Type	HPG
Min. Bore Dia.	ϕ4~ϕ7
Edge Width (mm)	1.0~2.0
Grooving Depth (mm)	1.0~2.0
Ref. to Page	G46

2-Edge Tip-Bars

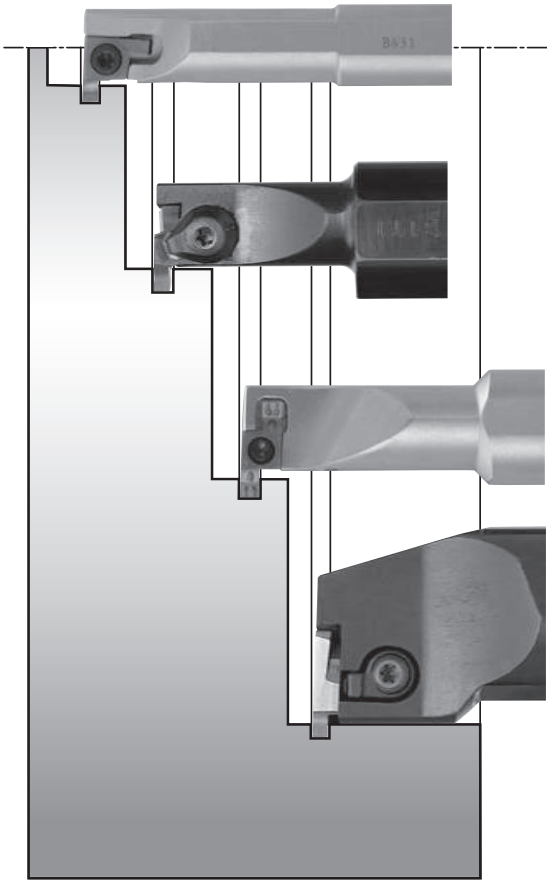


Type	VNG
Min. Bore Dia.	ϕ4~ϕ7
Edge Width (mm)	1.0~2.0
Grooving Depth (mm)	0.8~2.0
Ref. to Page	G45

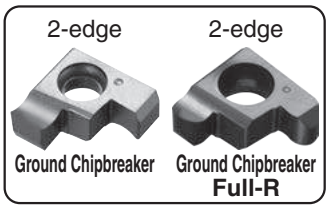
System Tip-Bars

Internal Grooving ϕ8~ (G47~G57)

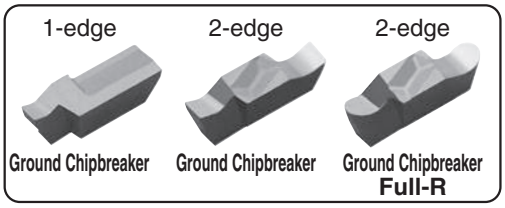
Shallow Grooving



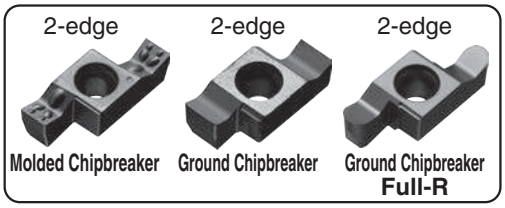
Type	SIGE
Min. Bore Dia.	ϕ8~ϕ12
Edge Width (mm)	1.0~3.0
Grooving Depth (mm)	1.5~2.2
Ref. to Page	G49



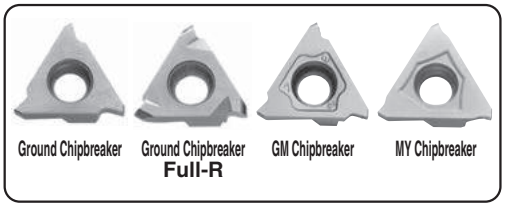
Type	GIV
Min. Bore Dia.	ϕ12~ϕ40
Edge Width (mm)	1.0~5.0
Grooving Depth (mm)	1.7~6.3
Ref. to Page	G54



Type	SIGE
Min. Bore Dia.	ϕ14~ϕ40
Edge Width (mm)	1.0~5.0
Grooving Depth (mm)	2.5~6.5
Ref. to Page	G49



Type	KIGBA
Min. Bore Dia.	ϕ35~ϕ40
Edge Width (mm)	0.33~4.8
Grooving Depth (mm)	0.8~2.8
Ref. to Page	G56



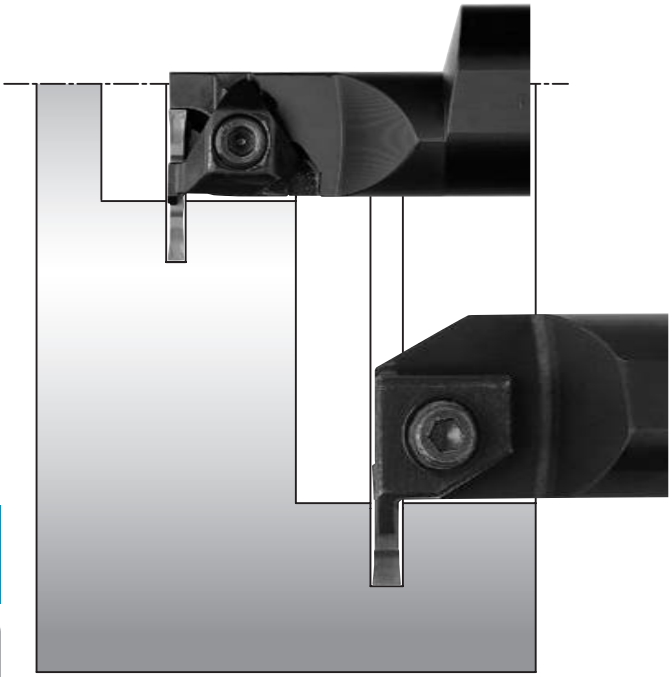
Type	KITG
Min. Bore Dia.	ϕ35~ϕ45
Edge Width (mm)	0.75~4.5
Grooving Depth (mm)	2.0~2.5
Ref. to Page	G57

Ground Chipbreaker

* KITG will be switched to KIGBA.

Summary of Internal Grooving

Deep Grooving (G61, G63)



Type	KGIA
Min. Bore Dia.	ϕ32~ϕ66
Edge Width (mm)	3.0~5.0
Grooving Depth (mm)	10~15
Ref. to Page	**G63**

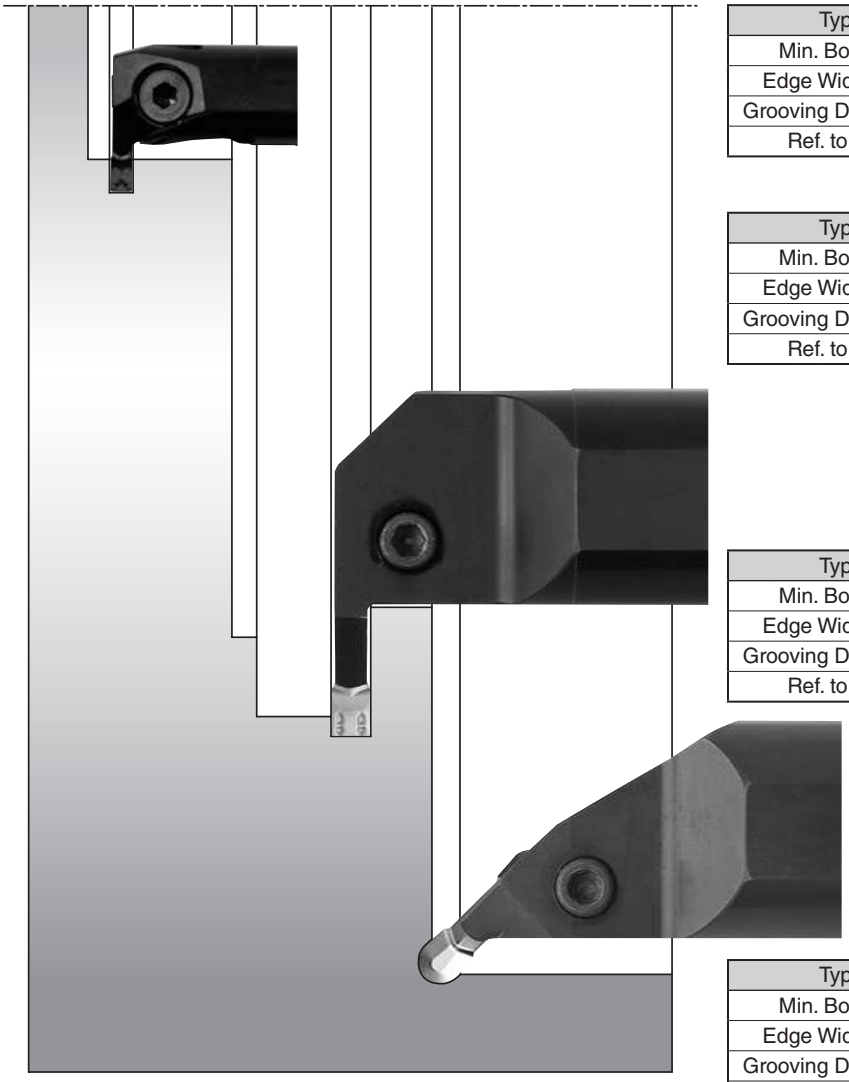
Molded Chipbreaker

Type	KIGH
Min. Bore Dia.	ϕ45~ϕ65
Edge Width (mm)	4.0~8.0
Grooving Depth (mm)	12
Ref. to Page	**G61**

Ground Chipbreaker

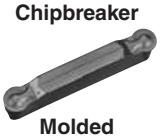
Molded Chipbreaker

Internal Grooving & Turning ϕ20~ (G58, G60, G62)



Type	KGDI
Min. Bore Dia.	ϕ18~ϕ40
Edge Width (mm)	2.0~5.0
Grooving Depth (mm)	4.5~11.0
Ref. to Page	**G58**

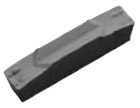
GMI Chipbreaker



Molded Chipbreaker Full-R

Type	KIGM-V
Min. Bore Dia.	ϕ20~ϕ40
Edge Width (mm)	3.0~5.0
Grooving Depth (mm)	5.5~11.0
Ref. to Page	**G60**

Type	KIGM-8
Min. Bore Dia.	ϕ65
Edge Width (mm)	8.0
Grooving Depth (mm)	20
Ref. to Page	**G62**



Molded Chipbreaker

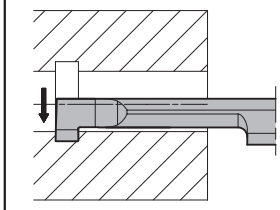
Ground Chipbreaker

Type	KIGMU-8
Min. Bore Dia.	ϕ65
Edge Width (mm)	8.0
Grooving Depth (mm)	2.2
Ref. to Page	**G62**

Molded Chipbreaker Full-R

Small Dia. Internal Grooving EZ Bars

EZG (Small Dia. Internal Grooving) NEW



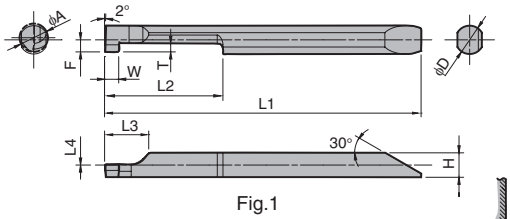


Fig.1

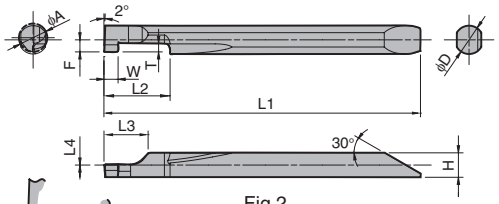
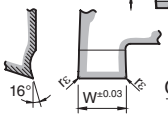


Fig.2



Chipbreaker in detail

• Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)										Drawing	MEGACOAT	Applicable Sleeves
		φA	W ±0.03	rε	φD	H	L1	L2	L3	L4	F	T		PR1225	EZH⇒F23~F27
EZGR	040040-050	4	0.5	±0.013 0.05	4	3.45	44.7	12	6.2	0	1.7	1	Fig.2	●	EZH040..
	040040-100		1.0											●	
	040040-150		1.5											●	
	040040-200		2.0											●	
	050050-100	5	1.0		5	4.3	52.8	20	6.7		2.15	1.5	Fig.1	●	EZH050..
	050050-150		1.5											●	
	050050-200		2.0											●	
	060060-100	6	1.0		6	5.15	60.7		7.6		2.65	2		●	EZH060..
	060060-150		1.5											●	
	060060-200		2.0											●	
	070070-100	7	1.0		7	6.2	63.7	25			3.05	2		●	EZH070..
	070070-150		1.5											●	
	070070-200		2.0											●	
	080070-100	8	1.0								3.45	2		●	
	080070-150		1.5											●	
	080070-200		2.0											●	
EZGR	030030-050S	3	0.5	±0.013 0.05	3	2.5	38.7	5	4.8	0	1.25	0.8	Fig.2	●	EZH030..
	030030-100S		1.0											●	
	040040-050S	4	0.5		4	3.45	44.7	8	6.2		1.7	1		●	EZH040..
	040040-100S		1.0											●	
	040040-150S		1.5											●	
	040040-200S		2.0											●	
	050050-100S	5	1.0		5	4.3	52.8	10	6.7		2.15	1.5		●	EZH050..
	050050-150S		1.5											●	
	050050-200S		2.0											●	
	060060-100S	6	1.0		6	5.15	60.7		7.6		2.65	2		●	EZH060..
	060060-150S		1.5											●	
	060060-200S		2.0											●	
	070070-100S	7	1.0		7	6.2	63.7				3.05			●	EZH070..
	070070-150S		1.5											●	
	070070-200S		2.0											●	
	080070-100S	8	1.0								3.45			●	
	080070-150S		1.5											●	
	080070-200S		2.0											●	

· Dimension T shows available grooving depth.

EZ Bars Identification System

EZ G R 030 030 – 050 S

Symbol of EZ Bars	Applications	Insert Hand	Min. Bore Dia.	Shank Dia.	Edge Width	Type
	G: Internal Grooving	R: Right-hand	030 : 3mm 040 : 4mm ⋮	030 : 3mm 040 : 4mm ⋮	050 : 0.5mm 100 : 1.0mm 150 : 1.5mm ⋮	S: Short type (L2 dimension)

Recommended Cutting Conditions

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)	EZGR030030-...S	EZGR040040-... EZGR050050-... EZGR040040-...S EZGR050050-...S	EZGR060060-... EZGR070070-... EZGR080070-... EZGR060060-...S EZGR070070-...S EZGR080070-...S	Remarks
	MEGACOAT				
	PR1225	f (mm/rev)			
Carbon steel / Alloy steel	★ 30-100	~0.02	~0.03	~0.05	Coolant
Stainless Steel	★ 30-80	~0.01	~0.02	~0.03	

★ :1st Recommendation

● : Std. Item

EZ Bars are sold in 1 piece boxes.

Applicable Sleeves for Internal Grooving Inserts

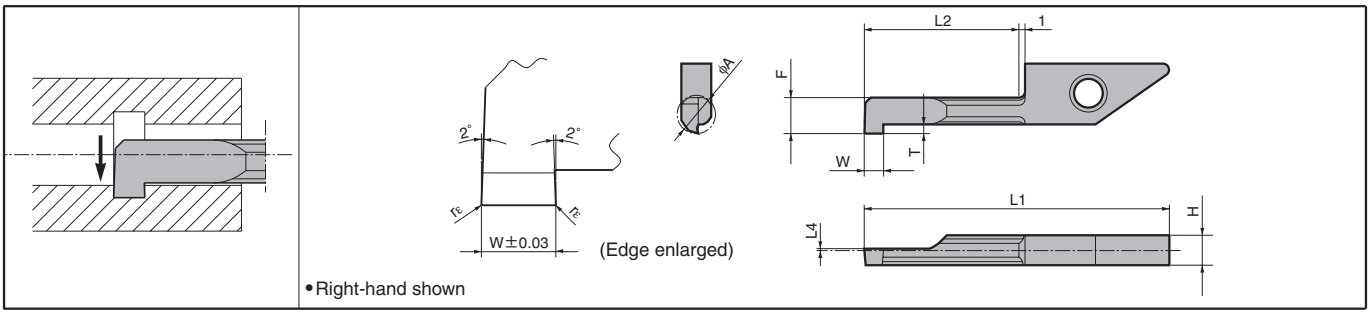
● Applicable Sleeves

Sleeve								Applicable Insert for Small Dia. Internal Grooving			Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length with coolant hole) ➡ F23		EZH-HP (Adjustable overhang length) ➡ F24		EZH-ST ➡ F26		Sleeve Shank Dia. ϕD1 (mm)		EZG	HPG	Shank Dia. ϕD (mm)	
-		-		EZH	03012ST-80	12		EZGR ...030-...	-	3	(General purpose)
					04012ST-80			EZGR ...040-...	HPG$^{R}_{L}$ 0404-...	4	
					05012ST-80			EZGR ...050-...	HPG$^{R}_{L}$ 0505-...	5	
					06012ST-80			EZGR ...060-...	HPG$^{R}_{L}$ 0606-...	6	
					07012ST-80			EZGR ...070-...	HPG$^{R}_{L}$ 0707-...	7	
-		EZH	03016HP-100	EZH	03016ST-100	16		EZGR ...030-...	-	3	(General purpose)
			04016HP-100		04016ST-100			EZGR ...040-...	HPG$^{R}_{L}$ 0404-...	4	
			05016HP-100		05016ST-100			EZGR ...050-...	HPG$^{R}_{L}$ 0505-...	5	
			06016HP-100		06016ST-100			EZGR ...060-...	HPG$^{R}_{L}$ 0606-...	6	
			07016HP-100		07016ST-100			EZGR ...070-...	HPG$^{R}_{L}$ 0707-...	7	
EZH	03019CT-120	EZH	03019HP-120	EZH	03019ST-120	19.05		EZGR ...030-...	-	3	Citizen Machinery
	04019CT-120		04019HP-120		04019ST-120			EZGR ...040-...	HPG$^{R}_{L}$ 0404-...	4	
	05019CT-120		05019HP-120		05019ST-120			EZGR ...050-...	HPG$^{R}_{L}$ 0505-...	5	
	06019CT-120		06019HP-120		06019ST-120			EZGR ...060-...	HPG$^{R}_{L}$ 0606-...	6	
	07019CT-120		07019HP-120		07019ST-120			EZGR ...070-...	HPG$^{R}_{L}$ 0707-...	7	
EZH	03020CT-120	EZH	03020HP-120	EZH	03020ST-120	20		EZGR ...030-...	-	3	Eguro Tsugami Citizen Machinery (General purpose)
	04020CT-120		04020HP-120		04020ST-120			EZGR ...040-...	HPG$^{R}_{L}$ 0404-...	4	
	05020CT-120		05020HP-120		05020ST-120			EZGR ...050-...	HPG$^{R}_{L}$ 0505-...	5	
	06020CT-120		06020HP-120		06020ST-120			EZGR ...060-...	HPG$^{R}_{L}$ 0606-...	6	
	07020CT-120		07020HP-120		07020ST-120			EZGR ...070-...	HPG$^{R}_{L}$ 0707-...	7	
EZH	03022CT-135	EZH	03022HP-135	EZH	03022ST-135	22		EZGR ...030-...	-	3	Star Micronics Nomura DS Tsugami
	04022CT-135		04022HP-135		04022ST-135			EZGR ...040-...	HPG$^{R}_{L}$ 0404-...	4	
	05022CT-135		05022HP-135		05022ST-135			EZGR ...050-...	HPG$^{R}_{L}$ 0505-...	5	
	06022CT-135		06022HP-135		06022ST-135			EZGR ...060-...	HPG$^{R}_{L}$ 0606-...	6	
	07022CT-135		07022HP-135		07022ST-135			EZGR ...070-...	HPG$^{R}_{L}$ 0707-...	7	
EZH	03025.0CT-135	EZH	03025.0HP-135	EZH	03025.0ST-135	25		EZGR ...030-...	-	3	Eguro Tsugami Citizen Machinery (General purpose)
	04025.0CT-135		04025.0HP-135		04025.0ST-135			EZGR ...040-...	HPG$^{R}_{L}$ 0404-...	4	
	05025.0CT-135		05025.0HP-135		05025.0ST-135			EZGR ...050-...	HPG$^{R}_{L}$ 0505-...	5	
	06025.0CT-135		06025.0HP-135		06025.0ST-135			EZGR ...060-...	HPG$^{R}_{L}$ 0606-...	6	
	07025.0CT-135		07025.0HP-135		07025.0ST-135			EZGR ...070-...	HPG$^{R}_{L}$ 0707-...	7	
EZH	03025.4CT-120	EZH	03025.4HP-120	EZH	03025.4ST-120	25.4		EZGR ...030-...	-	3	Citizen Machinery
	04025.4CT-120		04025.4HP-120		04025.4ST-120			EZGR ...040-...	HPG$^{R}_{L}$ 0404-...	4	
	05025.4CT-120		05025.4HP-120		05025.4ST-120			EZGR ...050-...	HPG$^{R}_{L}$ 0505-...	5	
	06025.4CT-120		06025.4HP-120		06025.4ST-120			EZGR ...060-...	HPG$^{R}_{L}$ 0606-...	6	
	07025.4CT-120		07025.4HP-120		07025.4ST-120			EZGR ...070-...	HPG$^{R}_{L}$ 0707-...	7	

· Choose sleeves (ϕd1) to meet with ϕD dimension of Internal Grooving Inserts.
· Adjustment Pin cannot be installed to **EZH-ST** sleeves.
To adjust overhang of the bar, please use **EZH-CT/HP** Sleeves.
· Machine manufacturers in random order.

Small Dia. Internal Grooving System Tip-Bars

VNG



Classification of usage			MEGA COAT		PVD	Carbide	PCD		Ref. to Page for Applicable Toolholders
●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel	●		○				
	M	Stainless Steel	●		○				
	K	Cast Iron				●			
	N	Non-ferrous Metals					●		
	S	Titanium Alloys					●		
	H	Hard materials (~40HRC)	○		○				
		Hard materials (40HRC~)							

● Dimensions

Description		Min. Bore Dia.	Dimension (mm)										MEGA COAT		PVD	Carbide	PCD		Ref. to Page for Applicable Toolholders
		ϕA	W	rε	ϕD	H	L1	L2	L3	L4	F	T	PR1225		PR930	KW10	KPD001	KPD010	
VNGR	0410-11	4	1.0	0.05	-	3.9	30.8	11	-	0.1	3.5	0.8	●		●	●			F30 F31
	0420-11		2.0										●		●	●			
	0510-11	5	1.0	0.05							4.4	1.0	●		●	●			
	0520-11		2.0										●		●	●			
	0610-20	6	1.0	0.05			39.8	20		0.3	5.2	1.8	●		●	●			
	0620-20		2.0										●		●	●			
	0710-20	7	1.0	0.05							6.2	2.0	●		●	●			
	0720-20		2.0										●		●	●			
VNGR	0410-11NB	4	1.0	0.05	-	3.9	30.8	11	-	0.1	3.5	0.8					MTO	MTO	
	0420-11NB		2.0														MTO	MTO	
	0510-11NB	5	1.0	0.05							4.4	1.0					MTO	MTO	
	0520-11NB		2.0														MTO	MTO	
	0610-20NB	6	1.0	0.05			39.8	20		0.3	5.2	1.8					MTO	MTO	
	0620-20NB		2.0														MTO	MTO	
	0710-20NB	7	1.0	0.05							6.2	2.0					MTO	MTO	
	0720-20NB		2.0														MTO	MTO	

· Dimension T shows available grooving depth.
· Dimension L4 indicates the cutting edge is above the Tool's Center Position.

◆ Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			VNG04 VNG05	VNG06 VNG07	Remarks
	MEGA	PVD	Carbide	f (mm/rev)		
	PR1225	PR930	KW10			
Carbon steel / Alloy steel	★ 30~100	☆ 30~100		~0.03	~0.05	Coolant
Stainless Steel	★ 30~80	☆ 30~80		~0.02	~0.03	
Non-ferrous Metals			★ ~300	~0.05	~0.08	

★ : 1st Recommendation ☆ : 2nd Recommendation

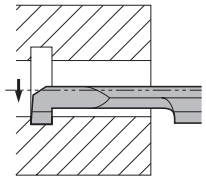
● : Std. Item
MTO : Made to order

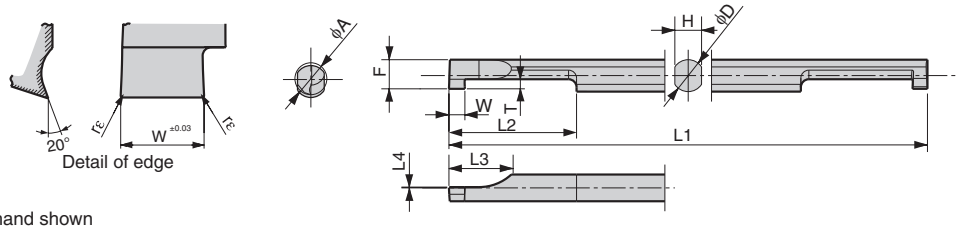
System Tip-Bars (VNG) are sold in 5 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

HPG (Small Dia. Internal Grooving)

Ref. to Page for Applicable Sleeves F26, F27





• Right-hand shown

Dimensions

Description	Min. Bore Dia.	Dimension (mm)										PVD Coated Carbide		Carbide	
	φA	W±0.03	rε	φD	H	L1	L2	L3	L4	F	T	PR930		KW10	
												R	L	R	L
HPGR/L 0404-10	4	1	0.05	4	3.35	60	15	8	0	3.65	1	●	●	●	
0404-20		2										●	●	●	
0505-10	5	1		5	4.3	70	20			4.55	1.5	●	●	●	
0505-20		2										●	●	●	
0606-10	6	1		6	5.2			10		5.5	2	●	●	●	
0606-20		2										●	●	●	
0707-10	7	1		7	6.2	80	25			6.45		●	●	●	
0707-20		2										●	●	●	

+0 -0.02

· Dimension T shows available grooving depth.

Description Table for Tip-Bars and Applicable Sleeves

Tip-Bars Description	Applicable Sleeves F26, F27
HPGR/L 0404-···	EZH 04·····
0505-···	05·····
0606-···	06·····
0707-···	07·····

Recommended Cutting Conditions

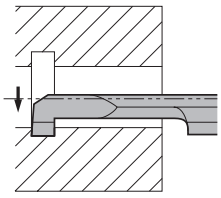
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		HPGR/L04 HPGR/L05	HPGR/L06 HPGR/L07	Remarks
	PVD Coated Carbide	Carbide	f (mm/rev)		
	PR930	KW10			
Carbon steel / Alloy steel	★ 30-100	-	~0.03	~0.05	Coolant
Stainless Steel	★ 30-80	-	~0.02	~0.03	
Non-ferrous Metals	-	★ ~300	~0.05	~0.08	

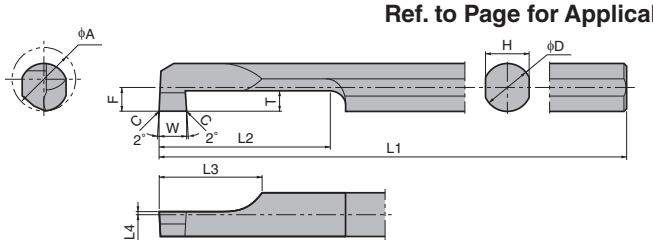
★: 1st Recommendation

PSG-S (Tip-Bars)

This insert will be switched to EZG.

Ref. to Page for Applicable Sleeves F84





• Right-hand shown

Dimensions

Description	Min. Bore Dia.	Dimension (mm)										PVD Coated Carbide		Carbide	
	φA	W±0.03	C	φD	H	L1	L2	L3	L4	F	T	PR930		KW10	
												R	L	R	L
PSGR/L 0510-60S	5	1.0	0.05	3.8	3.6	60	15	8	0.1	1.86	1.5			○	○
0520-60S		2.0	0.1											○	○
0610-70S	6	1.0	0.05	4.8	4.4	70	20		0.3	2.36	2.0	○	○	○	○
0620-70S		2.0	0.1									○	○	○	○
0710-70S	7	1.0	0.05	5.8	5.2	70	20	10		2.86		○	□	○	○
0720-70S		2.0	0.1									○	○	○	□
0810-80S	8	1.0	0.05	6.8	6.2	80	25			3.38		○	○	○	○
0820-80S		2.0	0.1									○	○	○	○

· Dimension T shows available grooving depth.

· Dimension L4 indicates the cutting edge is above the Tool's Center Position.

Recommended Cutting Conditions G103

● : Std. Item
○ : Check Availability
□ : Deleted from the next catalogue

Tip-Bars are sold in 1 piece boxes.

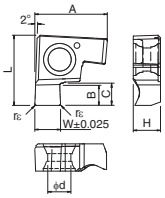
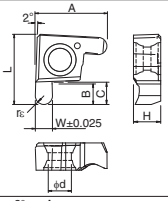
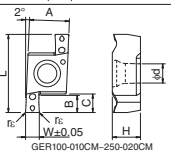
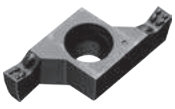
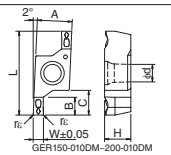
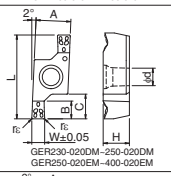
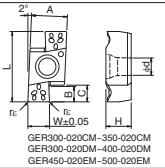
Applicable Inserts

(mm)

Description	A	L	H	ϕd
GE$^{R}_{L}$...-A	6.69	6.5	2.58	2.5
GER...-AR				
GE$^{R}_{L}$...-B	8.46	8.2	3.18	2.7
GER...-BR				
GER...-CM	5.8	11.48	4.05	2.8
GER...-DM	6.8	16.44	5.05	3.4
GER...-EM	9.54	21.66	5.55	4.4

		Cermet	MEGA COAT	PVD Coated Carbide	Carbide	
		TN6020	PR1225	PR1025	GW15	KW10
P	Carbon steel / Alloy steel	●	◔			
M	Stainless Steel	●	◔			
K	Cast Iron					◔
N	Non-ferrous Metals					●
S	Titanium Alloys					●
H	Hard materials (~40HRC)	●	○			
	Hard materials (40HRC~)					

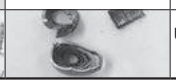
Classification of usage
- ●: Continuous-Light Interruption / 1st Choice
- ◔: Continuous-Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) W	B	C	rε	Cermet TN6020 R	L	MEGA COAT PR1225 R	L	PVD Coated Carbide PR1025 R	L	Carbide GW15 R	L	KW10 R	L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
2-edge		GE$^{R}_{L}$	100-005A	1.00	1.5	1.8	0.05	●	●	●	●	●	●			●	●	SIGE$^{R}_{L}$...A-EH SIGE$^{R}_{L}$...A-WH	G49 G50
			120-005A	1.20				●	●	●	●	●	●			●	●		
			125-005A	1.25				●	●	●	●	●	●			●	●		
			150-010A	1.50			0.1	●	●	●	●	●	●			●	●		
			200-010A	2.00				●	●	●	●	●	●			●	●		
		GE$^{R}_{L}$	100-005B	1.00	2.2	2.6	0.05	●	●	●	●	●	●			●	●	SIGE$^{R}_{L}$...B-EH SIGE$^{R}_{L}$...B-WH SIGER...B-WH-90	G49 G50 G51
			120-005B	1.20				●	●	●	●	●	●			●	●		
			125-005B	1.25				●	●	●	●	●	●			●	●		
			145-010B	1.45			0.1	●	●	●	●	●	●			●	●		
			150-010B	1.50				●	●	●	●	●	●			●	●		
			200-010B	2.00				●	●	●	●	●	●			●	●		
			250-020B	2.50			0.2	●	●	●	●	●	●			●	●		
			300-020B	3.00				●	●	●	●	●	●			●	●		
2-edge Full-R		GER	100-050AR	1.00	1.5	1.8	0.5			●		●				●		SIGER...A-EH SIGER...A-WH	G49 G50
			200-100AR	2.00			1.0			●		●				●			
		GER	100-050BR	1.00	2.2	2.6	0.5			●		●				●		SIGER...B-EH SIGER...B-WH SIGER...B-WH-90	G49 G50 G51
			200-100BR	2.00			1.0			●		●				●			
	 GER100-010CM–250-020CM	GER	150-010CM	1.50	2.5	2.7	0.1			●		●						SIGER...C-EH SIGER...C-WH SIGER...C-WH-90	
			200-010CM	2.00						●		●							
			250-020CM	2.50			0.2			●		●							
			300-020CM	3.00						●		●							
			350-020CM	3.50						●		●							
	 GER150-010DM–200-010DM GER150-010EM–200-010EM	GER	150-010DM	1.50	3.0	4.8	0.1			●		●						SIGER...D-EH	G49
			200-010DM	2.00	3.2					●		●							
			230-020DM	2.30			0.2			●		●							
			250-020DM	2.50						●		●							
			300-020DM	3.00	4.5					●		●							
			350-020DM	3.50						●		●							
			400-020DM	4.00						●		●							
	 GER230-020DM–250-020DM GER250-020EM–400-020EM	GER	150-010EM	1.50	3.0	6.8	0.1			●		●						SIGER...E-EH	
			200-010EM	2.00	3.2					●		●							
			250-020EM	2.50	4.5		0.2			●		●							
			300-020EM	3.00						●		●							
			350-020EM	3.50	5.5					●		●							
			400-020EM	4.00						●		●							
			450-020EM	4.50	6.5					●		●							
2-edge Molded Chipbreaker	 GER300-020CM–350-020CM GER300-020DM–400-020DM GER450-020EM–500-020EM		500-020EM	5.00						●		●							

· Dimension B shows available grooving depth.

Recommended Cutting Conditions ➡ G52

Comparison of Chip Control (Molded Chipbreaker)

Description \ f (mm/rev)	SCM415 (Bore Dia. ϕ16) 0.05	0.07	0.1	Evaluation
SIGER1612C-EH GER300-020CM (PR1025)				Good Chip Control
Competitor A Width : 3mm			Insert Fracture	Unstable Chip Control and biting
Competitor B Width : 3mm				Unstable Chip Control and biting

[Vc=100m/min, ap=2.0mm, Wet] (Internal evaluation)

● : Std. Item

Comparison of Chip Control (Min. Bore Dia.: ϕ8)

Description \ f (mm/rev)	SCM415 0.02	Evaluation
SIGER0808A-EH GER200-010A (PR1025)		✓
Competitor C Width : 2mm		Chipping

[Vc=50m/min, ap=1.25mm, Wet] (Internal evaluation)

Inserts are sold in 10 piece boxes.

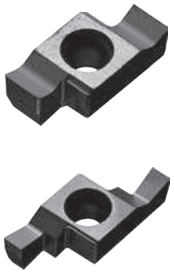
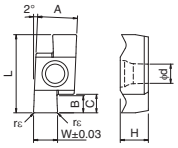
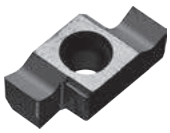
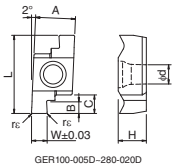
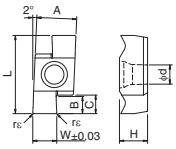
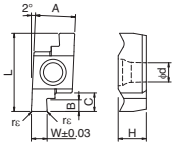
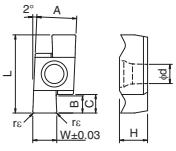
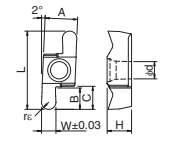
Applicable Inserts

(mm)

Description	A	L	H	ϕd
GE$^{R}_{L}$...-C	5.8	11.48	4.05	2.8
GER...-CR				
GE$^{R}_{L}$...-D	6.8	16.44	5.05	3.4
GER...-DR				
GE$^{R}_{L}$...-E	9.54	21.66	5.55	4.4

		Cermet	MEGA COAT	PVD Coated Carbide	Carbide	
		TN6020	PR1225	PR1025	GW15	KW10
P	Carbon steel / Alloy steel	●	◔	◔		
M	Stainless Steel	●	◔			
K	Cast Iron				◔	
N	Non-ferrous Metals				●	
S	Titanium Alloys				●	
H	Hard materials (~40HRC)	●	○			
	Hard materials (40HRC~)					

Classification of usage
- ●: Continuous-Light Interruption / 1st Choice
- ◔: Continuous-Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) W	B	C	rε	Cermet TN6020 R	Cermet TN6020 L	MEGA COAT PR1225 R	MEGA COAT PR1225 L	PVD Coated Carbide PR1025 R	PVD Coated Carbide PR1025 L	Carbide GW15 R	Carbide GW15 L	Carbide KW10 R	Carbide KW10 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
 2-edge		GE$^{R}_{L}$	100-005C	1.00	2.5	2.7	0.05	●	●	●	●	●	●	●	●			SIGE$^{R}_{L}$...C-EH SIGE$^{R}_{L}$...C-WH SIGER...C-WH-90	G49 G50 G51
			120-005C	1.20				●		●	●	●	●	●					
			125-005C	1.25				●	●	●		●	●	●	●				
			140-005C	1.40				●		●		●	●	●					
			145-010C	1.45			0.1	●	●	●		●	●	●	●				
			150-010C	1.50				●	●	●	●	●	●	●	●				
			170-010C	1.70				●		●		●	●	●					
			185-010C	1.85				●		●		●	●	●					
			195-010C	1.95				●		●		●	●	●					
			200-010C	2.00				●	●	●	●	●	●	●	●				
			250-020C	2.50			0.2	●	●	●	●	●	●	●	●				
			300-020C	3.00				●	●	●	●	●	●	●	●				
			350-020C	3.50				●	●	●		●	●	●	●				
	 GER100-005D-280-020D  GER300-020D-400-020D	GE$^{R}_{L}$	100-005D	1.00	2.5	4.8	0.05	●	●	●	●	●	●	●	●			SIGE$^{R}_{L}$...D-EH	G49
			140-005D	1.40				●		●	●	●	●	●					
			145-010D	1.45			0.10	●	●	●		●	●	●	●				
			150-010D	1.50	3.0			●	●	●	●	●	●	●	●				
			170-010D	1.70				●		●	●	●	●	●					
			185-010D	1.85				●				●	●	●					
			195-010D	1.95				●				●	●	●					
			200-010D	2.00	3.2			●	●	●	●	●	●	●	●				
			225-010D	2.25				●		●	●	●	●	●					
			230-020D	2.30			0.20	●	●	●	●	●	●	●	●				
			250-020D	2.50				●	●	●	●	●	●	●	●				
			275-020D	2.75				●				●	●	●					
			280-020D	2.80				●				●	●	●					
			300-020D	3.00				●	●	●	●	●	●	●	●				
			330-020D	3.30	4.5			●				●	●	●					
			350-020D	3.50				●	●	●		●	●	●	●				
			400-020D	4.00				●	●	●	●	●	●	●	●				
2-edge	 GER100-005E-430-020E  GER450-020E-500-020E	GE$^{R}_{L}$	100-005E	1.00	2.5	6.8	0.05	●	●	●	●	●	●	●	●			SIGE$^{R}_{L}$...E-EH	G49
			150-010E	1.50	3.0			●	●	●	●	●	●	●	●				
			170-010E	1.70				●		●	●	●	●	●					
			185-010E	1.85			0.1	●				●	●	●					
			195-010E	1.95				●				●	●	●					
			200-010E	2.00				●	●	●		●	●	●	●				
			225-010E	2.25	3.2			●		●		●	●	●					
			230-020E	2.30				●	●	●		●	●	●	●				
			250-020E	2.50				●	●	●	●	●	●	●	●				
			275-020E	2.75				●		●		●	●	●					
			280-020E	2.80	4.5			●		●	●	●	●	●					
			300-020E	3.00				●	●	●	●	●	●	●	●				
			330-020E	3.30				●		●		●	●	●					
			350-020E	3.50			0.2	●	●	●		●	●	●	●				
			400-020E	4.00	5.5			●	●	●		●	●	●	●				
			430-020E	4.30				●		●		●	●	●					
			450-020E	4.50				●	●	●		●	●	●	●				
			460-020E	4.60	6.5			●		●		●	●	●					
			500-020E	5.00				●	●	●		●	●	●	●				
2-edge Full-R		GER	200-100CR	2.00	2.5	2.7	1.0			●		●		●				SIGER...C-EH SIGER...C-WH SIGER...C-WH-90	G49 G50 G51
			250-125CR	2.50			1.25			●		●		●					
			300-150CR	3.00			1.5			●		●		●					
		GER	200-100DR	2.00	3.2	4.8	1.0			●		●		●				SIGER...D-EH	G49
			300-150DR	3.00	4.5		1.5			●		●		●					

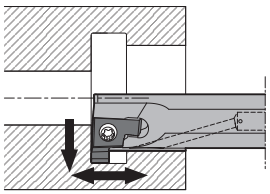
· Dimension B shows available grooving depth.

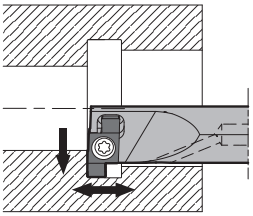
Recommended Cutting Conditions ➡G52

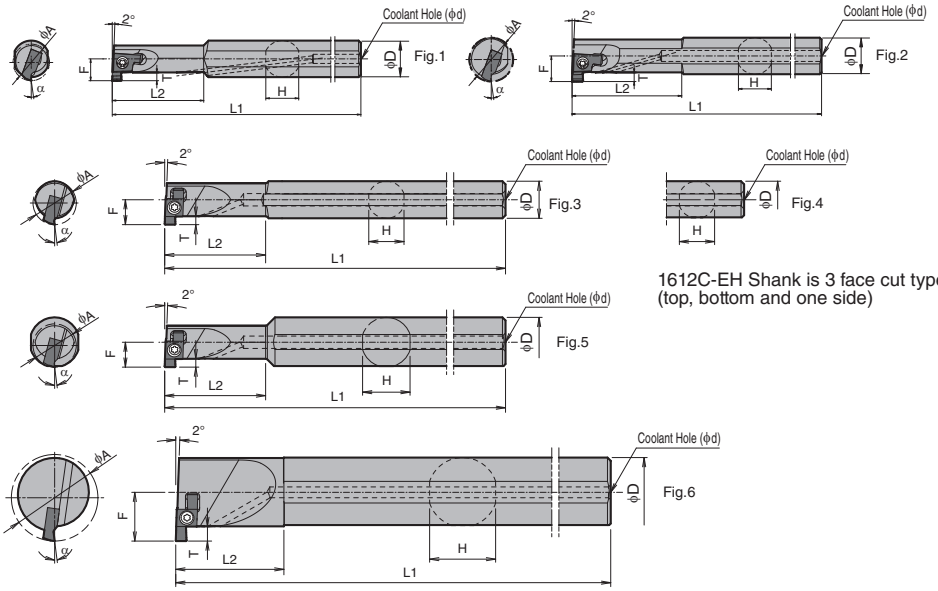
● : Std. Item

Inserts are sold in 10 piece boxes.

SIGE-EH Excellent Bar (with Coolant Hole)







1612C-EH Shank is 3 face cut type (top, bottom and one side)

• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

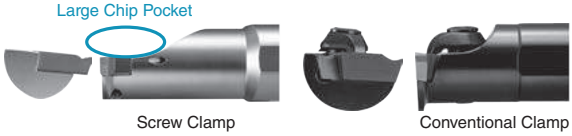
Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	T	ϕd	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench		Applicable Inserts ➔G47,G48
SIGE$^{R/L}$	0808A-EH	●	●	8	8	7.2	100	20	4.8	1.5	3	Fig.1	SB-2045TRN	FT-6	-	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR
	1010B-EH	●	●	10	10	9	125	25	6.2	2.2	3	Fig.1	SB-2255TR	-	DT-7	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR
	1210B-EH	●	●	12				30	7			Fig.2				
	1412C-EH	●	●	14	12	11.4	150	33	8	2.5	4	Fig.3	SB-2570TR	FT-8	-	GE$^{R/L}$100-005C~GE$^{R/L}$350-020C GER150-010CM~GER350020CM GER200-100CR~GER300-150CR
	1612C-EH	●	●	16				20	8.5			Fig.4				
	1616C-EH	●	●		16	15	160	36	9		5	Fig.5				
	2020D-EH	●	●	20	20	19	180	40	12.1	4.5	5		SB-3080TR	FT-10	-	GE$^{R/L}$100-005D~GE$^{R/L}$400-020D GER150-010DM~GER400-020DM GER200-100DR~GER300-150DR
	2525E-EH	●	●	25	25	24	200	45	15.6	6.5	5		SB-4085TR	FT-15	-	GE$^{R/L}$100-005E~GE$^{R/L}$500-020E GER150-010EM~GER500-020EM
	3232E-EH	●	●	32	32	30.4	220	55	19							
	4032E-EH	●	●	40			250	45	23			Fig.6				

· Dimension T shows available grooving depth. Available Groove Depth: "B" Dimension of Insert.

Features

● Large chip pocket screw clamp toolholder design enables excellent chip evacuation



Screw Clamp　　Conventional Clamp

● Cost effective chip control from a molded chipbreaker

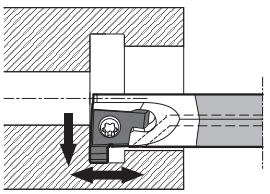
GER···M type

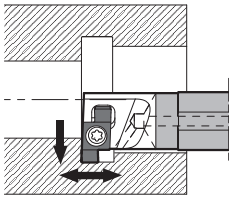
● Cutting edge is free from contact face

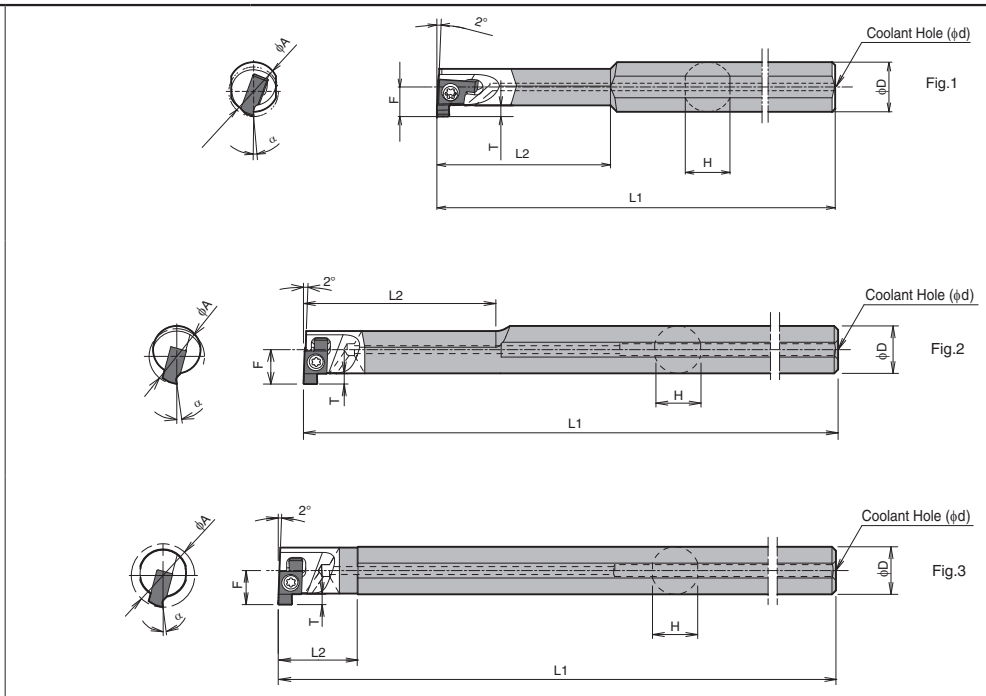
● An 8mm minimum bore diameter with a 2-edge design

● : Std. Item

SIGE-WH Carbide Shank Bar (with Coolant Hole)







• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	T	ϕd	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench FT	Spare Parts: Wrench DT	Applicable Inserts ➡G47, G48
SIGE[R/L] 0808A-WH	●	●	8	8	7.2	125	28	4.8	1.5	3	Fig.1	SB-2045TRN	FT-6	-	GE[R/L]100-005A~GE[R/L]200-010A GER100-050AR~GER200-100AR
1010B-WH	●	●	10	10	9	125	35	6.2	2.2	3	Fig.1	SB-2255TR	-	DT-7	GE[R/L]100-005B~GE[R/L]300-020B GER100-050BR~GER200-100BR
1210B-WH	●	●	12			140	45	7							
1412C-WH	●	●	14	12	11.4	150	50	8.7	2.5	4	Fig.2	SB-2570TR	FT-8	-	GE[R/L]100-005C~GE[R/L]350-020C GER150-010CM~GER350-020CM GER200-100CR~GER300-150CR
1612C-WH	●	●	16			180	20	8.5			Fig.3				

· Dimension T shows available grooving depth. Available Groove Depth: "B" Dimension of Insert.

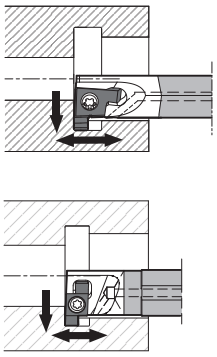
Applicable Insert & Rake Angle (α) after Installment of Insert

Toolholder Description	Applicable Insert & Rake Angle (α) after Installment of Insert: Ground Chipbreaker	α	Molded Chipbreaker	α
SIGE[R/L] 0808A-EH	GE[R/L]100-005A~GE[R/L]200-010A GER100-050AR~GER200-100AR	5°	-	-
1010B-EH, 1210B-EH	GE[R/L]100-005B~GE[R/L]300-020B GER100-050BR~GER200-100BR	5°	-	-
1412C-EH, 1612C-EH, 1616C-EH	GE[R/L]100-005C~GE[R/L]350-020C GER200-100CR~GER300-150CR	8°	GER150-010CM~GER350-020CM	10°
2020D-EH	GE[R/L]100-005D~GE[R/L]400-020D GER200-100DR~GER300-150DR	9°	GER150-010DM~GER400-020DM	10°
2525E-EH, 3232E-EH, 4032E-EH	GE[R/L]100-005E~GE[R/L]500-020E	10°	GER150-010EM~GER500-020EM	10°
SIGE[R/L] 0808A-WH	GE[R/L]100-005A~GE[R/L]200-010A GER100-050AR~GER200-100AR	5°	-	-
1010B-WH, 1210B-WH, 1008B-WH-90, 1210B-WH-90	GE[R/L]100-005B~GE[R/L]300-020B GER100-050BR~GER200-100BR	5°	-	-
1412C-WH, 1612C-WH, 1412C-WH-90	GE[R/L]100-005C~GE[R/L]350-020C GER200-100CR~GER300-150CR	8°	GER150-010CM~GER350-020CM	10°

α indicates the rake angle at the center of the edge width, after installing insert.

● : Std. Item

SIGE-WH-90 (For Automatic Lathe) Carbide Shank Bar (with Coolant Hole)



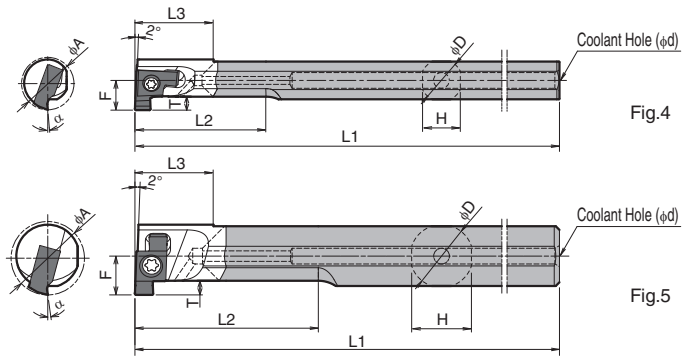


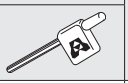
Fig.4

Fig.5

•Right-hand shown

Right-hand Insert for Right-hand Toolholder.

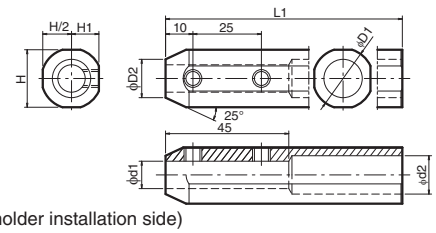
Toolholder Dimensions

Description		Std.	Min. Bore Dia.	Dimension (mm)								Drawing	Spare Parts		Applicable Inserts ➡G47, G48
													Clamp Screw	Wrench	
			φA	φD	H	L1	L2	*L3	F	T	φd				
SIGER	1008B-WH-90	●	10	8	7.2	90	25	15	5.6	2.2	3	Fig.4	SB-2255TR	FT-7	GER100-005B~GER300-020B GER100-050BR~GER200-100BR
	1210B-WH-90	●	12	10	9.4		30		6.6						
	1412C-WH-90	●	14	12	11.4	90	35	15	7.4	2.5	3	Fig.5	SB-2570TR	FT-8	GER100-005C~GER350-020C GER150-010CM~GER350-020CM GER200-100CR~GER300-150CR

*Dimension L3 shows minimum overhang length.

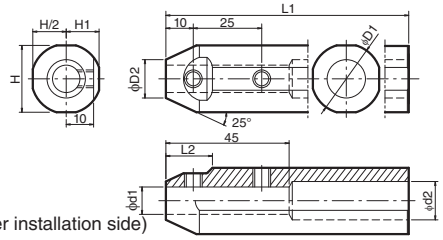
· Ref. to Page ➡G50 for Applicable Insert & Rake Angle (α) after Installment of Insert.

Applicable Sleeves



(Toolholder installation side)

Fig.1



(Toolholder installation side)

Fig.2

Description		Std.	Dimension (mm)							Drawing	Spare Parts		Applicable Machine Manufacturer
											Screw	Wrench	
			φd1	φD1	φD2	φd2	H	H1	L1	L2				
SHA	0820-120	●	8	20	14	12	19	9.25	120	-	Fig.1	HS6X4P	LW-3	Eguro Tsugami Citizen Machinery
	1020-120	●	10											
SHA	0825.0-135	●	8	25	14	14	24	11.5	135	17	Fig.2			
	1025.0-135	●	10											
	1225.0-135	●	12		16									
SHA	0819-120	●	8	19.05	14	12	18	8.75	120	-	Fig.1	HS6X4P	LW-3	Citizen Machinery
	1019-120	●	10											
SHA	0820-120	●	8	20	14	12	19	9.25	120	-	Fig.1			
	1020-120	●	10											
SHA	0825.4-120	●	8	25.4	14	14	24.4	12	120	17	Fig.2			
	1025.4-120	●	10											
	1225.4-120	●	12		16									
SHA	0822-125	●	8	22	14	14	21	10	125	-	Fig.1	HS6X4P	LW-3	Star Micronics Nomura DS
	1022-125	●	10											
	1222-125	●	12		16									
SHA	0823-120	●	8	23	14	14	22	10.5	120	16	Fig.2	HS6X4P	LW-3	Nomura DS
	1023-120	●	10											
	1223-120	●	12		16									

* Length of φd1...45mm (All of SHA sleeves)

· Choose sleeves (φd1) to meet with φD dimension of toolholder.

· Machine manufacturers in random order.

● : Std. Item

◆ Recommended Cutting Conditions (Ground Chipbreaker: GE$^{R/L}$…A(R), GE$^{R/L}$…B(R))

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)				(1) f for Grooving (mm/rev)			Remarks
	Cermet	MEGACOAT	PVD Coated Carbide	Carbide	(2) f for Turning (mm/rev)			
	TN6020	PR1225	PR1025	KW10	(3) ap for Turning (mm)			
					GE$^{R/L}$ 100~200-010A 100~200-100AR	GE$^{R/L}$ 100~200-010B 100~200-100BR	GE$^{R/L}$ 250~300-020B	
Carbon Steel	☆ 50~80	★ 50~80	☆ 50~80	-	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	Coolant
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Alloy Steel	☆ 50~80	★ 50~80	☆ 50~80	-	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Stainless Steel	-	★ 50~80	☆ 50~80	-	(1) 0.01~0.03	(1) 0.01~0.03	(1) 0.01~0.03	
					(2) 0.01~0.03	(2) 0.01~0.03	(2) 0.01~0.03	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Cast Iron	-	-	-	★ 50~80	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Aluminum	-	-	-	★ 50~100	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.1	(3) Max. 0.1	(3) Max. 0.2	
Brass	-	-	-	★ 50~100	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.1	(3) Max. 0.1	(3) Max. 0.2	

* Use PVD coated grade or carbide for turning with edge width 1mm. (GE$^{R/L}$100-005A / 100-005B)

★: 1st Recommendation ☆: 2nd Recommendation

◆ Recommended Cutting Conditions (Ground Chipbreaker: GE$^{R/L}$…C(R), GE$^{R/L}$…D(R), GE$^{R/L}$…E)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)				(1) f for Grooving (mm/rev)							Remarks
	Cermet	MEGACOAT	PVD Coated Carbide	Carbide	(2) f for Turning (mm/rev)							
	TN6020	PR1225	PR1025	GW15	(3) ap for Turning (mm)							
					GE$^{R/L}$ 100~200-010C 200-100CR	GE$^{R/L}$ 250~350-020C 250~300-150CR						
					GE$^{R/L}$ 100~145-010D	GE$^{R/L}$ 150~195-010D	GE$^{R/L}$ 200~280-020D 200-100DR		GE$^{R/L}$ 300~400-020D 300-150DR			
					GE$^{R/L}$ 100-010E	GE$^{R/L}$ 150~195-010E	GE$^{R/L}$ 200~225-010E 230-020E	GE$^{R/L}$ 250~330-020E		GE$^{R/L}$ 350~430-020E	GE$^{R/L}$ 450~500-020E	
Carbon Steel	☆ 120~180	★ 60~140	☆ 60~140	-	(1) 0.03~0.08	(1) 0.03~0.08	(1) 0.04~0.09	(1) 0.04~0.09	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	Coolant
					(2) 0.03~0.08	(2) 0.03~0.08	(2) 0.04~0.09	(2) 0.04~0.09	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Alloy Steel	☆ 100~160	★ 60~120	☆ 60~120	-	(1) 0.03~0.07	(1) 0.03~0.07	(1) 0.04~0.08	(1) 0.04~0.08	(1) 0.05~0.1	(1) 0.05~0.1	(1) 0.05~0.1	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.08	(2) 0.04~0.08	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Stainless Steel	☆ 70~130	★ 60~110	☆ 60~110	-	(1) 0.03~0.07	(1) 0.03~0.07	(1) 0.04~0.08	(1) 0.04~0.08	(1) 0.05~0.1	(1) 0.05~0.1	(1) 0.05~0.1	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.08	(2) 0.04~0.08	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Cast Iron	-	-	-	★ 60~100	(1) 0.03~0.08	(1) 0.03~0.08	(1) 0.04~0.09	(1) 0.04~0.09	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	
					(2) 0.03~0.08	(2) 0.03~0.08	(2) 0.04~0.09	(2) 0.04~0.09	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Aluminum	-	-	-	★ 150~300	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.15	(1) 0.05~0.15	(1) 0.08~0.15	(1) 0.08~0.15	(1) 0.08~0.15	
					(2) 0.05~0.12	(2) 0.05~0.12	(2) 0.05~0.15	(2) 0.05~0.15	(2) 0.08~0.15	(2) 0.08~0.15	(2) 0.08~0.15	
					(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.8	(3) Max. 0.8	(3) Max. 0.8	
Brass	-	-	-	★ 100~250	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.15	(1) 0.05~0.15	(1) 0.08~0.15	(1) 0.08~0.15	(1) 0.08~0.15	
					(2) 0.05~0.12	(2) 0.05~0.12	(2) 0.05~0.15	(2) 0.05~0.15	(2) 0.08~0.15	(2) 0.08~0.15	(2) 0.08~0.15	
					(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.8	(3) Max. 0.8	(3) Max. 0.8	

* Use PVD coated grade or carbide for turning with edge width 1mm. (GE$^{R/L}$100-010C / 100-010D / 100-010E)

★: 1st Recommendation ☆: 2nd Recommendation

◆ Recommended Cutting Conditions (Molded Chipbreakers: GER…CM, GER…DM, GER…EM)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)				(1) f for Grooving (mm/rev)						Remarks
	Cermet	MEGACOAT	PVD Coated Carbide	Carbide	(2) f for Turning (mm/rev)						
	TN6020	PR1225	PR1025	GW15	(3) ap for Turning (mm)						
					GER 150~200-010CM	GER 250~350-020CM					
					GER 150~200-010DM		GER 230~250-020DM	GER 300~400-020DM			
					GER 150~200-010EM			GER 250~300-020EM	GER 350~400-020EM	GER 450~500-020EM	
Carbon Steel	-	★ 60~160	☆ 60~160	-	(1) 0.03~0.1	(1) 0.03~0.12	(1) 0.04~0.12	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	Coolant
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.1	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max.1.0	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	
Alloy Steel	-	★ 60~140	☆ 60~140	-	(1) 0.03~0.1	(1) 0.03~0.1	(1) 0.04~0.12	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.1	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max.1.0	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	
Stainless Steel	-	★ 60~110	☆ 60~110	-	(1) 0.03~0.08	(1) 0.03~0.08	(1) 0.04~0.08	(1) 0.05~0.1	(1) 0.05~0.1	(1) 0.05~0.1	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.1	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max.1.0	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	(3) Max.1.5	

★: 1st Recommendation ☆: 2nd Recommendation

Insert for Small Dia. Internal Grooving

Applicable Inserts (GIV / GIV-E / GIV-W)

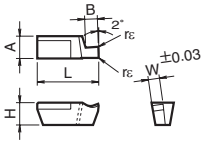
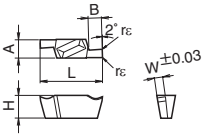
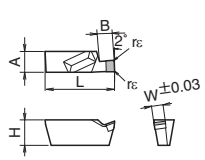
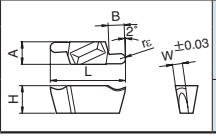
(mm)

Description	A	L	H
GV$^{R/L}$...SS	3.6	9	3.0
GV$^{R/L}$...S	4.0	11	4.0
GV$^{R/L}$...A	4.0	12	5.0
GV$^{R/L}$...B	4.5	15	5.5
GV$^{R/L}$...C	5.8	21	6.5

Classification of usage

●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		TN90		TC40N		TC60M		MEGA COAT PR1225		PVD Coated Carbide PR930		Carbide KW10		PCD KPD010	
P	Carbon steel / Alloy steel							●		◔					
M	Stainless Steel							●		◔					
K	Cast Iron											◔			
N	Non-ferrous Metals											●		●	
S	Titanium Alloys											●		●	
H	Hard materials (~40HRC)							○		○					
	Hard materials (40HRC~)														

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) W	B	rε	Cermet TN90 R	TN90 L	TC40N R	TC40N L	TC60M R	TC60M L	MEGA COAT PR1225 R	PR1225 L	PVD Coated Carbide PR930 R	PR930 L	Carbide KW10 R	KW10 L	PCD KPD010 R	KPD010 L	Applicable Toolholders
1-edge		GV$^{R/L}$	100-020SS	1.00	2.3	0.2	●				●		●	●	●		●	●			GIV$^{R/L}$...1SS
			125-020SS	1.25			●				●		●	●	●		●	●			
			145-020SS	1.45			●				●		●	●	●	●	●	●			
			200-020SS	2.00			●				●		●	●	●		●	●			
			250-020SS	2.50			●				●		●	●	●		●	●			
			300-020SS	3.00			●				●		●	●	●	●	●	●			
		GV$^{R/L}$	100-020S	1.00	2.3	0.2	●		●	●	●		●	●	●	●	●	●			GIV$^{R/L}$...1S GIV$^{R/L}$...1SE
			125-020S	1.25			●		●	●	●		●		●		●	●			
			145-020S	1.45			●		●	●	●		●		●		●	●			
			185-020S	1.85			●		●	●	●		●		●		●	●			
			200-020S	2.00			●		●	●	●		●	●	●	●	●	●			
			250-020S	2.50			●		●	●	●		●	●	●		●	●			
			340-020S	3.40					●	●	●		●		●		●	●			
2-edge		GV$^{R/L}$	100-020A	1.00	2.3	0.2	●		●	●	●	●	●	●	●	●	●	●			GIV$^{R/L}$...1A GIV$^{R/L}$...1AE GIV$^{R/L}$...1AW
			125-020A	1.25			●		●	●	●	●	●	●	●		●	●			
			145-020A	1.45			●		●	●	●	●	●	●	●		●	●			
			185-020A	1.85			●		●	●	●	●	●	●	●		●	●			
			200-020A	2.00			●	●	●	●	●	●	●	●	●	●	●	●			
			250-020A	2.50			●		●	●	●	●	●	●	●		●	●			
			300-020A	3.00			●		●	●	●	●	●		●		●	●			
			340-020A	3.40			●		●	●	●		●		●		●	●			
		GV$^{R/L}$	145-020B	1.45	2.8	0.2	●		●	●	●	●	●	●	●	●	●	●			GIV$^{R/L}$...1B GIV$^{R/L}$...1BE GIV$^{R/L}$...1BW
			185-020B	1.85			●		●	●	●	●	●		●		●				
			200-020B	2.00	3.2		●	●	●	●	●	●	●	●	●	●	●	●			
			230-020B	2.30			●	●	●	●	●	●	●	●	●	●	●				
			250-020B	2.50			●		●	●	●	●	●	●	●	●	●	●			
			280-020B	2.80			●		●	●	●	●	●		●		●				GIV$^{R/L}$...2B GIV$^{R/L}$...2BE GIV$^{R/L}$...2BW
			300-020B	3.00			●	●	●	●	●	●	●	●	●	●	●	●			
			340-020B	3.40	4.2		●		●	●	●		●		●		●				
			400-020B	4.00			●		●	●	●		●		●		●	●			
		GV$^{R/L}$	280-020C	2.80	4.5	0.2	●	●	●	●	●	●	●	●	●		●	●			GIV$^{R/L}$...1C GIV$^{R/L}$...1CE GIV$^{R/L}$...1CW
			300-020C	3.00			●	●	●	●	●	●	●	●	●	●	●	●			
			340-020C	3.40	5.5		●		●	●	●	●	●	●	●	●	●	●			
			400-020C	4.00			●	●	●	●	●	●	●	●	●	●	●	●			GIV$^{R/L}$...2C GIV$^{R/L}$...2CE GIV$^{R/L}$...2CW
			430-020C	4.30	6.3		●		●	●	●	●	●		●		●	●			
			460-020C	4.60					●	●	●	●	●		●		●	●			
			500-020C	5.00			●		●	●	●	●	●	●	●	●	●	●			
1-edge		GV$^{R/L}$	145-020A	1.45	2.3	0.2													●	MTO	GIV$^{R/L}$...1A GIV$^{R/L}$...1AE GIV$^{R/L}$...1AW
			200-020A	2.00															●	MTO	
			300-020A	3.00															MTO	MTO	
		GV$^{R/L}$	200-020B	2.00	3.2	0.2													●	MTO	GIV$^{R/L}$...1B GIV$^{R/L}$...1BE GIV$^{R/L}$...1BW
			250-020B	2.50															●	MTO	
			300-020B	3.00	4.2														MTO	MTO	GIV$^{R/L}$...2B□
		GV$^{R/L}$	300-020C	3.00	4.5	0.2													MTO	MTO	GIV$^{R/L}$...1C□
			400-020C	4.00	5.5														MTO	MTO	GIV$^{R/L}$...2C□
2-edge Full-R		GV$^{R/L}$	200-100AR	2.00	2.3	1.00					●		●	●	●	●	●				GIV$^{R/L}$...1A GIV$^{R/L}$...1AE GIV$^{R/L}$...1AW
			250-125AR	2.50		1.25					●		●		●		●				
			300-150AR	3.00		1.50					●		●		●		●				
		GV$^{R/L}$	200-100BR	2.00	3.2	1.00	●				●		●		●		●				GIV$^{R/L}$...1B□
			300-150BR	3.00	4.2	1.50	●				●		●		●		●				GIV$^{R/L}$...2B□

· Dimension B shows available grooving depth.

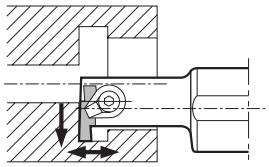
Recommended Cutting Conditions ➡G104
Ref. to Page for Applicable Toolholders ➡G55

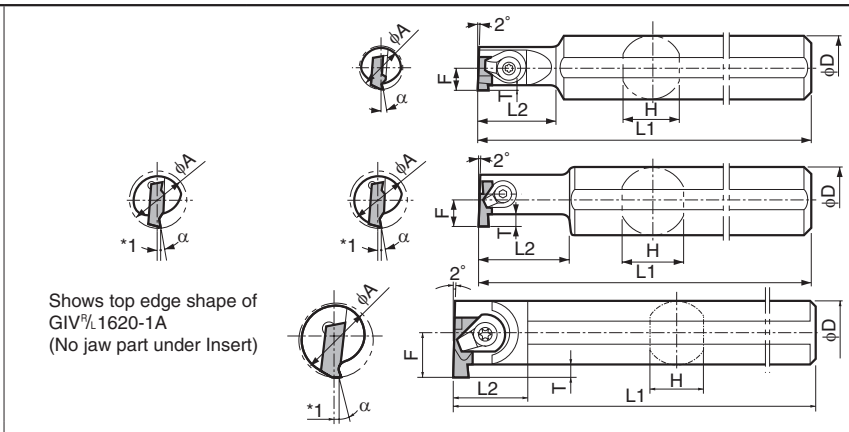
● : Std. Item
MTO : Made to order

Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

GIV



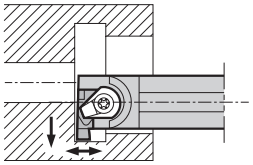


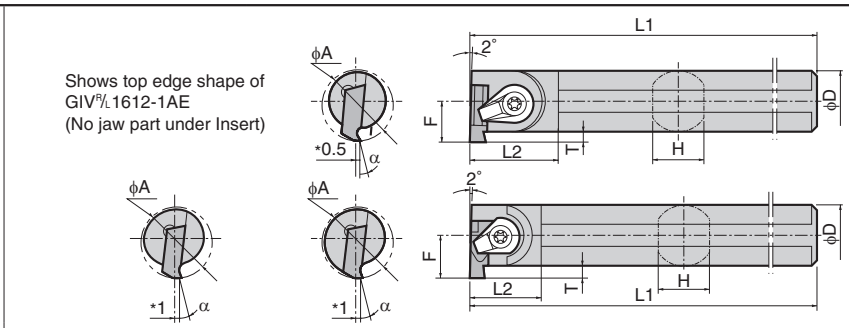
Shows top edge shape of GIV$^{R}_{L}$1620-1A (No jaw part under Insert)

• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

GIV-E Excellent Bar



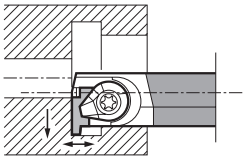


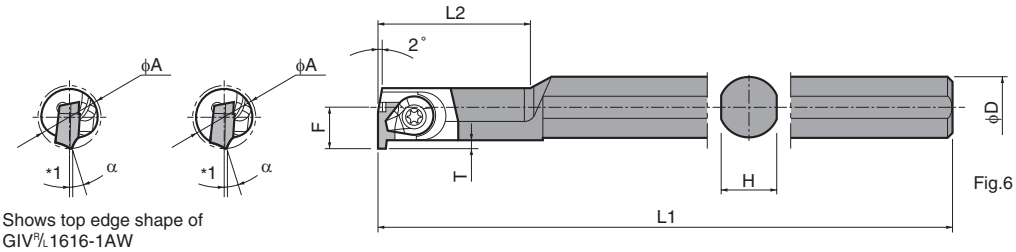
Shows top edge shape of GIV$^{R}_{L}$1612-1AE (No jaw part under Insert)

• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

GIV-W Carbide Shank Bar





Shows top edge shape of GIV$^{R}_{L}$1616-1AW (No jaw part under Insert)

• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Applicable Insert & Rake Angle (α) after Installment of Insert

Toolholder Description	Insert Description ➔G53		Rake Angle (α)	
	General Grooving (Square)	Full-R Grooving (Round)	TC40N	TN90, TC60M PR930, PR1225 KW10
GIV$^{R}_{L}$…1SS	GV$^{R}_{L}$100~300-020SS	-	10°	15°
GIV$^{R}_{L}$…1S	GV$^{R}_{L}$100~340-020S	-	10°	15°
GIV$^{R}_{L}$…1SE	GV$^{R}_{L}$100~340-020S	-	3°	8°
GIV$^{R}_{L}$…1A(□)	GV$^{R}_{L}$100~340-020A	GV$^{R}_{L}$200-100AR~300-150AR	3°	8°
GIV$^{R}_{L}$…1B(□)	GV$^{R}_{L}$145~250-020B	GV$^{R}_{L}$200-100BR	4°	9°
GIV$^{R}_{L}$…2B(□)	GV$^{R}_{L}$280~400-020B	GV$^{R}_{L}$300-150BR		
GIV$^{R}_{L}$…1C(□)	GV$^{R}_{L}$280~340-020C	-	5°	10°
GIV$^{R}_{L}$…2C(□)	GV$^{R}_{L}$400~500-020C	-		

* GIV, GIV-E and GIV-W are designed to set the cutting edge height 1mm above the center height. (0.5mm for GIV$^{R}_{L}$1612-1AE)

● Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	T	Drawing	Spare Parts: Clamp Set	Spare Parts: Clamp Set	Spare Parts: Wrench	Spare Parts: Wrench	Ref. to Page for Applicable Inserts
GIV$^{R}_{L}$	1216-1SS	●	●	12	16	15	150	20	6.0	2.2	Fig.1	CPS-4V	-	FT-10	-	G53
	1420-1S	●	●	14	20	19	150	24	7.0	2.2	Fig.1	CPS-5F	-	FT-15	-	
	1620-1A	●	●	16	20	19	160	28	8.0	2.2	Fig.2	CPS-5V	-	FT-15	-	
	2025-1B	●	●	20	25	23	180	35	10.0	Note 1) 2.8	Fig.2	CPS-5V	-	FT-15	-	
	2025-2B	●	●							Note 2) 3.2						
	2532-1C	●	●	25	32	30	200	43	12.5	Note 3) 4.5	Fig.2	-	CPS-6V	-	LW-3	
	3232-1C	●	●	32			220	52	16.0							
	4032-1C	●	●	40			250	43	21.0		Fig.3					
	2532-2C	●	●	25	32	30	200	43	12.5	Note 4) 5.5	Fig.2					
	3232-2C	●	●	32			220	52	16.0							
	4032-2C	●	●	40			250	43	22.2		Fig.3					
GIV$^{R}_{L}$	1412-1SE	●	●	14	12	11.4	150	18	7.7	1.7	Fig.4	CPS-5F	-	FT-15	-	
	1612-1AE	●	●	16	12	11.4	150	19	8.2	2.2	Fig.5	CPS-5V	-	FT-15	-	
	2016-1BE	●	●	20	16	15.2	180	20	11.2	Note 1) 2.8	Fig.5	CPS-5V	-	FT-15	-	
	2016-2BE	●	●					19	11.7	Note 5) 3.2						
	2520-1CE	●	●	25	20	19	200	25	14.5	Note 6) 4.5	Fig.5	-	CPS-6V	-	LW-3	
	3225-1CE	●	●	32	25	24	220	24	17.5	Note 7) 4.5						
	4032-1CE	●	●	40	32	31	240	29	21.0	Note 7) 4.5						
	2720-2CE	●	●	27	20	19	200	25	16.2	Note 4) 5.5						
	3225-2CE	●	●	32	25	24	220	24	18.7							
	4032-2CE	●	●	40	32	31	240	29	22.2							
GIV$^{R}_{L}$	1616-1AW	●	●	16	16	15	175	48	10.6	2.2	Fig.6	CPS-5V	-	FT-15	-	
	2020-1BW	●	●	20	20	19	220	60	14.6	Note 1) 2.8	Fig.6	CPS-5V	-	FT-15	-	
	2020-2BW	●	●							Note 2) 3.2						
	2525-1CW	●	●	25	25	24	260	70	19.1	Note 3) 4.5	Fig.6	-	CPS-6V	-	LW-3	
	2525-2CW	●	●							Note 4) 5.5						

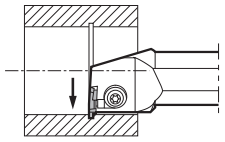
· Dimension T shows available grooving depth.

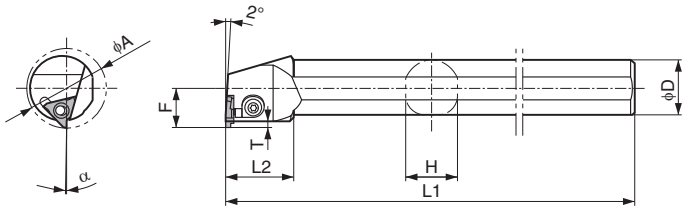
Note 1: GV$^{R}_{L}$200~250-020B Insert can be used up to a Groove Depth 3.2mm.
Note 2: GV$^{R}_{L}$300~400-020B Insert can be used up to a Groove Depth 4.2mm.
Note 3: GV$^{R}_{L}$340-020C Insert can be used up to a Groove Depth 5.5mm.
Note 4: GV$^{R}_{L}$430~500-020C Insert can be used up to a Groove Depth 6.3mm.
Note 5: GV$^{R}_{L}$300~400-020B Insert can be used up to a Groove Depth 3.8mm. (When using GIV$^{R}_{L}$2016-2BE)
Note 6: GV$^{R}_{L}$340-020C Insert can be used up to a Groove Depth 4.7mm. (When using GIV$^{R}_{L}$2520-1CE)
Note 7: GV$^{R}_{L}$340-020C Insert can be used up to a Groove Depth 5.3mm. (When using GIV$^{R}_{L}$3225-1CE, GIV$^{R}_{L}$4032-1CE)
If you need any of insert groove depth specified in notes 1 to 7, modify the dimension T of toolholder.

● : Std. Item

Internal Shallow Grooving Toolholders

KIGBA





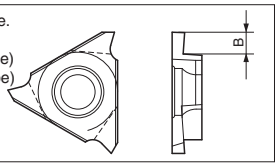
•Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	*T	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts ➡G6~G8
KIGBA R/L	3525-16	●	●	35	25	23	220	30	17.5	2.8	LGBA-16L/RS	FT-15	GBA32L/R type
	4032-22	●	●	40	32	30	250	30	23.0	3.0	LGBA-22L/RS	FT-15	GBA43L/R type

*Dimension T shows the distance from the toolholder to the cutting edge.
Available Grooving Depth depends on the insert.
KIGBA R/L 3525-16: Dimension B of the applicable insert (GBA32 type)
4032-22: Dimension B of the applicable insert (GBA43 type)
1. 2.0mm (Dimension B < 2.8mm)
2. 2.8mm (Dimension B ≥ 2.8mm)



· Clamp Set : LGBA-○○ LS for Right-hand Toolholder, and LGBA-○○ RS for Left-hand Toolholder.

Rake Angle (α) after Installment of GBA type

GBA32R/L○○○-○○○		GBA43R/L○○○-○○○		GBA43R/L○○○-○○○R (Full-R)		
α	Insert Grades	α	Insert Grades	α	Insert Grades	Full-R Description
+1°	TN620, TN90, PV7040, PR930 PR1115, PR1215, PR905 KPD001, KPD010	-9°	KBN510, KBN525	+1°	TN620, TN90, PV7040, PR930 PR1115, PR1215, PR905	050R~150R
		+1°	TN620, TC40N, TN90, PV7040 PR930, PR1115, PR1215, PR905 KPD001, KPD010	+5°	TN620, TN90, PV7040, PR930 PR1115, PR1215, PR905	200R
+11°	KW10	+11°	KW10		KW10	050R~200R

Rake Angle (α) after Installment of GBA-GM type

α	Insert Description
+1°	GBA43R/L150-020GM
+6°	GBA43R/L175-020GM ≀ GBA43R/L265-030GM
+3°	GBA43R/L300-030GM ≀ GBA43R/L400-040GM

α indicates the rake angle at the center of the edge width, after installing insert.

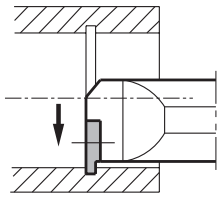
Rake Angle (α) after Installment of GBA-MY type

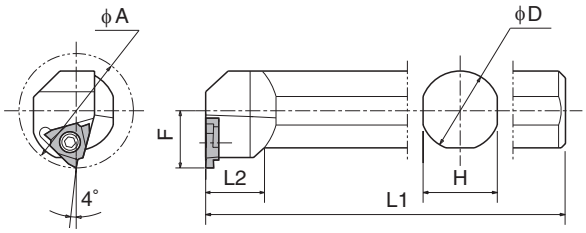
α	Insert Description
+6°	GBA43R/L175-020MY ≀ GBA43R/L350-030MY
+5°	GBA43R/L400-040MY

α indicates the rake angle at the center of the edge width, after installing insert.

● : Std. Item

KITG (Will be switched to KIGBA G56)





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	Spare Parts: Clamp Screw		Wrench	
KITG R/L	3525T-16	●	●	35	25	23	220	18	17.5	SB-4TR	-	FT-15	-
	4532T-22	●	●	45	32	30	250	20	22.5	-	GS-50	-	LW-3

· Available Grooving Depth: KITG R/L 3525T-16=2.0mm, KITG R/L 4532T-22=2.5mm

* KITG will be switched to KIGBA as an Internal Shallow Grooving Toolholder; however, it will continue to be sold as Internal Threading Toolholder (J23).
· GBA Insert cannot be installed to this toolholder.

Applicable Inserts

(TG insert will be switched to GBA G6~G8)

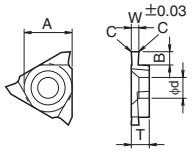
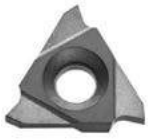
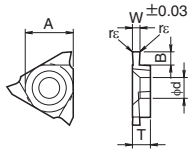
(mm)

Description	A	T	ϕd
TG32_	9.525	3.18	4.5
TG43_	12.70	4.76	5.5

P	Carbon steel / Alloy steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metals	
S	Titanium Alloys	
H	Hard materials (~40HRC)	
	Hard materials (40HRC~)	

Classification of usage

●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) W	B	C or rε	Cermet TN60 R	TN60 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
General (Square) (Corner is Chamfered) TG32 type	 (Corner is Chamfered)	TG32 R/L	075	0.75	2.0	C0.1	○	○	KITG R/L...16	G57
			095	0.95			○	○		
			125	1.25			○	○		
			145	1.45			○	○		
			150	1.50			○	○		
			175	1.75			○	○		
			200	2.00			○	○		
		TG43 R/L	150	1.50	3.5	0.2	○	○	KITG R/L...22	G57
			175	1.75			○	○		
			200	2.00			○	○		
			230	2.30			○	○		
			250	2.50	4.0	0.3	○	○		
			265	2.65			○	○		
			280	2.80			○	○		
			300	3.00			○	○		
			330	3.30			○	○		
General (Square) (Corner is R shape) TG43 type			350	3.50	5.0		○	○		
			400	4.00		0.4	○	○		
			430	4.30			○	○		
			450	4.50			○	○		

· Dimension B shows available grooving depth.

Recommended Cutting Conditions G102

* KITG will be switched to KIGBA.
* For applicable insert, TG insert will be switched to GBA.
Change Insert Grade TN60 for TN90.
There are various types of GBA insert grades available dependent on the user's cutting condition requirements.
* Check the corner-R(rε) of the insert when changing.

● : Std. Item
○ : Check Availability

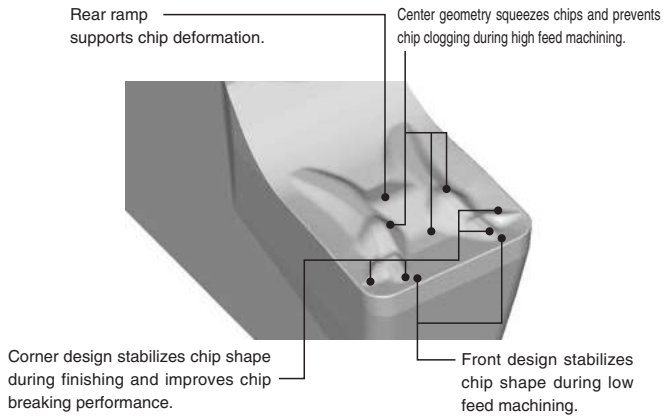
Inserts are sold in 10 piece boxes.

KGDI

Stable Machining with Excellent Chip Control and Smooth Chip Evacuation

Point 1 Excellent Chip Control with GMI Chipbreaker for Internal Grooving

Evenly breaks chips in various cutting conditions with newly designed chipbreaker geometry.
Good chip control even in finishing applications with small depths of cut.



● **Comparison of Chip Control** (Internal evaluation)

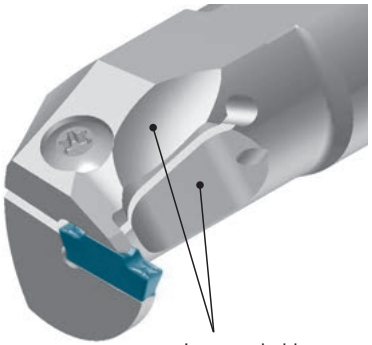
GMI Chipbreaker | Competitor A | Conventional product F

Smooth chip control with stable chip shape compared with Competitor A and Conventional F.
Prevents frequent machine stops caused by tangled chips.

Cutting Conditions : Vc=100m/min, f=0.07mm/rev Toolholder : KGDIR3225B-3
Insert : GDM3015N-040GMI Workpiece Material : SCr420

Point 2 Smooth Chip Evacuation by Creating Chip Pocket

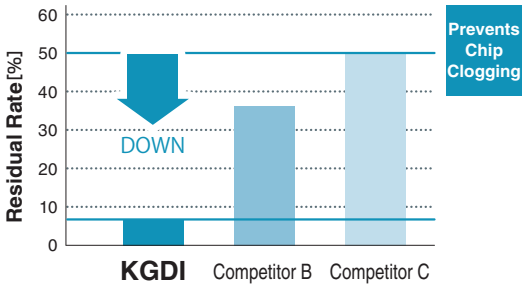
Smooth chip evacuation when grooving and finishing.



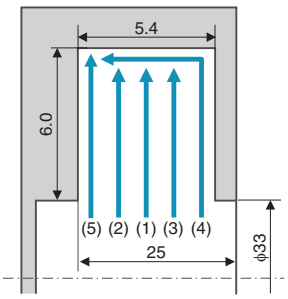
Improved chip evacuation by innovation chip pockets

Cutting Conditions : Vc=100m/min
(1) : ap=3mm, (2)(3) : ap=1mm, (4)(5) : ap=0.2mm
f=0.08mm/rev
Toolholder : KGDIR3225B-3
Insert : GDM3015N-040GMI
Workpiece Material : SCM415

● **Residual Chips** (Internal evaluation)



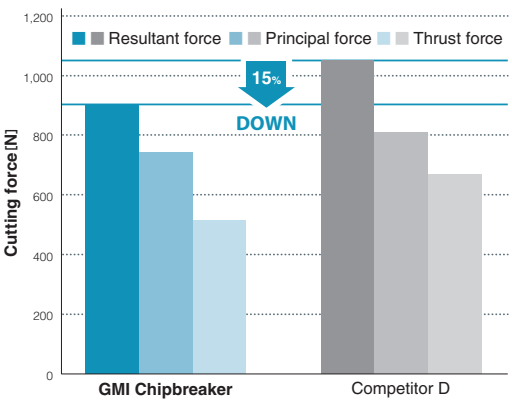
Chips remaining in machined bore were greatly reduced compared with Competitor B and C.



Point 3 Low Cutting Forces and Stable Machining

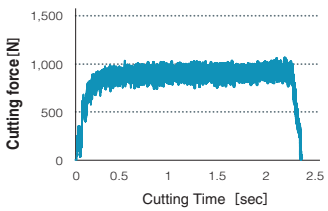
GMI chipbreaker prevents chip clogging and reduces cutting forces.

● **Comparison of Cutting force** (Internal evaluation)



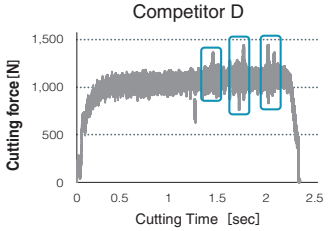
Cutting Conditions : Vc=150m/min, f=0.1mm/rev
Toolholder : KGDIR3225B-3 Insert : GDM3015N-040GMI
Workpiece Material : SCM415

GMI Chipbreaker



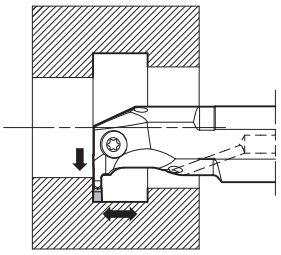
Stable machining
with few changes in cutting force.

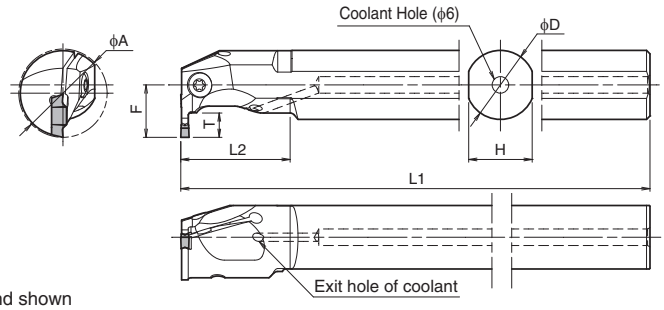
Competitor D



Instantaneous increase of cutting force due to clogged chips.

KGDI





•Right-hand shown

Toolholder Dimensions

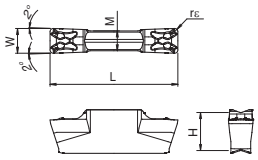
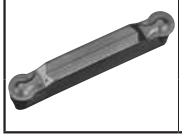
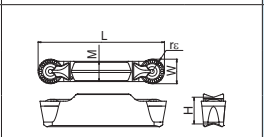
Description		Std. R	Std. L	Min. Bore Dia. ϕA with GMI	Min. Bore Dia. ϕA with CM	ϕD	H	L1	L2	F	T	Edge Width W (mm) MIN.	Edge Width W (mm) MAX.	Spare Parts: Clamp Screw		Spare Parts: Wrench	
KGDI$^{R}_{L}$	1816B-2	●	●	18	–	16	15	150	25	9.5	4.5	2.0	2.0	GS-50	—	LW-3	—
	2520B-2	●	●	25		20	18	180	30	14.5	6						
	3225B-2	●	●	32		25	23	200	40	19	7			—	SB-5TR	—	LTW-20
KGDI$^{R}_{L}$	2016B-3	●	●	20	21	16	15	150	25	11.5	5.5	3.0	3.0	GS-50	—	LW-3	—
	2520B-3	●	●	25	26	20	18	180	30	14.5	6						
	3225B-3	●	●	32	33	25	23	200	40	19	8			—	SB-5TR	—	LTW-20
KGDI$^{R}_{L}$	3225B-4	●	●	32	40 (34*)	25	23	200	40	19	8.5	4.0	5.0	—	SB-5TR	—	LTW-20
	4032B-4	●	●	40	48 (42*)	32	29	220	50	23.5	11						
KGDI$^{R}_{L}$	3225B-5	●	●	32	37 (34*)	25	23	200	40	19	8.5	5.0	5.0	—	SB-5TR	—	LTW-20
	4032B-5	●	●	40	45 (42*)	32	29	220	50	23.5	11						

* Possible by slightly chamfering toolholder's tip about 0.5 mm

Applicable Inserts

Classification of usage
●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

						Applicable Toolholders
P	Carbon steel / Alloy steel	●	◔	◕	◔	
M	Stainless Steel		◕	◔	◔	
K	Cast Iron				◕	

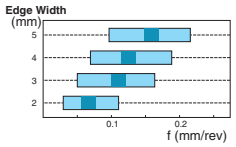
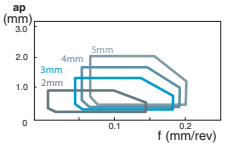
Insert		Description		Dimension (mm) W	Tolerance	rε	M	L	H	Cermet TN620	MEGACOAT NANO PR1535	MEGACOAT PR1225	MEGACOAT PR1215	Applicable Toolholders
		GDM	2013N-020GMI	2.0	±0.03	0.2	1.5	13.5	4.3	●	●	●	●	KGDI$^{R}_{L}$...-2
			3015N-040GMI	3.0		0.4	2.4	15.5	4.6	●	●	●	●	KGDI$^{R}_{L}$...-3
			4020N-040GMI	4.0			3.4	20	4.3	●	●	●	●	KGDI$^{R}_{L}$...-4
			5020N-040GMI	5.0	±0.04		4.4			●	●	●	●	KGDI$^{R}_{L}$...-4
			5020N-080GMI			0.8				●	●	●	●	KGDI$^{R}_{L}$...-5
		GDM	3015N-150R-CM	3.0	±0.03	1.5	2.3	16.3	4.6	○	○	●	●	KGDI$^{R}_{L}$...-3
			4020N-200R-CM	4.0		2.0	3.3	20	4.3	○	○	●	●	KGDI$^{R}_{L}$...-4
			5020N-250R-CM	5.0	±0.04	2.5	4.2	21		○	○	●	●	KGDI$^{R}_{L}$...-4 KGDI$^{R}_{L}$...-5

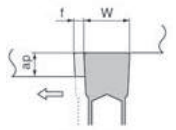
Recommended Cutting Conditions (Vc)

Workpiece Material	Chip-breaker	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN620	MEGACOAT NANO PR1535	MEGACOAT PR1225	MEGACOAT PR1215	Remarks
Carbon Steel	GMI CM	☆ 100~220	☆ 80~150	★ 80~200	☆ 100~200	Coolant
Alloy Steel		☆ 80~200	☆ 70~150	★ 70~180	☆ 80~180	
Stainless Steel		☆ 70~180	★ 60~150	★ 60~150	☆ 60~150	
Cast Iron					★ 100~200	

★ 1st Recommendation ☆ 2nd Recommendation

Recommended Cutting Conditions (f, ap)

Chipbreaker	Grooving	Turning
GMI (General purpose)		

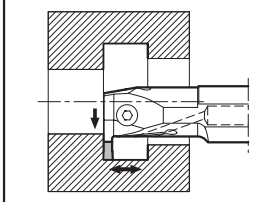


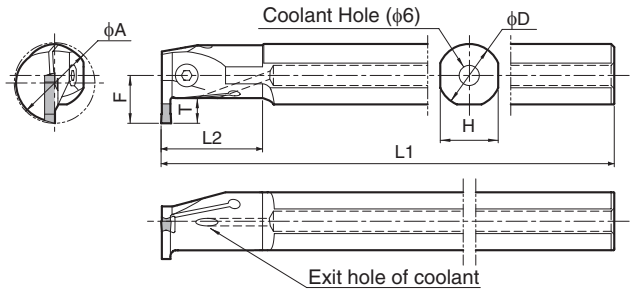
■ In the graph indicates the most recommended value of feed (f)

●: Std. Item
○: Check Availability

Internal Grooving Toolholders

KIGM-V (Will be switched to KGDI ➡ G58~G59)





• Right-hand shown

Toolholder Dimensions

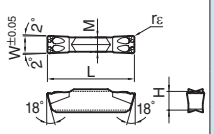
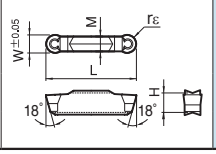
Description		Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	T	Edge Width W (mm) MIN.	MAX.	Spare Parts: Clamp Screw		Wrench	
KIGMR/L	2016B-3V	○	○	20	16	15	150	25	11.5	5.5	3.0	3.0	GS-50	-	LW-3	-
	2520B-3V	○	○	25	20	18	180	32	14.5	6.0						
	3225B-3V	○	○	32	25	23	200	40	19	8.0			-	SB-5TR	-	LTW-20
	3225B-4V	○	○	32	25	23	200	40	19	8.5	4.0	5.0	-	SB-5TR	-	LTW-20
	4032B-4V	○	○	40	32	29	220	50	23.5	11.0						

· Dimension T shows available grooving depth.

Applicable Inserts (mm)

Description	L	H
GMM3015…V□	15.5	4.3
GMM4020…V□	20	
GMM5020…V□		

								Classification of usage
P	Carbon steel / Alloy steel			◔	●			●: Continuous-Light Interruption / 1st Choice ◔: Continuous-Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice
M	Stainless Steel			●	◔			
K	Cast Iron					●	◔	
N	Non-ferrous Metals						●	
S	Titanium Alloys						●	
H	Hard materials (~40HRC)			○	●			
	Hard materials (40HRC~)							

Insert		Description		Dimension (mm) W	rε	M	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PR930	PR905	Carbide KW10	Applicable Toolholders
Chip Control Oriented M Class		GMM	3015-040V	3.0	0.4	2.3	○	○	○	○	○	○	KIGMR/L 2016B-3V 2520B-3V 3225B-3V
			4020-040V	4.0	0.4	3.3	○	○	○	○	○	○	KIGMR/L 3225B-4V 4032B-4V
			5020-080V	5.0	0.8	4.2	○	○	○	○	○	○	
Chip Control Oriented M Class Full-R / Copying		GMM	3015-150VR	3.0	1.5	2.3	○	○		○	○	○	KIGMR/L 2016B-3V 2520B-3V 3225B-3V
			4020-200VR	4.0	2.0	3.3		○		○	○	○	KIGMR/L 3225B-4V 4032B-4V
			5020-250VR	5.0	2.5	4.2		○		○	□	○	

· It is not recommended to use this for KIGM-V Internal Grooving Toolholders against GMM...V / GMM...VR which the front relief angle is 18°, because the relief angle of the insert used for GMM4020-04 toolholder is 10°.

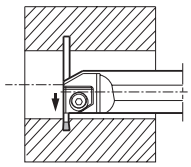
Recommended Cutting Conditions ➡ G105

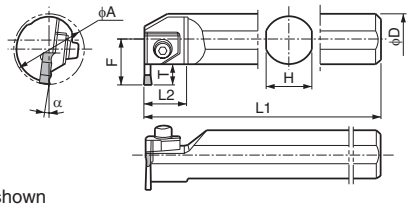
Inserts are sold in 10 piece boxes.

○: Check Availability
□: Deleted from the next catalogue

Internal Large Dia. Deep Grooving Toolholders [GH / GHU Insert]

KIGH





• Right-hand shown

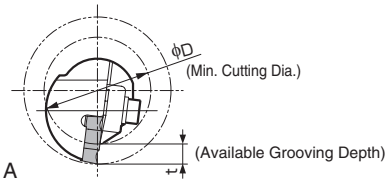


Fig. A

Toolholder Dimensions

Description		Std.	Min. Bore Dia. ϕA	ϕD	H	L1	L2	F	T	Clamp	Clamp Bolt	Washer	Spring	Wrench
KIGHR	4532B-4	●	45	32	30	200	27	28.2	12	CGH-1L	HH6X25	W-6	SP-6	LW-5
	5540B-4	●	55	40	38	250		32.3						
	6550B-4	●	65	50	48	300		37.3						
	4532B-5	●	45	32	30	200	27	28.2	12					
	5540B-5	●	55	40	38	250		32.3						
	6550B-5	●	65	50	48	300		37.3						
	5540B-7	●	55	40	38	250	27	32.3	12	CGH-2L				
	6550B-7	●	65	50	48	300		37.3						

· Dimension T shows the distance from the toolholder to the cutting edge. For the available grooving depth (t), ref. to "List of Min. Available Cutting Diameter and Groove Depth".
· Dimension L2 depends on the insert's edge width.

Rake Angle (α) after Installment of GH / GHU

GHOOOO-OO		GHUOO-OO	
α	Insert Grades	α	Insert Grades
-5°	A65, A66N, PT600M	+5°	TN60 CR9025
+5°	TC40N		
+15°	TN90, TC60M PR930 KW10		

List of the Min. Cutting Diameter and Grooving Depth (Refer to Fig. A)

Toolholder Description		ϕD (Min. Cutting Dia.)					
KIGHR	4532B-O	ϕ110	ϕ70	ϕ65	ϕ60	ϕ55	ϕ45
	5540B-O	ϕ70	ϕ60	ϕ55			
	6550B-O	ϕ65					
Available Grooving Depth t (mm)		12	11.5	11	10	9	Under 8

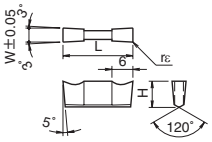
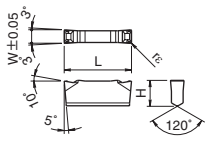
Applicable Inserts

(mm)

Description	L	H
GH4020-OO~GH8020-OO	20	7.5
GHUOO-OO	20	

P	Carbon steel / Alloy steel						◕					
M	Stainless Steel						◕					
K	Cast Iron								◕	○		●
N	Non-ferrous Metals								◕			
S	Titanium Alloys								◕			
H	Hard materials (~40HRC)						●					
	Hard materials (40HRC~)										○	●

Classification of usage
◕: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

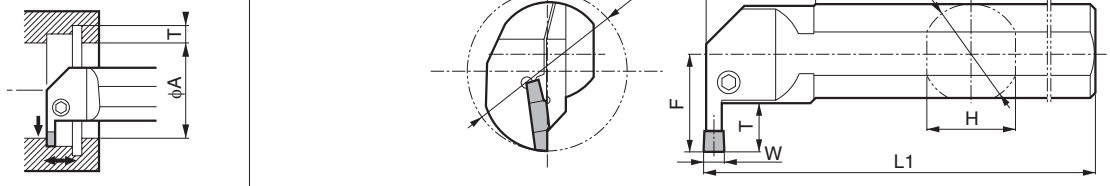
Insert		Description		Dimension (mm) W	Dimension (mm) rε	Cermet TN60	Cermet TN90	Cermet TC40N	Cermet TC60M	CVD Coated Carbide CR9025	PVD Coated Carbide PR930	Ceramic KW10	Ceramic A65	Ceramic A66N	Ceramic PT600M	Applicable Toolholders
Ground Chipbreaker		GH	4020-02	4.0	0.2		●	●	●		●		●			KIGHR4532B-4 5540B-4 6550B-4
			4020-05		0.5		●	●	●		●		●	●	●	
			4520-02	4.5	0.2			●								
			4520-05		0.5			●								
			5020-02	5.0	0.2		●	●	●		●		●			KIGHR4532B-5 5540B-5 6550B-5
			5020-05		0.5		●	●	●		●		●	●	●	
			5520-02	5.5	0.2			●								
			5520-05		0.5			●								
			6020-02	6.0	0.2		●	●	●		●		●			
			6020-05		0.5		●	●	●		●		●	●	●	
			6520-02	6.5	0.2			●								
			6520-05		0.5			●								
Ceramic	Ceramic insert is above shape.		7020-02	7.0	0.2		●	●	●		●		●			KIGHR5540B-7 6550B-7
			7020-05		0.5		●	●	●		●		●	●		
			7520-02	7.5	0.2			●								
			7520-05		0.5			●								
			8020-02	8.0	0.2		●	●	●		●		●			
			8020-05		0.5		●	●	●		●		●			
Molded Chipbreaker		GHU	40-20	4.0	0.25	●				●						KIGHR...OOOOB-4
			50-20	5.0	0.30	●				●						KIGHR...OOOOB-5
			60-20	6.0	0.30	●				●						

Recommended Cutting Conditions G102

● : Std. Item

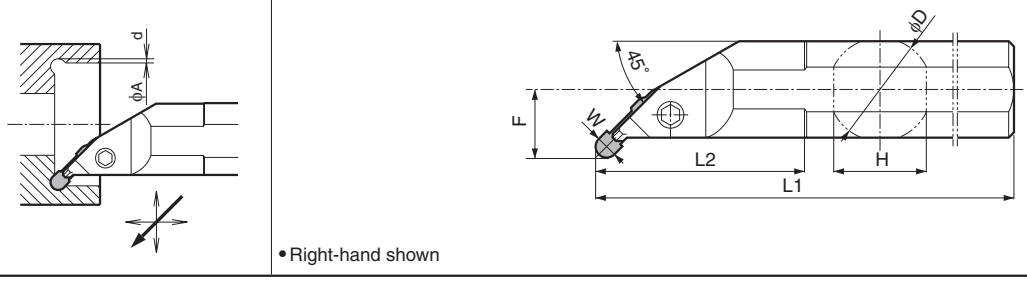
Inserts are sold in 10 piece boxes.

KIGM-8 (8mm-Width Insert / Large Internal Diameter Deep Grooving)



• Right-hand shown

KIGMU-8 (8mm-Width Insert / Large Internal Diameter Undercut Grooving)



• Right-hand shown

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	T	d			Edge Width W (mm) MIN.	MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
KIGM R/L 6540B-8	●	●	65	40	36	300	41	41	20	-			8.0	8.0	HH6X20	LW-5
KIGMUR 6540B-8	●		65	40	36	300	83	26	-	2.2			8.0	8.0	HH6X20	LW-5

· Dimension T shows available grooving depth.

· Dimension d shows the distance from the internal face of the workpiece.

Applicable Inserts (mm)

Description	L	H
GMM8030-080MW	30	5.5
GMG8030-050MG		
GMGA8030-400R		

P	Carbon steel / Alloy steel			◔	●		
M	Stainless Steel			●	◔		
K	Cast Iron					●	◔
N	Non-ferrous Metals						●
S	Titanium Alloys						●
H	Hard materials (~40HRC)			○	●		
	Hard materials (40HRC~)						

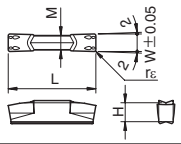
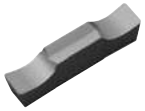
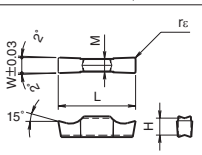
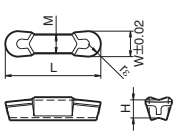
Classification of usage

●: Continuous-Light Interruption / 1st Choice

◔: Continuous-Light Interruption / 2nd Choice

●: Continuous / 1st Choice

○: Continuous / 2nd Choice

Insert		Description	Dimension (mm) W	rε	M	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	PVD Coated Carbide PR905	Carbide KW10	Applicable Toolholders	Ref. to Page for Applicable Toolholders
Chip Control Oriented M Class		GMM 8030-080MW	8.0	0.8	6.0		●	●	●	●	●	KIGM R/L ...8 KIGMUR...8	G62
 Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG 8030-050MG	8.0	0.5	6.0	●	●		●	●	●		
Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMGA 8030-400R	8.0	4.0	6.0						●		

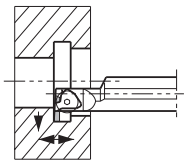
· If using a full-R insert with KIGM-8 type toolholder, you need to modify the corner of insert adapter of toolholder.

Recommended Cutting Conditions ➡ G105

● : Std. Item

Inserts are sold in 10 piece boxes.

KGIA



Integral Type

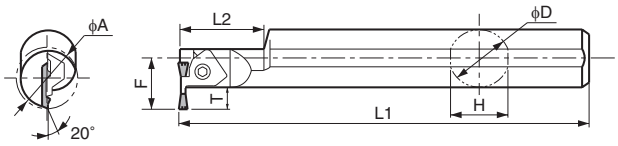
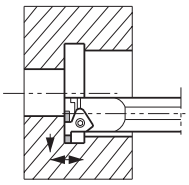


Fig.1



Separate Type

• Right-hand shown

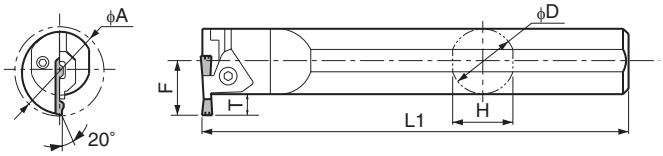


Fig.2

Toolholder Dimensions

Description		Std.	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	T			Drawing	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench
KGIAR	3232B-3	●	32	32	30.4	200	45	26.5	10			Fig.1	CGIA-3R	HH5X15	SP-5	LW-4
	4332B-3	●	43	32	30	200	-	26.3				Fig.2				
	5140B-3	●	51	40	38	250	-	30.3								
	3232B-4	●	32	32	30.4	200	45	26.5	10			Fig.1	CGIA-4R			
	4332B-4	●	43	32	30	200	-	26.3				Fig.2				
	5140B-4	●	51	40	38	250	-	30.3								
	5640B-5	●	56	40	38	250	-	35.3	15			Fig.2	CGIA-5R			
	6650B-5	●	66	50	48	250	-	40.3								

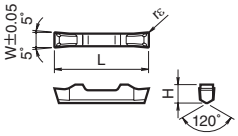
· Dimension T shows available grooving depth.

Composition

Type	Spare Parts / Toolholder Description		Toolholder	Blade	Clamp Screw	Wrench
Integral Type	KGIAR	3232B-3	-	-	-	-
Separate Type		4332B-3	KGIAR32H	BGIAR43-3	SB-40140TR	FT-15
		5140B-3	KGIAR40H	BGIAR51-3		
Integral Type		3232B-4	-	-	-	-
Separate Type		4332B-4	KGIAR32H	BGIAR43-4	SB-40140TR	FT-15
		5140B-4	KGIAR40H	BGIAR51-4		
Separate Type		5640B-5	KGIAR40H	BGIAR56-5	SB-40140TR	FT-15
		6650B-5	KGIAR50H	BGIAR66-5		

Applicable Inserts

P	Carbon steel / Alloy steel	○	●	Classification of usage
M	Stainless Steel	○	●	
K	Cast Iron			●: Continuous-Light Interruption / 1st Choice
N	Non-ferrous Metals			◔: Continuous-Light Interruption / 2nd Choice
S	Titanium Alloys			●: Continuous / 1st Choice
H	Hard materials (~40HRC)	○	●	○: Continuous / 2nd Choice
	Hard materials (40HRC~)			

Insert		Description		Dimension (mm) W	rε	L	H	Cermet TN60	CVD Coated Carbide CR9025	Applicable Toolholders
Molded Chipbreaker		GIA	30	3.0	0.20	25	5.0	●	●	KGIAR…3
			40	4.0	0.25			●	●	KGIAR…4
			50	5.0	0.30	30		●	●	KGIAR…5

Recommended Cutting Conditions ➡ G103

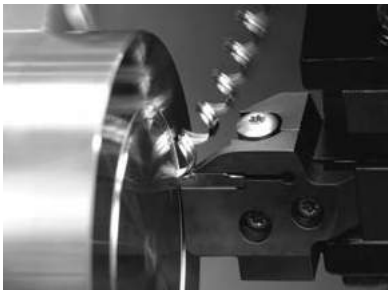
● : Std. Item

Inserts are sold in 10 piece boxes.

Summary of Face Grooving

Face Grooving Dia. ϕD

Face grooving diameter (ϕD) is the suitable value for the initial grooving on the unprocessed workpiece (Ref. to Fig.1).



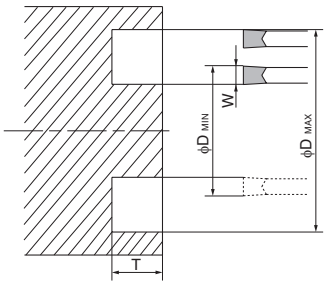
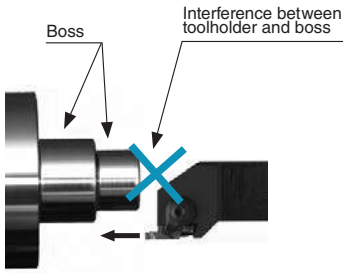
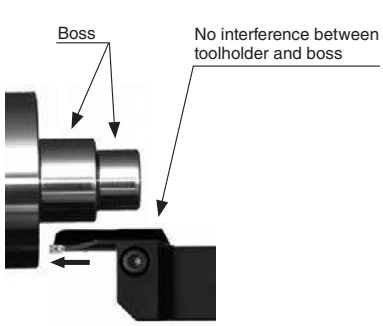


Fig.1

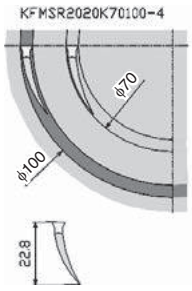
Caution for Face Grooving

1) When face grooving, the suitable toolholder depends on the length of the boss

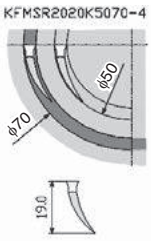




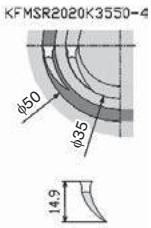
2) Selection of Face Grooving Toolholder



Shape of below jaw

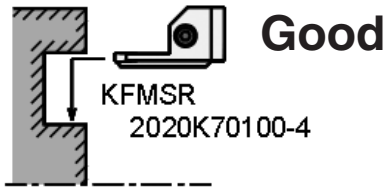


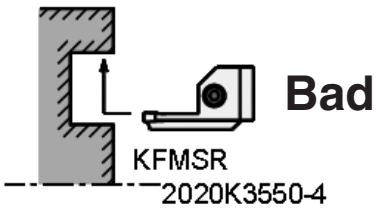
Shape of below jaw



Shape of below jaw

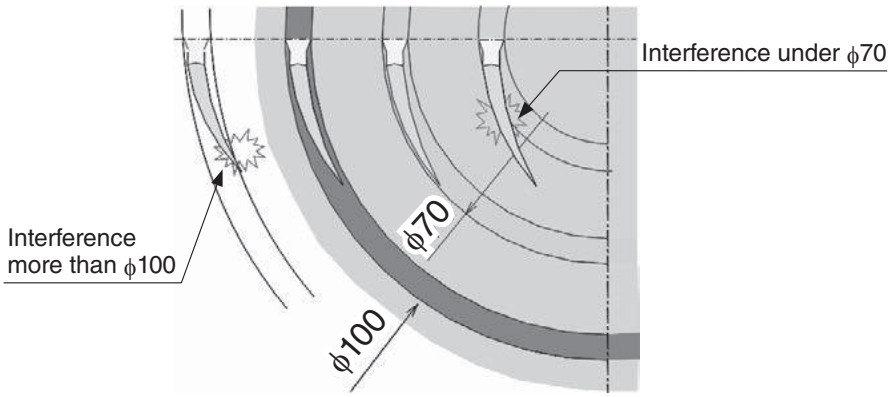
Wider grooving (turning) should be performed from the outside inwards





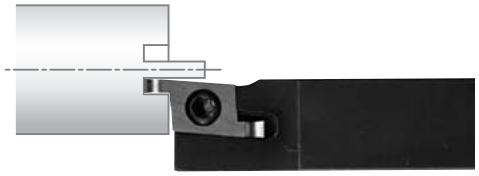
3) Interference of Face Grooving Toolholder

e.g.) KFMSR2525M70100-4

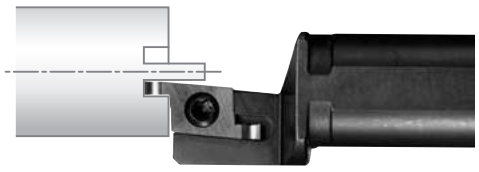


· Example of usage for the face grooving toolholder.
When face grooving, KFMSR2525M70100-4 should be between ϕ70~ϕ100 for grooving the outer diameter at first.
If the workpiece is machined at a diameter ϕ100 or ϕ70, the jaw of toolholder interferes with the workpiece.

Small Dia. Face Grooving ϕ6~

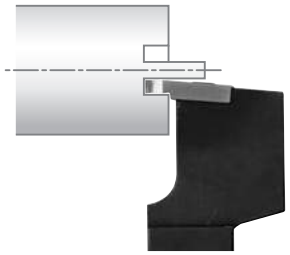


Type	STW
Face Groove Dia.	ϕ6
Edge Width (mm)	0.5~2.0
Grooving Depth(mm)	1.0~3.0
Ref. to Page	G72



Type	S..-STW
Face Groove Dia.	ϕ6
Edge Width (mm)	0.5~2.0
Grooving Depth(mm)	1.0~3.0
Ref. to Page	G72

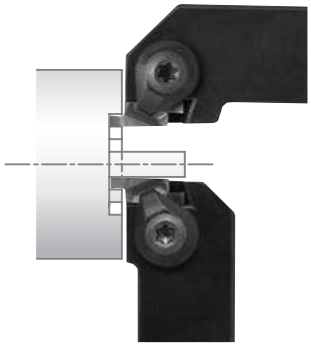
Twin-Bars for Horizontal type



Type	STWS
Face Groove Dia.	ϕ6
Edge Width (mm)	0.5~2.0
Grooving Depth(mm)	1.0~3.0
Ref. to Page	G73

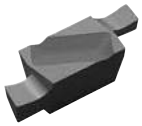
Twin-Bars for Vertical type

Small Dia. Face Grooving ϕ8~



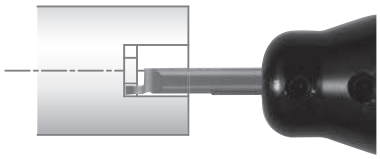
Type	GFVS-AA
Face Groove Dia.	ϕ8
Edge Width (mm)	1.0~3.0
Grooving Depth(mm)	2.2
Ref. to Page	G88

Type	GFVT-AA
Face Groove Dia.	ϕ8
Edge Width (mm)	1.0~3.0
Grooving Depth(mm)	2.2
Ref. to Page	G88



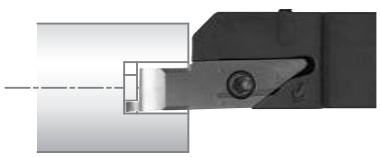
Ground Chipbreaker

Small Dia. Face Grooving ϕ5~, ϕ8~



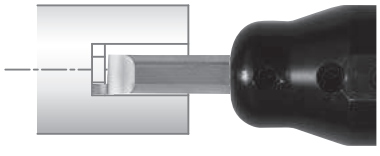
Type	EZFG
Face Groove Dia.	ϕ5, ϕ6, ϕ8
Edge Width (mm)	1.0~3.0
Grooving Depth(mm)	1.5~3.0
Ref. to Page	G68

EZ Bars



Type	VNFG
Face Groove Dia.	ϕ8
Edge Width (mm)	1.0~3.0
Grooving Depth(mm)	2.0~3.0
Ref. to Page	G70

System Tip-Bars

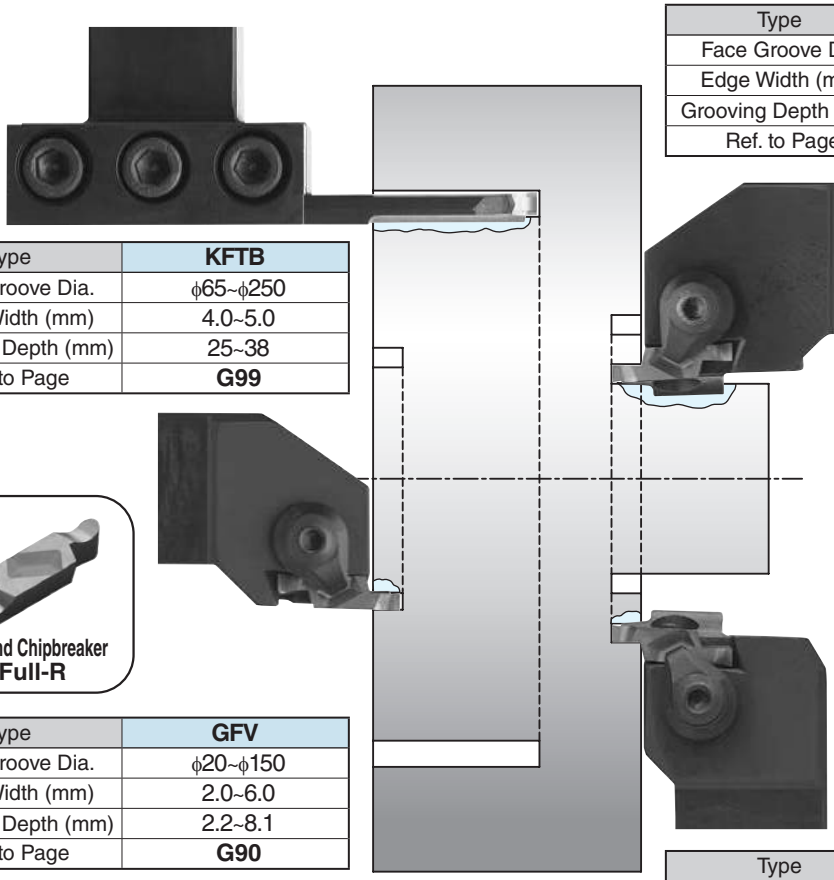


Type	HPFG
Face Groove Dia.	ϕ8
Edge Width (mm)	1.0~3.0
Grooving Depth(mm)	2.0~3.0
Ref. to Page	G71

2-Edge Tip-Bars

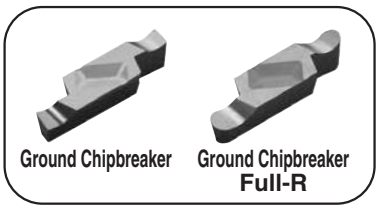
Summary of Face Grooving

Face Grooving ϕ20~



Type	GFVS
Face Groove Dia.	ϕ35~ϕ150
Edge Width (mm)	2.5~6.0
Grooving Depth (mm)	4.6~8.1
Ref. to Page	**G92**

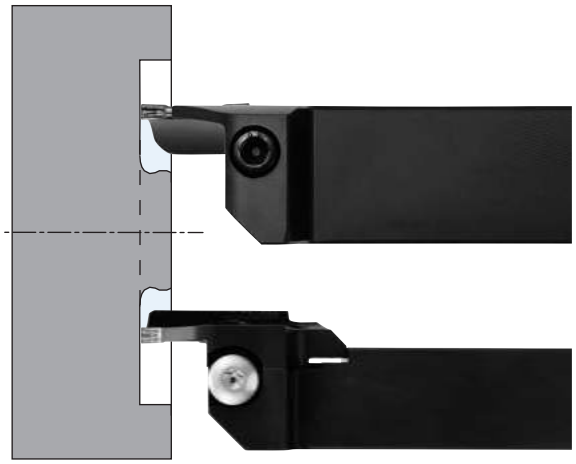
Type	KFTB
Face Groove Dia.	ϕ65~ϕ250
Edge Width (mm)	4.0~5.0
Grooving Depth (mm)	25~38
Ref. to Page	**G99**



Type	GFV
Face Groove Dia.	ϕ20~ϕ150
Edge Width (mm)	2.0~6.0
Grooving Depth (mm)	2.2~8.1
Ref. to Page	**G90**

Type	GFVT
Face Groove Dia.	ϕ35~ϕ150
Edge Width (mm)	2.5~6.0
Grooving Depth (mm)	4.6~8.1
Ref. to Page	**G92**

KGDF Face Grooving ϕ25~ (G74~G87)



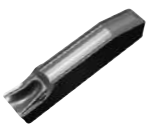
Type	KGDF-Z
Face Groove Dia.	ϕ50
Edge Width (mm)	3.0~5.0
Grooving Depth (mm)	15
Ref. to Page	**G82**

Type	*KGDF
Face Groove Dia.	ϕ25
Edge Width (mm)	2.0~6.0
Grooving Depth (mm)	6~32
Ref. to Page	**G78**

* The separate type toolholders can accept all the blades if their hand is matching.

Grooving and Turning **GM**

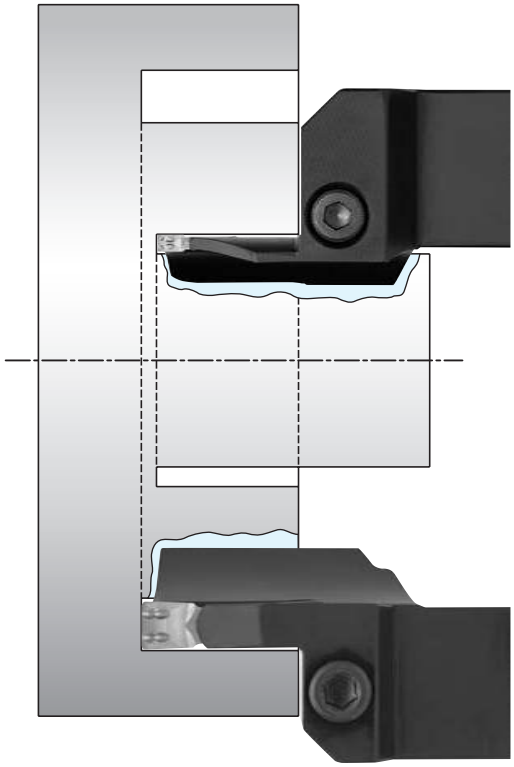
Deep grooving and Turning **DM**



High Feed **GH**

Full-R **CM**

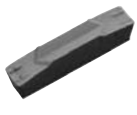
Face Grooving & Turning ϕ25~



Type	KFMS
Face Groove Dia.	ϕ25~ϕ235
Edge Width (mm)	3.0~6.0
Grooving Depth(mm)	13~32
Ref. to Page	**G96**

Molded Chipbreaker

Type	KFMS-8
Face Groove Dia.	ϕ54~ϕ155
Edge Width (mm)	8.0
Grooving Depth(mm)	25
Ref. to Page	**G98**

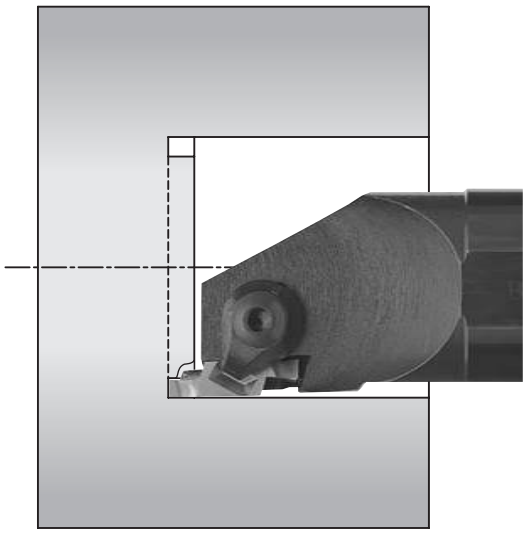


Molded Chipbreaker

Ground Chipbreaker

Molded Chipbreaker Full-R

Face Grooving ϕ35~



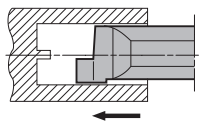
Type	GIFV
Face Groove Dia.	ϕ35~ϕ50
Edge Width (mm)	2.0~6.0
Grooving Depth(mm)	2.2~8.1
Ref. to Page	**G100**

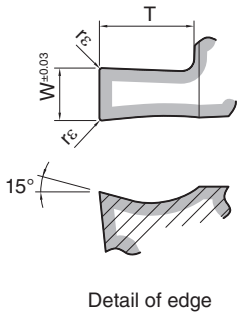
Ground Chipbreaker

Ground Chipbreaker Full-R

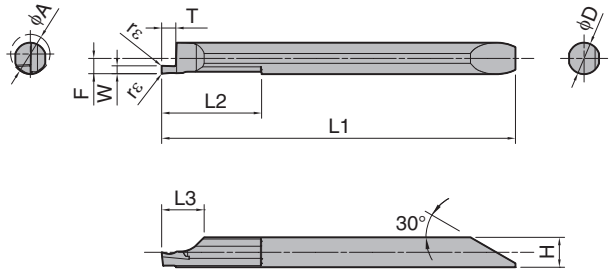
Small Dia. Face Grooving EZ Bars

EZFG





Detail of edge



• Right-hand shown

Dimensions

Description	Min. Face Groove Dia.	Dimension (mm)									MEGACOAT	Applicable Sleeves
	ϕA	W ±0.03	rε	ϕD	H	L1	L2	L3	F	T	PR1225	
EZFGR 050040-100	5	1.0	±0.013 0.05	4	3.8	45.0	12	5.4	1.9	1.5	●	EZH040..
050040-150		1.5								2.0	●	
EZFGR 060050-100	6	1.0	±0.013 0.05	5	4.8	53.2	15	6.9	2.4	1.5	●	EZH050..
060050-150		1.5								2.5	●	
060050-200		2.0								3.0	●	
EZFGR 080070-100	8	1.0	±0.013 0.05	7	6.8	64.2	25	7.9	3.4	2.0	●	EZH070..
080070-150		1.5								2.5	●	
080070-200		2.0								3.0	●	
080070-300		3.0									●	

· Dimension T shows available grooving depth.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)	EZFGR050040-100 EZFGR060050-100 EZFGR080070-100	EZFGR050040-150 EZFGR060050-150 EZFGR080070-150	EZFGR060050-200 EZFGR080070-200	EZFGR080070-300	Remarks
	MEGACOAT					
	PR1225	f (mm/rev)				
Carbon steel / Alloy steel	★ 30~100	~0.02	~0.03	~0.04	~0.05	Coolant
Stainless Steel	★ 30~80	~0.01	~0.02	~0.02	~0.03	

★ : 1st Recommendation

EZ Bars Identification System

EZ FG R 050 040 – 100

Symbol of EZ Bars	Applications	Insert Hand	Min. Face Groove Dia.	Shank Dia.	Edge Width
	FG: Face Grooving	R: Right-hand	050 : 5mm 060 : 6mm 080 : 8mm	040 : 4mm 050 : 5mm 070 : 7mm	100 : 1.0mm 150 : 1.5mm 200 : 2.0mm 300 : 3.0mm

EZ Bars are sold in 1 piece boxes.

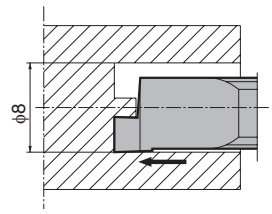
● : Std. Item

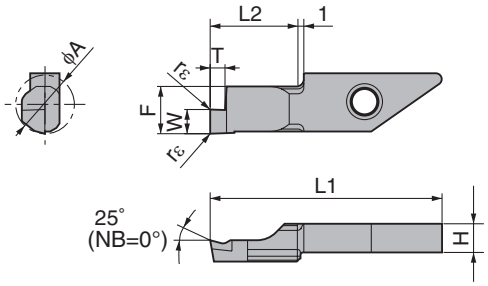
● Applicable Sleeves

Sleeve				Applicable Insert for Internal Face Grooving			Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length with coolant hole) ➡ F23	EZH-HP (Adjustable overhang length) ➡ F24	EZH-ST ➡ F26	Sleeve Shank Dia. ϕD1 (mm)	EZFG	HPFG	Shank Dia. ϕD (mm)	
-	-	EZH 04012ST-80	12	EZFGR ...040-...	-	4	(General purpose)
		05012ST-80		EZFGR ...050-...	-	5	
		07012ST-80		EZFGR ...070-...	HPFG R/L 0807-...	7	
-	EZH 04016HP-100	EZH 04016ST-100	16	EZFGR ...040-...	-	4	(General purpose)
	05016HP-100	05016ST-100		EZFGR ...050-...	-	5	
	07016HP-100	07016ST-100		EZFGR ...070-...	HPFG R/L 0807-...	7	
EZH 04019CT-120	EZH 04019HP-120	EZH 04019ST-120	19.05	EZFGR ...040-...	-	4	Citizen Machinery
05019CT-120	05019HP-120	05019ST-120		EZFGR ...050-...	-	5	
07019CT-120	07019HP-120	07019ST-120		EZFGR ...070-...	HPFG R/L 0807-...	7	
EZH 04020CT-120	EZH 04020HP-120	EZH 04020ST-120	20	EZFGR ...040-...	-	4	Eguro Tsugami Citizen Machinery (General purpose)
05020CT-120	05020HP-120	05020ST-120		EZFGR ...050-...	-	5	
07020CT-120	07020HP-120	07020ST-120		EZFGR ...070-...	HPFG R/L 0807-...	7	
EZH 04022CT-135	EZH 04022HP-135	EZH 04022ST-135	22	EZFGR ...040-...	-	4	Star Micronics Nomura DS Tsugami
05022CT-135	05022HP-135	05022ST-135		EZFGR ...050-...	-	5	
07022CT-135	07022HP-135	07022ST-135		EZFGR ...070-...	HPFG R/L 0807-...	7	
EZH 04025.0CT-135	EZH 04025.0HP-135	EZH 04025.0ST-135	25	EZFGR ...040-...	-	4	Eguro Tsugami Citizen Machinery (General purpose)
05025.0CT-135	05025.0HP-135	05025.0ST-135		EZFGR ...050-...	-	5	
07025.0CT-135	07025.0HP-135	07025.0ST-135		EZFGR ...070-...	HPFG R/L 0807-...	7	
EZH 04025.4CT-120	EZH 04025.4HP-120	EZH 04025.4ST-120	25.4	EZFGR ...040-...	-	4	Citizen Machinery
05025.4CT-120	05025.4HP-120	05025.4ST-120		EZFGR ...050-...	-	5	
07025.4CT-120	07025.4HP-120	07025.4ST-120		EZFGR ...070-...	HPFG R/L 0807-...	7	

· Choose sleeves (ϕd1) to meet with ϕD dimension of Face Grooving Inserts.
· Adjustment Pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT/HP sleeves.
· Machine manufacturers in random order.

VNFG (System Tip-Bars)





•Right-hand shown

Dimensions

Classification of usage									
●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel	●		○			
	M	Stainless Steel	●		○			
	K	Cast Iron				●		
	N	Non-ferrous Metals				○	●	
	S	Titanium Alloys				○	●	
	H	Hard materials (~40HRC)	○		○			
		Hard materials (40HRC~)						

Description		Face Grooving Dia. ϕA		Dimension (mm)							MEGA COAT		PVD	Carbide	PCD		Ref. to Page for Applicable Toolholders
		MIN.	MAX.	W±0.03	rε	H	L1	L2	F	T	PR1225		PR930	KW10	KPD001	KPD010	
VNFGR	0810-10	8 (0)	∞ (∞)	1.0	0.05	3.9	29.6	10	7.3	2.0	●		●	●			F30 F31
	0820-10			2.0							●		●	●			
	0830-10			3.0						3.0	●		●	●			
VNFGR	0820-10NB			2.0	0.05	3.9	29.6	10	7.3	2.0					MTO	MTO	
	0830-10NB			3.0						3.0					MTO	MTO	

· Dimension T shows available grooving depth.

· Face grooving diameter ϕA MIN. (0) means that you can make the initial groove within MIN. ~ MAX. and then widen it to the center.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			VNFG0810	VNFG0820	VNFG0830	Remarks
	MEGACOAT	PVD Coated Carbide	Carbide				
	PR1225	PR930	KW10	f (mm/rev)			
Carbon steel / Alloy steel	★ 30~100	☆ 30~100		~0.02	~0.04	~0.05	Coolant
Stainless Steel	★ 30~80	☆ 30~80		~0.01	~0.02	~0.03	
Non-ferrous Metals			★ ~300	~0.04	~0.06	~0.08	

★ :1st Recommendation ☆ : 2nd Recommendation

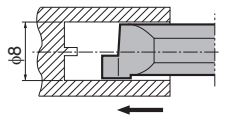
System Tip-Bars are sold in 5 piece boxes.

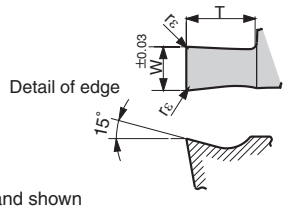
CBN & PCD Inserts are sold in 1 piece boxes.

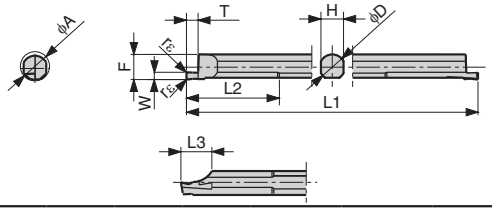
● : Std. Item
MTO : Made to order

HPFG Face Grooving (Small Dia.)

Ref. to Page for Applicable Sleeves F27







• Right-hand shown

Dimensions

Description	Face Grooving Dia. ϕA		Dimension (mm)									Insert Grades			
												PVD Coated Carbide		Carbide	
	MIN.	MAX.	W±0.03	rε	ϕD	H	L1	L2	L3	F	T	PR930		KW10	
												R	L	R	L
HPFGR/L 0807-10	8 (0)	∞ (∞)	1	+0 -0.02 0.05	7	6.2	80	25	8.5	6.9	2	●	●	●	
HPFGR/L 0807-20			2								3	●	●	●	
HPFGR/L 0807-30			3									●	●	●	

· Dimension T shows available grooving depth.

· Face grooving diameter ϕA MIN. (0) means that you can make the initial groove within MIN. ~ MAX. and then widen it to the center.

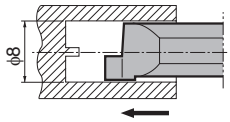
Recommended Cutting Conditions

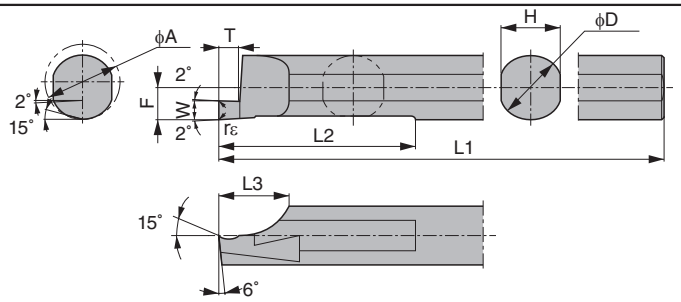
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		HPFGR/L 0807-10	HPFGR/L 0807-20	HPFGR/L 0807-30	Remarks
	PVD Coated Carbide	Carbide				
	PR930	KW10	f (mm/rev)			
Carbon steel / Alloy steel	★ 30~100	—	~0.02	~0.04	~0.05	Coolant
Stainless Steel	★ 30~80	—	~0.01	~0.02	~0.03	
Non-ferrous Metals	—	★ ~300	~0.04	~0.06	~0.08	

★ : 1st Recommendation

PSFG-S (Tip-Bars)

This insert will be switched to EZFG.





• Right-hand shown

Description	Face Grooving Dia. ϕA		Dimension (mm)									PVD Coated Carbide		Carbide		Ref. to Page for Applicable Sleeves
	MIN.	MAX.	W±0.03	rε	ϕD	H	L1	L2	L3	F	T	PR930		KW10		
												R	L	R	L	
PSFGR/L 0810-20S	8 (0)	∞ (∞)	1.0	0.05	6.8	6.2	80	25.5	7	3.4	2.0	○	○	○	○	F84
PSFGR/L 0820-20S			2.0									○	○	○	○	
PSFGR/L 0830-20S			3.0									○	○	○	○	

· Dimension T shows available grooving depth.

· Face grooving diameter ϕA MIN. (0) means that you can make the initial groove within MIN. ~ MAX. and then widen it to the center.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			PSFGR/L0810	PSFGR/L0820	PSFGR/L0830	Remarks
	PVD Coated Carbide		Carbide				
	PR930		KW10	f (mm/rev)			
Carbon steel / Alloy steel	★ 30~100			~0.02	~0.04	~0.05	Coolant
Stainless Steel	★ 30~80			~0.01	~0.02	~0.03	
Non-ferrous Metals			★ ~300	~0.04	~0.06	~0.08	

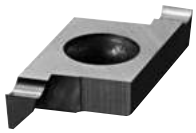
★ : 1st Recommendation

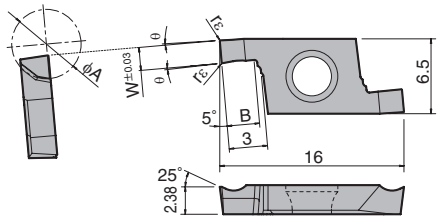
● : Std. Item
○ : Check Availability

Tip-Bars are sold in 1 piece boxes.

Small Dia. Face Grooving (Twin-Bars)

TWFG (Horizontal type)





•Left-hand shown

Description		Face Grooving Dia. φA MIN.	Face Grooving Dia. φA MAX.	Dimension (mm) W	Dimension (mm) rε	Dimension (mm) B	Angle θ	Insert Grades PVD Coated Carbide PR1025	Insert Grades PVD Coated Carbide	Insert Grades Carbide KW10
TWFGL	050	6 (0)	∞ (∞)	0.5	0.05	1.0	1.5°	●		●
	080			0.8		1.5		●		●
	100			1.0		2.2	2°	●		●
	125			1.25				●		●
	150			1.5				●		●
	180			1.8		3.0		●		●
	200			2.0				●		●

· Dimension B shows available grooving depth.

· Face grooving diameter φA MIN. (0) means that you can make the initial groove within MIN. ~ MAX. and then widen it to the center.

STW (Square Shank for Horizontal type)

(For right-hand toolholder for boring, ref. to page **F34**.)

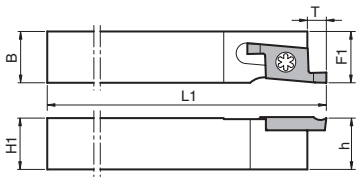


Fig.1

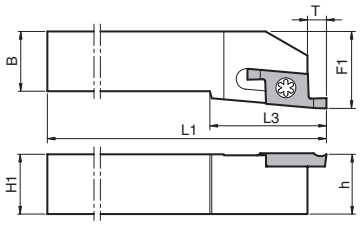


Fig.2

•Left-hand shown

Toolholder Dimensions

Description		Std.	Dimension (mm) H1=h	B	L1	L2	L3	F1	F2	T	F3	Drawing	Spare Parts Clamp Screw	Spare Parts Wrench	Applicable Inserts G72
STWL	1010F-15	●	10	10	85	-	-	10	-	3	-	Fig.1	SB-3080TR	LTW-10S	TWFGL○○○
	1212F-15	●	12	12				12							
	1212K-15	●	12	12	125			12							
	1616K-15	●	16	16				16							
	2020K-15	●	20	20			25	25				Fig.2			
	2525M-15	●	25	25	150			32							

· Dimension T shows the distance from the toolholder to the cutting edge. Available groove depth: "B" dimension of insert.

S..-STW (Round Shank for Horizontal type)

(For right-hand toolholder for boring, ref. to page **F34**.)

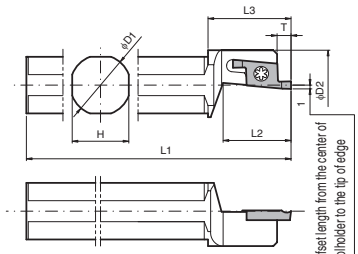


Fig.1

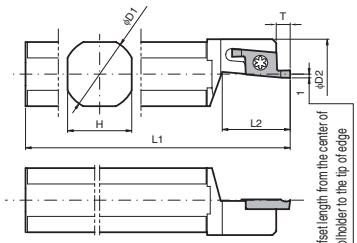


Fig.2

•Left-hand shown

Toolholder Dimensions

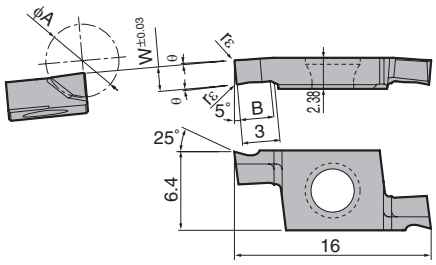
Description		Std.	Dimension (mm) φD1	φD2	H	L1	L2	L3	T	Drawing	Spare Parts Clamp Screw	Spare Parts Wrench	Applicable Inserts G72
S12F-	STWL15	●	12	20	11	80	18	22	3	Fig.1	SB-3080TR	LTW-10S	TWFGL○○○
S14H-	STWL15	●	14		13	100							
S15F-	STWL15	●	15.875		15	85							
S16F-	STWL15	●	16										
S19G-	STWL15	●	19.05	18.5	17	90		-	3	Fig.2			
S19K-	STWL15	●				120							
S20G-	STWL15	●	20	19.5	18	90							
S20K-	STWL15	●				120							
S22K-	STWL15	●	22	21.5	20	125	22						
S25.0J-	STWL15	●	25	24.5	23	110							
S25K-	STWL15	●	25.4	25	23	120							

· Dimension T shows the distance from the toolholder to the cutting edge. Available groove depth: "B" dimension of insert.

● : Std. Item

Twin-Bars are sold in 5 piece boxes.

TWFGT (Vertical type)



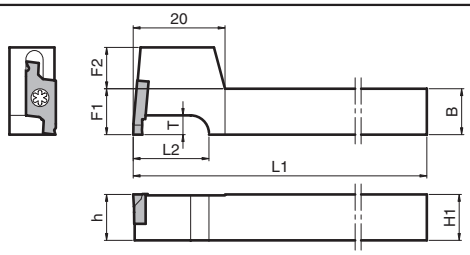
• Right-hand shown

Description		Face Grooving Dia. ϕA MIN.	Face Grooving Dia. ϕA MAX.	Dimension (mm) W	Dimension (mm) rε	Dimension (mm) B	Angle θ	Insert Grades PVD Coated Carbide PR1025		Insert Grades Carbide KW10
TWFGTR	050	6 (0)	∞ (∞)	0.5	0.05	1.0	1.5°	●		●
	080			0.8		1.5		●		●
	100			1.0		2.2	2°	●		●
	125			1.25				●		●
	150			1.5				●		●
	180			1.8		3.0		●		●
	200			2.0				●		●

· Dimension B shows available grooving depth.

· Face grooving diameter ϕA MIN. (0) means that you can make the initial groove within MIN. ~ MAX. and then widen it to the center.

STWS (Square Shank for vertical type : L-shape)



• Right-hand shown

Toolholder Dimensions

Description		Std.	Dimension (mm) H1=h	B	L1	L2	L3	F1	F2	T	F3	Drawing	Spare Parts Clamp Screw	Spare Parts Wrench	Applicable Inserts G73
STWSR	1010JX-15T	●	10	10	120	16	-	10	9	3	-	-	SB-3080TR	LTW-10S	TWFGTR○○○
	1212JX-15T	●	12	12				12	7						
	1616JX-15T	●	16	16		20		16	3						
STWSR	1010F-15T	●	10	10	85	16		10	9						
	1212F-15T	●	12	12				12	7						

· Dimension T shows the distance from the toolholder to the cutting edge. Available groove depth: "B" dimension of insert.

Recommended Cutting Conditions (TWFG / TWFGT)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) PVD Coated Carbide PR1025	Carbide KW10	TWFGL050 TWFGL080 TWFGL100 TWFGTR050 TWFGTR080 TWFGTR100 f (mm/rev)	TWFGL125 TWFGL150 TWFGTR125 TWFGTR150 f (mm/rev)	TWFGL180 TWFGL200 TWFGTR180 TWFGTR200 f (mm/rev)	Remarks
Carbon steel / Alloy steel	★ 30~100		~0.02	~0.03	~0.04	Coolant
Stainless Steel	★ 30~80		~0.01	~0.02	~0.02	
Non-ferrous Metals		★ ~300	~0.03	~0.04	~0.06	

★ : 1st Recommendation

● : Std. Item

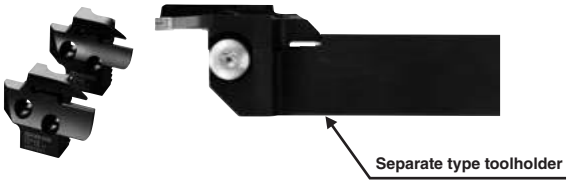
Twin-Bars are sold in 5 piece boxes.

KGDF Face Grooving

Features

Separate type toolholder (toolholder + blade) and Integral type toolholder are available.

Adaptable to a wide range of face grooving applications by changing blades

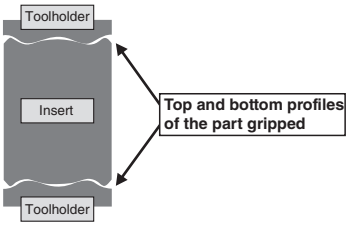


New insert clamping system "W Grip"

Unique "W Grip" (insert anti-slip structure) provides stable machining quality

1) Prevents abnormal machining surface and / or insert breakage resulting from slip of insert.
2) Improves repetitive installation accuracy of insert

GDFM and GDFMS inserts are not applicable to KGD external grooving, cut-off and KGDI internal grooving toolholders.



W Grip technology

Smooth chip control

For general purpose GM Chipbreaker, For high feed grooving GH Chipbreaker, For deep grooving DM Chipbreaker

Advantages of Chipbreaker

For general purpose GM Chipbreaker

- Smooth surface from cutting edge to the far side
  Enhances breaking of chips and maintains their evacuation direction constant.
- Gradually raised surface.
  Keeps curling of chips in constant shape.
- Flat cutting edge line
  Improves chip control.
- Steep surface near the cutting edge
  Good chip control during shoulder grooving.

For high feed grooving GH Chipbreaker

- Concave part in middle
  Control chips upward.
- Dots jutted out center side
  Changes chip shape smoothly. Stable chip control during shoulder grooving.
- Slope portion
  Constantly curled chips.
- Negative cutting edge line
  Improvement of strong edge.

For deep grooving DM Chipbreaker

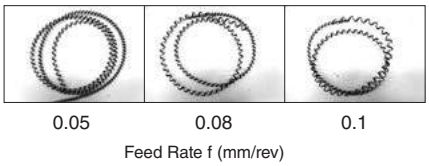
- Concave part in middle
  Enhances breaking of chips.
- Inflated inner surface
  Enhances breaking of chips and maintains their evacuation direction constant.
- Smooth surface up to the far side standing wall
  Reduces cutting force, enhances breaking of chips and maintains their evacuation in constant direction.

- Curved lead edge
  Keeps chips in constant shape.

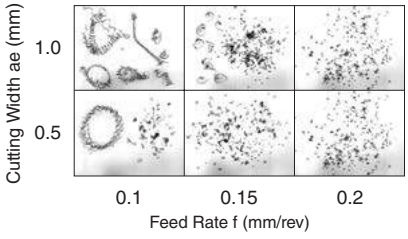
Chip Control of GM Chipbreaker

<Cutting Conditions>
Vc=150m/min f=0.05~0.2mm/rev GDFM5020N-040GM SCM415 Wet

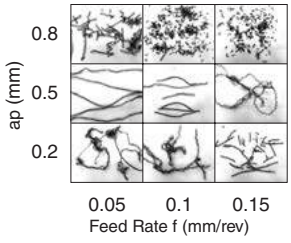
Face Grooving (ϕ62)



Side Grooving



Turning



High precision edge preparation

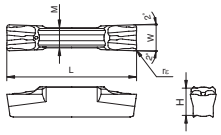
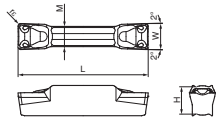
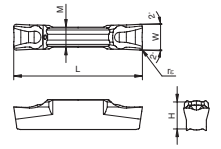
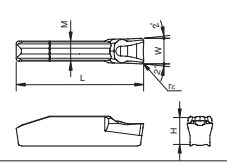
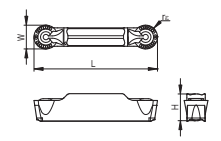
➡ High precision molding technology with tolerance ±0.03mm (Edge width 2, 3, 4mm types)

Highly-reputed MEGACOAT technology

➡ Long tool life and high efficiency machining achieved by superior oxidation resistance and wear resistance.

GDFM / GDFMS

Classification of usage							
◕: Continuous-Light Interruption / 1st Choice ◔: Continuous-Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon steel / Alloy steel	●		◕	◔	Ref. to Page for Applicable Toolholders
	M	Stainless Steel			◕	◔	
	K	Cast Iron				◕	
	N	Non-ferrous Metals					
	S	Titanium Alloys					
	H	Hard materials (~40HRC)					
		Hard materials (40HRC~)					

Insert			Description		Dimension (mm)						Cermet		MEGACOAT		Ref. to Page for Applicable Toolholders
					W	Tolerance	rε	M	L	H	TN620	TN90	PR1225	PR1215	
Grooving and Turning			GDFM	2020N-020GM	2.0	±0.03	0.2	1.5	21	3.9		●	●	●	G78 ~ G84
				3020N-030GM	3.0		0.3	2.1	20	4.3		●	●	●	
				4020N-040GM	4.0		0.4	3.1		4.5		●	●	●	
				5020N-040GM	5.0	±0.04		4.1				●	●	●	
			NEW	5020N-080GM			0.8					●	●	●	
				6020N-040GM	6.0		0.4	5.0				●	●	●	
			NEW	6020N-080GM			0.8					●	●	●	
Grooving and Turning (High feed)			GDFM	4020N-040GH	4.0	±0.03	0.4	3.1	20	4.5			●	●	
				5020N-040GH	5.0	±0.04		4.1					●	●	
				5020N-080GH			0.8						●	●	
				6020N-040GH	6.0		0.4	5.0					●	●	
				6020N-080GH			0.8						●	●	
Deep grooving and Turning			GDFM	3020N-030DM	3.0	±0.03	0.3	2.1	20	4.3		●	●	●	
				4020N-040DM	4.0		0.4	3.1		4.5		●	●	●	
				5020N-040DM	5.0	±0.04		4.1				●	●	●	
				6020N-040DM	6.0			5.0				●	●	●	
	1-edge		GDFMS	3020N-030DM	3.0	±0.03	0.3	2.1	20	4.3		●	●	●	
				4020N-040DM	4.0		0.4	3.1		4.5		●	●	●	
				5020N-040DM	5.0	±0.04		4.1				●	●	●	
				6020N-040DM	6.0			5.0				●	●	●	
Full-R			GDFM	3020N-150R-CM	3.0	±0.03	1.5	2.1	20	4.3	●		●	●	
				4020N-200R-CM	4.0		2.0	3.1	*21	4.5	●		●	●	
				5020N-250R-CM	5.0	±0.04	2.5	4.1			●		●	●	
				6020N-300R-CM	6.0		3.0	5.0	*22		●		●	●	

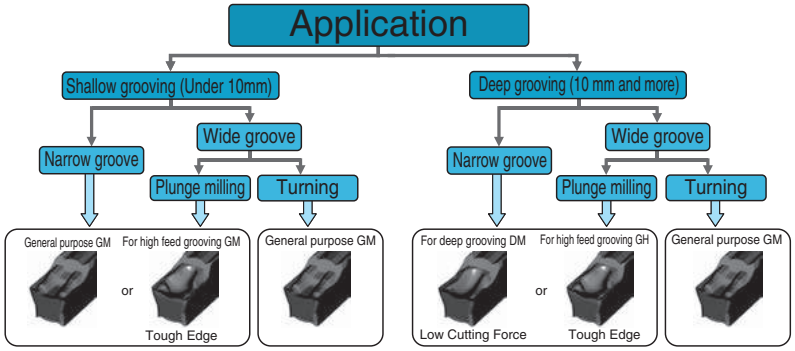
*GDFM40/50/60-CM differes from other descriptions in length (L) to avoid interference of a toolholder with workpiece.

Recommended Cutting Conditions ➡ G86

◆ Inserts Identification System

G D F	M	S	30	20	N	-	030	DM
Series	Tolerance Symbol M: M Class	No. of edge (Without Indication) : 2-edge S: 1-edge	Edge Width 20 : 2mm 30 : 3mm ⋮	Insert Length 20 : 20mm	Hand of Tool N: Neutral		Corner-R(rε) 020 : 0.2mm 030 : 0.3mm 040 : 0.4mm 150R : 1.5mm (Full-R)	Chipbreaker Symbol GM : Grooving and Turning DM : Grooving GH : High feed grooving CM : Full-R

● Chipbreaker Selection



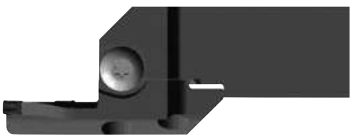
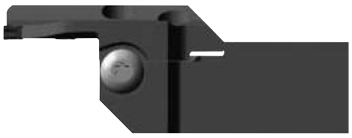
* If chip control is not stable when using the general GM chipbreaker for grooving, change the chipbreaker to the DM chipbreaker for deep grooving or GH chipbreaker for high feed grooving.

● : Std. Item

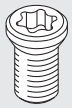
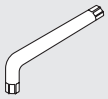
Inserts are sold in 10 piece boxes.

KGDF

Toolholder Assembly Identification

Unit Description (Unit Description is not printed.)	Blade (Blade Description is printed.)	Toolholder (Toolholder Description is printed.)
Left-hand : KGDFL···S	Left-hand : KGDFL····C	**Right**-hand : KGD**R**····C
 •Left-hand shown	•Left-hand shown	•Right-hand shown
Right-hand : KGDFR···S	Right-hand : KGDFR····C	**Left**-hand : KGD**L**····C
 •Right-hand shown	•Right-hand shown	•Left-hand shown

- Right-hand Blade for **Left-hand** Toolholder, Left-hand Blade for **Right-hand** Toolholder.
- The Unit Description is not printed on the product. It is printed on the box label.
- Combination of the toolholder and blade (both separately sold) can make up the corresponding assembly.
- The insert clamping screw (BH6X10TR), blade fixing screw (SB-60120TR) and wrench (LTW-25) which are included in the toolholder can be used.

Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
		
BH6X10TR	SB-60120TR	LTW-25

Face Grooving Toolholder Assembly Identification System

Hand of unit	Toolholder shank size	Toolholder Length	Width	Symbol of assembly toolholder
R : Right-hand L : Left-hand	2020 : □20 2525 : □25	X : Special	2 : 2mm 3 : 3mm ⋮	S : indicates the unit description

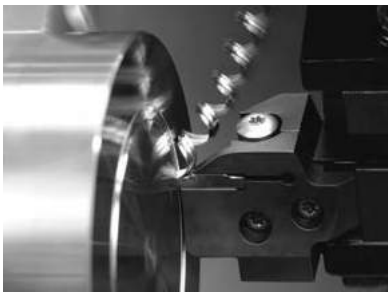
KGDF	R	2020	X	25	-	3	A	S

Series	Min. diameter in face grooving	* For the minimum external diameter which can be applied to the initial face grooving (you can also use 1-edge insert), ref. to the MIN. value of "Face Grooving Dia. ϕD" in the dimension tables of toolholders and blades.
KGDF Face Grooving	Indicates the minimum external diameter suitable for the initial face grooving. 25 : 25mm ⋮ 235 : 235mm	

Grooving Depth	
A : 6~13mm B : 13~15mm	2-edge insert (1-edge insert can also be used.)
C : 20~25mm D : 32mm	1-edge insert

◆ Face Grooving Dia. ϕD

Face grooving diameter (ϕD) is the suitable value for the initial grooving on the unprocessed workpiece (Ref. to Fig.1).
Then, you can widen it up to the center towards the inside (excluding the models listed in the right table) and towards the outside according to machine limits.



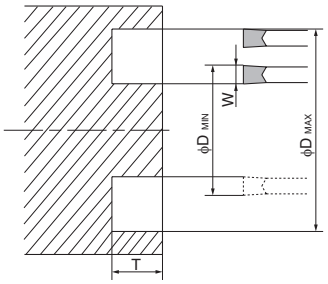
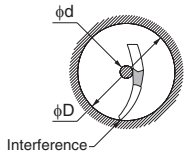


Fig.1

◆ Limit of Turning toward Center

Turning towards the Center causes the toolholder to interfere with the groove wall depending on the initial cut's diameter.

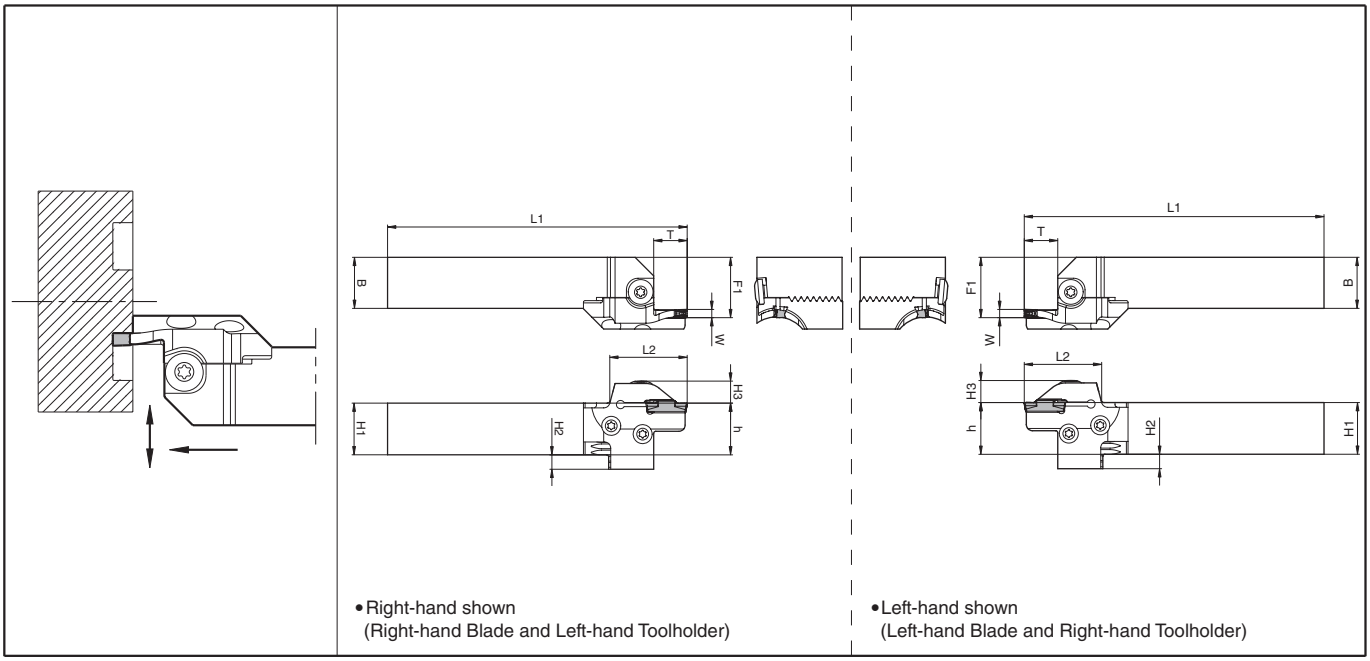


Remaining Boss Dia. ϕd

Description \ ϕD	25	26	27	28 and over
	ϕd (mm)			
KGDF$^{R}_{L}$ 2020X25-3AS 2525X25-3AS	4	2	0	0 (No remaining Boss)
KGDF$^{R}_{L}$ 2020X25-4AS 2525X25-4AS	6	3	0	
KGDF$^{R}_{L}$ 2020X25-5AS 2525X25-5AS	7	4	1	
KGDF$^{R}_{L}$ 2020X25-6AS 2525X25-6AS	9	4	1	

e.g.)
KGDFR2020X25-3AS with ϕ25 as first cut towards the center, it will cause a rubbing with the toolholder cartridge if ϕd is 4.0mm.

KGDF



• Right-hand shown
(Right-hand Blade and Left-hand Toolholder)

• Left-hand shown
(Left-hand Blade and Right-hand Toolholder)

Toolholder Dimensions

Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. ϕD (mm) MIN.	MAX.	Unit Description (Standard Stock Description)	Std. R	Std. L	Blade Description ➡G85	Toolholder Description ➡G25	H1=h	H2	H3	B	L1	L2	F1	T
0°	2	□20	6	25	30	KGDFR 2020X25-2AS	●	-	KGDFR -25-2A-C	KGDL2020-C	20	12	11.6	20	115	33	24.5	6
				30	35	2020X30-2AS	●	-	-30-2A-C									
				35	45	2020X35-2AS	●	-	-35-2A-C									
				45	60	2020X45-2AS	●	-	-45-2A-C									
				60	80	2020X60-2AS	●	-	-60-2A-C									
				80	100	2020X80-2AS	●	-	-80-2A-C									
				100	130	2020X100-2AS	●	-	-100-2A-C									
			13	25	30	No unit description ➡			-25-2B-C						118	36		13
			15	30	35				-30-2B-C									
				35	45				-35-2B-C									
				45	60				-45-2B-C						120	38		15
				60	80				-60-2B-C									
				80	100				-80-2B-C									
				100	130				-100-2B-C									
		□25	6	25	30	KGDFR 2525X25-2AS	●	-	KGDFR -25-2A-C	KGDL2525-C	25	7	11.6	25	140	33	29.5	6
				30	35	2525X30-2AS	●	-	-30-2A-C									
				35	45	2525X35-2AS	●	-	-35-2A-C									
				45	60	2525X45-2AS	●	-	-45-2A-C									
				60	80	2525X60-2AS	●	-	-60-2A-C									
				80	100	2525X80-2AS	●	-	-80-2A-C									
				100	130	2525X100-2AS	●	-	-100-2A-C									
			13	25	30	No unit description ➡			-25-2B-C						143	36		13
			15	30	35				-30-2B-C									
				35	45				-35-2B-C									
				45	60				-45-2B-C						145	38		15
				60	80				-60-2B-C									
				80	100				-80-2B-C									
				100	130				-100-2B-C									
		□32	6	25	30	No unit description ➡			KGDFR -25-2A-C	KGDL3232-C	32	-	11.6	32	160	33	36.5	6
				30	35				-30-2A-C									
				35	45				-35-2A-C									
				45	60				-45-2A-C									
				60	80				-60-2A-C									
				80	100				-80-2A-C									
				100	130				-100-2A-C									
			13	25	30				-25-2B-C						163	36		13
			15	30	35				-30-2B-C									
				35	45				-35-2B-C									
				45	60				-45-2B-C						165	38		15
				60	80				-60-2B-C									
				80	100				-80-2B-C									
				100	130				-100-2B-C									

Note) 1. In case the unit description is not available (No unit description), please purchase toolholder and blade separately.
2. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡G75

● : Std. Item

● Toolholder Dimensions

Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. ϕD (mm) MIN.	Face Grooving Dia. ϕD (mm) MAX.	Unit Description (Standard Stock Description)	Std. R	Std. L	Blade Description ➡G85	Toolholder Description ➡G25	H1=h	H2	H3	B	L1	L2	F1	T
0°	3	□20	13	25	30	KGDF$^{R}_{L}$ 2020X25-3AS	●	●	KGDF$^{R}_{L}$ -25-3A-C	KGD$^{L}_{R}$2020-C	20	12	11.6	20	118	36	24.5	13
				30	40	2020X30-3AS	●	●	-30-3A-C									
				40	50	2020X40-3AS	●	●	-40-3A-C									
			15	50	65	2020X50-3BS	●	●	-50-3B-C						120	38		15
				65	85	2020X65-3BS	●	●	-65-3B-C									
				85	110	2020X85-3BS	●	●	-85-3B-C									
				110	145	2020X110-3BS	●	●	-110-3B-C									
			22	50	65	2020X50-3CS	●	●	-50-3C-C						127	45		22
				65	85	2020X65-3CS	●	●	-65-3C-C									
			25	85	110	2020X85-3CS	●	●	-85-3C-C						130	48		25
				110	145	2020X110-3CS	●	●	-110-3C-C									
		□25	13	25	30	KGDF$^{R}_{L}$ 2525X25-3AS	●	●	KGDF$^{R}_{L}$ -25-3A-C	KGD$^{L}_{R}$2525-C	25	7	11.6	25	143	36	29.5	13
				30	40	2525X30-3AS	●	●	-30-3A-C									
				40	50	2525X40-3AS	●	●	-40-3A-C									
			15	50	65	2525X50-3BS	●	●	-50-3B-C						145	38		15
				65	85	2525X65-3BS	●	●	-65-3B-C									
				85	110	2525X85-3BS	●	●	-85-3B-C									
				110	145	2525X110-3BS	●	●	-110-3B-C									
			22	50	65	2525X50-3CS	●	●	-50-3C-C						152	45		22
				65	85	2525X65-3CS	●	●	-65-3C-C									
			25	85	110	2525X85-3CS	●	●	-85-3C-C						155	48		25
				110	145	2525X110-3CS	●	●	-110-3C-C									
		□32	13	25	30	No unit description ➡			KGDF$^{R}_{L}$ -25-3A-C	KGD$^{L}_{R}$3232-C	32	-	11.6	32	163	36	36.5	13
				30	40				-30-3A-C									
				40	50				-40-3A-C									
			15	50	65				-50-3B-C						165	38		15
				65	85				-65-3B-C									
				85	110				-85-3B-C									
				110	145				-110-3B-C									
			22	50	65				-50-3C-C						172	45		22
				65	85				-65-3C-C									
			25	85	110				-85-3C-C						175	48		25
				110	145				-110-3C-C									
0°	4	□20	13	25	35	KGDF$^{R}_{L}$ 2020X25-4AS	●	●	KGDF$^{R}_{L}$ -25-4A-C	KGD$^{L}_{R}$2020-C	20	12	11.6	20	118	36	24.5	13
			15	35	50	2020X35-4BS	●	●	-35-4B-C						120	38		15
				50	70	2020X50-4BS	●	●	-50-4B-C									
				70	100	2020X70-4BS	●	●	-70-4B-C									
				100	150	2020X100-4BS	●	●	-100-4B-C									
				150	220	2020X150-4BS	●	●	-150-4B-C									
				220	∞	2020X220-4BS	●	●	-220-4B-C									
			25	35	50	2020X35-4CS	●	●	-35-4C-C						130	48		25
				50	70	2020X50-4CS	●	●	-50-4C-C									
				70	100	2020X70-4CS	●	●	-70-4C-C									
				100	150	2020X100-4CS	●	●	-100-4C-C									
				150	220	2020X150-4CS	●	●	-150-4C-C									
				220	∞	2020X220-4CS	●	●	-220-4C-C									
		□25	13	25	35	KGDF$^{R}_{L}$ 2525X25-4AS	●	●	KGDF$^{R}_{L}$ -25-4A-C	KGD$^{L}_{R}$2525-C	25	7	11.6	25	143	36	29.5	13
			15	35	50	2525X35-4BS	●	●	-35-4B-C						145	38		15
				50	70	2525X50-4BS	●	●	-50-4B-C									
				70	100	2525X70-4BS	●	●	-70-4B-C									
				100	150	2525X100-4BS	●	●	-100-4B-C									
				150	220	2525X150-4BS	●	●	-150-4B-C									
				220	∞	2525X220-4BS	●	●	-220-4B-C									
			25	35	50	2525X35-4CS	●	●	-35-4C-C						155	48		25
				50	70	2525X50-4CS	●	●	-50-4C-C									
				70	100	2525X70-4CS	●	●	-70-4C-C									
				100	150	2525X100-4CS	●	●	-100-4C-C									
				150	220	2525X150-4CS	●	●	-150-4C-C									
				220	∞	2525X220-4CS	●	●	-220-4C-C									
		□32	13	25	35	No unit description ➡			KGDF$^{R}_{L}$ -25-4A-C	KGD$^{L}_{R}$3232-C	32	-	11.6	32	163	36	36.5	13
			15	35	50				-35-4B-C						165	38		15
				50	70				-50-4B-C									
				70	100				-70-4B-C									
				100	150				-100-4B-C									
				150	220				-150-4B-C									
				220	∞				-220-4B-C									
			25	35	50				-35-4C-C						175	48		25
				50	70				-50-4C-C									
				70	100				-70-4C-C									
				100	150				-100-4C-C									
				150	220				-150-4C-C									
				220	∞				-220-4C-C									

Note) 1. In case the unit description is not available (No unit description), please purchase toolholder and blade separately.
2. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡ G75

● : Std. Item

Toolholder Dimensions

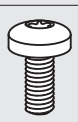
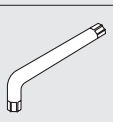
Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. φD (mm) MIN.	MAX.	Unit Description (Standard Stock Description)	Std. R	L	Blade Description ➡G85	Toolholder Description ➡G25	H1=h	H2	H3	B	L1	L2	F1	T
0°	5	□20	15	25	35	KGDF$^{R}_{L}$ 2020X25-5BS	●	●	KGDF$^{R}_{L}$ -25-5B-C	KGD$^{L}_{R}$2020-C	20	12	11.6	20	120	38	24.5	15
				35	50	2020X35-5BS	●	●	-35-5B-C									
				50	75	2020X50-5BS	●	●	-50-5B-C									
				75	115	2020X75-5BS	●	●	-75-5B-C									
				115	180	2020X115-5BS	●	●	-115-5B-C									
				180	235	2020X180-5BS	●	●	-180-5B-C									
				235	∞	2020X235-5BS	●	●	-235-5B-C									
			20	25	35	2020X25-5CS	●	●	-25-5C-C						125	43		20
			25	35	50	2020X35-5CS	●	●	-35-5C-C						130	48		25
				50	75	2020X50-5CS	●	●	-50-5C-C									
				75	115	2020X75-5CS	●	●	-75-5C-C									
				115	180	2020X115-5CS	●	●	-115-5C-C									
				180	235	2020X180-5CS	●	●	-180-5C-C									
				235	∞	2020X235-5CS	●	●	-235-5C-C									
			32	75	115	No unit description ➡			-75-5D-C						137	55		32
				115	180				-115-5D-C									
				180	235				-180-5D-C									
				235	∞				-235-5D-C									
		□25	15	25	35	KGDF$^{R}_{L}$ 2525X25-5BS	●	●	KGDF$^{R}_{L}$ -25-5B-C	KGD$^{L}_{R}$2525-C	25	7	11.6	25	145	38	29.5	15
				35	50	2525X35-5BS	●	●	-35-5B-C									
				50	75	2525X50-5BS	●	●	-50-5B-C									
				75	115	2525X75-5BS	●	●	-75-5B-C									
				115	180	2525X115-5BS	●	●	-115-5B-C									
				180	235	2525X180-5BS	●	●	-180-5B-C									
				235	∞	2525X235-5BS	●	●	-235-5B-C									
			20	25	35	2525X25-5CS	●	●	-25-5C-C						150	43		20
			25	35	50	2525X35-5CS	●	●	-35-5C-C						155	48		25
				50	75	2525X50-5CS	●	●	-50-5C-C									
				75	115	No unit description ➡			-75-5C-C									
				115	180				-115-5C-C									
				180	235				-180-5C-C									
				235	∞				-235-5C-C									
			32	75	115	KGDF$^{R}_{L}$ 2525X75-5DS	●	●	-75-5D-C						162	55		32
				115	180	2525X115-5DS	●	●	-115-5D-C									
				180	235	2525X180-5DS	●	●	-180-5D-C									
				235	∞	2525X235-5DS	●	●	-235-5D-C									
		□32	15	25	35	No unit description ➡			KGDF$^{R}_{L}$ -25-5B-C	KGD$^{L}_{R}$3232-C	32	-	11.6	32	165	38	36.5	15
				35	50				-35-5B-C									
				50	75				-50-5B-C									
				75	115				-75-5B-C									
				115	180				-115-5B-C									
				180	235				-180-5B-C									
				235	∞				-235-5B-C									
			20	25	35				-25-5C-C						170	43		20
			25	35	50				-35-5C-C						175	48		25
				50	75				-50-5C-C									
				75	115				-75-5C-C									
				115	180				-115-5C-C									
				180	235				-180-5C-C									
				235	∞				-235-5C-C									
			32	75	115				-75-5D-C						182	55		32
				115	180				-115-5D-C									
				180	235				-180-5D-C									
				235	∞				-235-5D-C									

Note) 1. In case the unit description is not available (No unit description), please purchase toolholder and blade separately.
2. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡ G75

Spare Parts (Common with separate types)

* The parts are included in the toolholder and unit.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
			
KGDF$^{R}_{L}$.....S	BH6X10TR	SB-60120TR	LTW-25

● : Std. Item

● Toolholder Dimensions

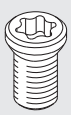
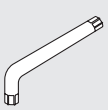
Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. ϕD (mm) MIN.	Face Grooving Dia. ϕD (mm) MAX.	Unit Description (Standard Stock Description)	Std. R	Std. L	Blade Description ➡G85	Toolholder Description ➡G25	H1=h	H2	H3	B	L1	L2	F1	T
0°	6	□20	15	25	35	KGDF$^{R}_{L}$ 2020X25-6BS	●	●	KGDF$^{R}_{L}$ -25-6B-C	KGD$^{L}_{R}$ 2020-C	20	12	11.6	20	120	38	24.5	15
				35	50	2020X35-6BS	●	●	-35-6B-C									
				50	75	2020X50-6BS	●	●	-50-6B-C									
				75	115	2020X75-6BS	●	●	-75-6B-C									
				115	180	2020X115-6BS	●	●	-115-6B-C									
				180	235	2020X180-6BS	●	●	-180-6B-C									
				235	∞	2020X235-6BS	●	●	-235-6B-C									
			20	25	35	2020X25-6CS	●	●	-25-6C-C						125	43		20
			25	35	50	2020X35-6CS	●	●	-35-6C-C						130	48		25
				50	75	2020X50-6CS	●	●	-50-6C-C									
				75	115	2020X75-6CS	●	●	-75-6C-C									
				115	180	2020X115-6CS	●	●	-115-6C-C									
				180	235	2020X180-6CS	●	●	-180-6C-C									
				235	∞	2020X235-6CS	●	●	-235-6C-C									
			32	75	115	No unit description ➡			-75-6D-C						137	55		32
				115	180				-115-6D-C									
				180	235				-180-6D-C									
				235	∞				-235-6D-C									
		□25	15	25	35	KGDF$^{R}_{L}$ 2525X25-6BS	●	●	KGDF$^{R}_{L}$ -25-6B-C	KGD$^{L}_{R}$ 2525-C	25	7	11.6	25	145	38	29.5	15
				35	50	2525X35-6BS	●	●	-35-6B-C									
				50	75	2525X50-6BS	●	●	-50-6B-C									
				75	115	2525X75-6BS	●	●	-75-6B-C									
				115	180	2525X115-6BS	●	●	-115-6B-C									
				180	235	2525X180-6BS	●	●	-180-6B-C									
				235	∞	2525X235-6BS	●	●	-235-6B-C									
			20	25	35	2525X25-6CS	●	●	-25-6C-C						150	43		20
			25	35	50	2525X35-6CS	●	●	-35-6C-C						155	48		25
				50	75	2525X50-6CS	●	●	-50-6C-C									
				75	115	No unit description ➡			-75-6C-C									
				115	180				-115-6C-C									
				180	235				-180-6C-C									
				235	∞				-235-6C-C									
			32	75	115	KGDF$^{R}_{L}$ 2525X75-6DS	●	●	-75-6D-C						162	55		32
				115	180	2525X115-6DS	●	●	-115-6D-C									
				180	235	2525X180-6DS	●	●	-180-6D-C									
				235	∞	2525X235-6DS	●	●	-235-6D-C									
		□32	15	25	35	No unit description ➡			KGDF$^{R}_{L}$ -25-6B-C	KGD$^{L}_{R}$ 3232-C	32	-	11.6	32	165	38	36.5	15
				35	50				-35-6B-C									
				50	75				-50-6B-C									
				75	115				-75-6B-C									
				115	180				-115-6B-C									
				180	235				-180-6B-C									
				235	∞				-235-6B-C									
			20	25	35				-25-6C-C						170	43		20
			25	35	50				-35-6C-C						175	48		25
				50	75				-50-6C-C									
				75	115				-75-6C-C									
				115	180				-115-6C-C									
				180	235				-180-6C-C									
				235	∞				-235-6C-C									
			32	75	115				-75-6D-C						182	55		32
				115	180				-115-6D-C									
				180	235				-180-6D-C									
				235	∞				-235-6D-C									

Note) 1. In case the unit description is not available (No unit description), please purchase toolholder and blade separately.
2. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡ G75

● Spare Parts (Common with separate types)

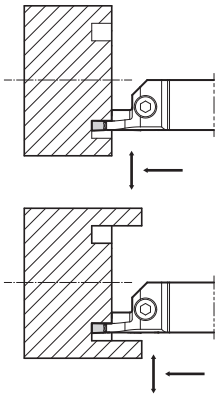
* The parts are included in the toolholder and unit.

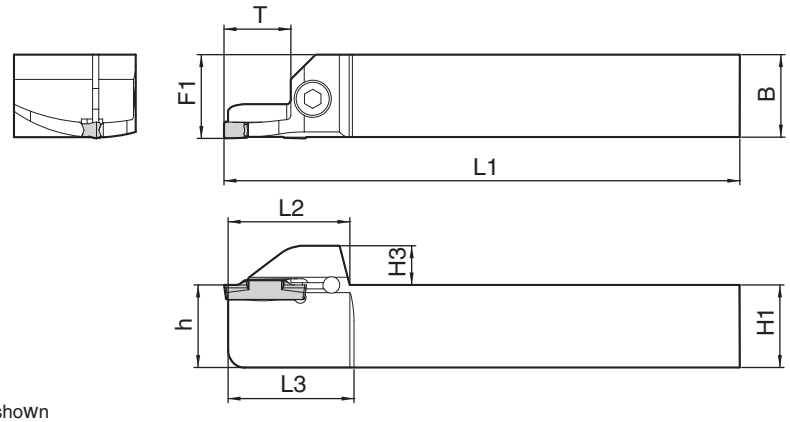
Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Spare Parts: Clamp Screw (for Blade)	Spare Parts: Wrench
			
KGDF$^{R}_{L}$·····S	BH6X10TR	SB-60120TR	LTW-25

● : Std. Item

Face Grooving Toolholders (Integral Type)

KGDF-Z NEW





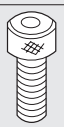
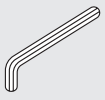
•Right-hand shown

Toolholder Dimensions

Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. ϕD (mm) MIN.	MAX.	Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	L3	F1	T
3	□20	15	50	65	KGDF R/L 2020K50-3B-Z	●	●	20	9.5	20	125	30.5	31	20.3	15
			65	85	2020K65-3B-Z	●	●								
			85	110	2020K85-3B-Z	●	●								
			110	145	2020K110-3B-Z	●	●								
	□25		50	65	KGDF R/L 2525M50-3B-Z	●	●	25		25	150			25.3	
			65	85	2525M65-3B-Z	●	●								
			85	110	2525M85-3B-Z	●	●								
			110	145	2525M110-3B-Z	●	●								
4	□20	15	50	70	KGDF R/L 2020K50-4B-Z	●	●	20	9.5	20	125	30.5	31	20.3	15
			70	100	2020K70-4B-Z	●	●								
			100	150	2020K100-4B-Z	●	●								
	□25		50	70	KGDF R/L 2525M50-4B-Z	●	●	25		25	150			25.3	
			70	100	2525M70-4B-Z	●	●								
			100	150	2525M100-4B-Z	●	●								
5	□20	15	50	75	KGDF R/L 2020K50-5B-Z	●	●	20	9.5	20	125	30.5	31	20.3	15
			75	115	2020K75-5B-Z	●	●								
			115	180	2020K115-5B-Z	●	●								
	□25		50	75	KGDF R/L 2525M50-5B-Z	●	●	25		25	150			25.3	
			75	115	2525M75-5B-Z	●	●								
			115	180	2525M115-5B-Z	●	●								

Applicable Inserts G75

Spare Parts

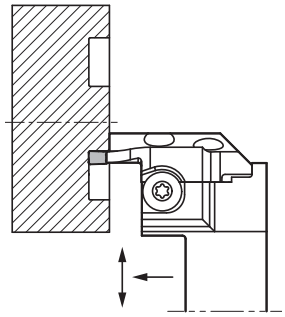
Description	Spare Parts: Clamp Bolt	Spare Parts: Wrench
		
KGDF R/L ····Z	HH5X16	LW-4

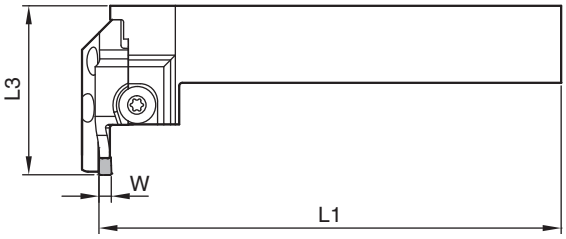
Toolholder Identification System (Integral Type)

KGDF	R	2525	M	50	3	B	Z
Series: KGDF Face Grooving	Hand of Tool: R: Right-hand, L: Left-hand	Shank Size: 2020 : □20mm, 2525 : □25mm	Toolholder Length: K : 125mm, M : 150mm	Min. Face Groove Dia.: 50 : 50mm … 115 : 115mm	Edge Width: 3 : 3mm, 4 : 4mm, 5 : 5mm	Grooving Depth: B : 15mm	Toolholder Type: Z : Integral Type

● : Std. Item

KGDF





• Right-hand shown (Right-hand Blade and Right-hand Toolholder)

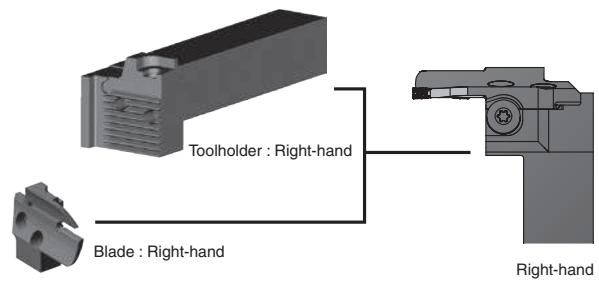
Combination of Toolholder & Blade

Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. φD (mm) MIN.	Face Grooving Dia. φD (mm) MAX.	Blade Description ➡G85	Toolholder Description ➡G25	Dimension (mm) L1	Dimension (mm) L3
90°	2	□20	6	25	30	KGDFR -25-2A-C	KGDSR2020-C	125	49.7
				30	35	-30-2A-C			
				35	45	-35-2A-C			
				45	60	-45-2A-C			
				60	80	-60-2A-C			
				80	100	-80-2A-C			
				100	130	-100-2A-C			
			13	25	30	-25-2B-C			52.7
			15	30	35	-30-2B-C			54.7
				35	45	-35-2B-C			
				45	60	-45-2B-C			
				60	80	-60-2B-C			
				80	100	-80-2B-C			
				100	130	-100-2B-C			
		□25	6	25	30	KGDFR -25-2A-C	KGDSR2525-C	150	49.7
				30	35	-30-2A-C			
				35	45	-35-2A-C			
				45	60	-45-2A-C			
				60	80	-60-2A-C			
				80	100	-80-2A-C			
				100	130	-100-2A-C			
			13	25	30	-25-2B-C			52.7
			15	30	35	-30-2B-C			54.7
				35	45	-35-2B-C			
				45	60	-45-2B-C			
				60	80	-60-2B-C			
				80	100	-80-2B-C			
				100	130	-100-2B-C			
90°	3	□20	13	25	30	KGDF$^{R}_{L}$ -25-3A-C	KGDS$^{R}_{L}$2020-C	125	52.7
				30	40	-30-3A-C			
				40	50	-40-3A-C			
			15	50	65	-50-3B-C			54.7
				65	85	-65-3B-C			
				85	110	-85-3B-C			
				110	145	-110-3B-C			
			22	50	65	-50-3C-C			59.7
				65	85	-65-3C-C			
			25	85	110	-85-3C-C			61.7
				110	145	-110-3C-C			
		□25	13	25	30	KGDF$^{R}_{L}$ -25-3A-C	KGDS$^{R}_{L}$2525-C	150	52.7
				30	40	-30-3A-C			
				40	50	-40-3A-C			
			15	50	65	-50-3B-C			54.7
				65	85	-65-3B-C			
				85	110	-85-3B-C			
				110	145	-110-3B-C			
			22	50	65	-50-3C-C			59.7
				65	85	-65-3C-C			
			25	85	110	-85-3C-C			61.7
				110	145	-110-3C-C			

Applicable Inserts ➡G75

Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. φD (mm) MIN.	Face Grooving Dia. φD (mm) MAX.	Blade Description ➡G85	Toolholder Description ➡G25	Dimension (mm) L1	Dimension (mm) L3
90°	4	□20	13	25	35	KGDF$^{R}_{L}$ -25-4A-C	KGDS$^{R}_{L}$2020-C	125	52.7
			15	35	50	-35-4B-C			54.7
				50	70	-50-4B-C			
				70	100	-70-4B-C			
				100	150	-100-4B-C			
				150	220	-150-4B-C			
				220	∞	-220-4B-C			
			25	35	50	-35-4C-C			64.7
				50	70	-50-4C-C			
				70	100	-70-4C-C			
				100	150	-100-4C-C			
				150	220	-150-4C-C			
				220	∞	-220-4C-C			
		□25	13	25	35	KGDF$^{R}_{L}$ -25-4A-C	KGDS$^{R}_{L}$2525-C	150	52.7
			15	35	50	-35-4B-C			54.7
				50	70	-50-4B-C			
				70	100	-70-4B-C			
				100	150	-100-4B-C			
				150	220	-150-4B-C			
				220	∞	-220-4B-C			
			25	35	50	-35-4C-C			64.7
				50	70	-50-4C-C			
				70	100	-70-4C-C			
				100	150	-100-4C-C			
				150	220	-150-4C-C			
				220	∞	-220-4C-C			

Applicable Inserts ➡G75



- KGDF 90° type is not available as unit (Toolholder + blade). Please purchase toolholder and blade separately.
- Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.
- The insert clamping screw (BH6X10TR), blade fixing screw (SB-60120TR) and wrench (LTW-25) which are included in the toolholder can be used.

Face Grooving Toolholders (90° Separate Type)

● Combination of Blade & Toolholder

Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. φD (mm) MIN.	Face Grooving Dia. φD (mm) MAX.	Blade Description ➡G85	Toolholder Description ➡G25	Dimension (mm) L1	Dimension (mm) L3
90°	5	□20	15	25	35	KGDF$^{R}_{L}$ -25-5B-C	KGDS$^{R}_{L}$2020-C	125	54.7
				35	50	-35-5B-C			
				50	75	-50-5B-C			
				75	115	-75-5B-C			
				115	180	-115-5B-C			
				180	235	-180-5B-C			
				235	∞	-235-5B-C			
			20	25	35	-25-5C-C			59.7
			25	35	50	-35-5C-C			64.7
				50	75	-50-5C-C			
				75	115	-75-5C-C			
				115	180	-115-5C-C			
				180	235	-180-5C-C			
				235	∞	-235-5C-C			
			32	75	115	-75-5D-C			71.7
				115	180	-115-5D-C			
				180	235	-180-5D-C			
				235	∞	-235-5D-C			
		□25	15	25	35	KGDF$^{R}_{L}$ -25-5B-C	KGDS$^{R}_{L}$2525-C	150	54.7
				35	50	-35-5B-C			
				50	75	-50-5B-C			
				75	115	-75-5B-C			
				115	180	-115-5B-C			
				180	235	-180-5B-C			
				235	∞	-235-5B-C			
			20	25	35	-25-5C-C			59.7
			25	35	50	-35-5C-C			64.7
				50	75	-50-5C-C			
				75	115	-75-5C-C			
				115	180	-115-5C-C			
				180	235	-180-5C-C			
				235	∞	-235-5C-C			
			32	75	115	-75-5D-C			71.7
				115	180	-115-5D-C			
				180	235	-180-5D-C			
				235	∞	-235-5D-C			

Applicable Inserts ➡ **G75**

Shank Angle	Edge Width W (mm)	Shank Size (mm)	Max. depth of cut (mm)	Face Grooving Dia. φD (mm) MIN.	Face Grooving Dia. φD (mm) MAX.	Blade Description ➡G85	Toolholder Description ➡G25	Dimension (mm) L1	Dimension (mm) L3
90°	6	□20	15	25	35	KGDF$^{R}_{L}$ -25-6B-C	KGDS$^{R}_{L}$2020-C	125	54.7
				35	50	-35-6B-C			
				50	75	-50-6B-C			
				75	115	-75-6B-C			
				115	180	-115-6B-C			
				180	235	-180-6B-C			
				235	∞	-235-6B-C			
			20	25	35	-25-6C-C			59.7
			25	35	50	-35-6C-C			64.7
				50	75	-50-6C-C			
				75	115	-75-6C-C			
				115	180	-115-6C-C			
				180	235	-180-6C-C			
				235	∞	-235-6C-C			
			32	75	115	-75-6D-C			71.7
				115	180	-115-6D-C			
				180	235	-180-6D-C			
				235	∞	-235-6D-C			
		□25	15	25	35	KGDF$^{R}_{L}$ -25-6B-C	KGDS$^{R}_{L}$2525-C	150	54.7
				35	50	-35-6B-C			
				50	75	-50-6B-C			
				75	115	-75-6B-C			
				115	180	-115-6B-C			
				180	235	-180-6B-C			
				235	∞	-235-6B-C			
			20	25	35	-25-6C-C			59.7
			25	35	50	-35-6C-C			64.7
				50	75	-50-6C-C			
				75	115	-75-6C-C			
				115	180	-115-6C-C			
				180	235	-180-6C-C			
				235	∞	-235-6C-C			
			32	75	115	-75-6D-C			71.7
				115	180	-115-6D-C			
				180	235	-180-6D-C			
				235	∞	-235-6D-C			

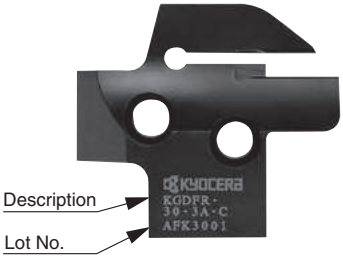
Applicable Inserts ➡ **G75**

◆ Face Grooving Blade Identification System

Hand of blade	Width	Blade Symbol
R : Right-hand L : Left-hand	2 : 2mm 5 : 5mm 3 : 3mm 6 : 6mm 4 : 4mm	C : Applicable to toolholder with suffix "-C"

KGDF **R** – **25** – **3** **A** – **C**

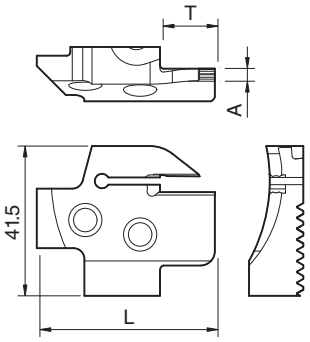
Series	Min. diameter in face grooving	Grooving Depth	
KGDF Face Grooving	Indicates the minimum external diameter suitable for the initial face grooving.	A : 13mm B : 15mm	2-edge insert (1-edge insert can also be used.)
	25 : 25mm : 235 : 235mm	C : 20mm~25mm D : 32mm	1-edge insert



Example of printing of blade description

Face Grooving Blade

● Blade Dimensions

Shape	Blade Description	Std. R	Std. L	Dimension (mm) L	Dimension (mm) T	Dimension (mm) A	Face Grooving Dia. φD (mm) MIN.	Face Grooving Dia. φD (mm) MAX.	Edge Width (mm) W	Applicable Inserts ➡G75	Toolholder Description ➡G25
	KGDFR -25-2A-C	●	-	44.35	6	1.5	25	30	2	GDFM2020N-020GM	KGD$^{L}_{R}$·····-C KGDS$^{R}_{L}$····-C
	KGDFR -30-2A-C	●	-				30	35			
	KGDFR -35-2A-C	●	-				35	45			
	KGDFR -45-2A-C	●	-				45	60			
	KGDFR -60-2A-C	●	-				60	80			
	KGDFR -80-2A-C	●	-				80	100			
	KGDFR -100-2A-C	●	-				100	130			
	KGDFR -25-2B-C	●	-	47.35	13		25	30			
	KGDFR -30-2B-C	●	-	49.35	15		30	35			
	KGDFR -35-2B-C	●	-				35	45			
	KGDFR -45-2B-C	●	-				45	60			
	KGDFR -60-2B-C	●	-				60	80			
	KGDFR -80-2B-C	●	-				80	100			
	KGDFR -100-2B-C	●	-				100	130			
	KGDF$^{R}_{L}$ -25-3A-C	●	●	47.35	13	2	25	30	3	GDFM3020N-030GM GDFM3020N-030DM GDFMS3020N-030DM GDFM3020N-150R-CM	
	KGDF$^{R}_{L}$ -30-3A-C	●	●				30	40			
	KGDF$^{R}_{L}$ -40-3A-C	●	●				40	50			
	KGDF$^{R}_{L}$ -50-3B-C	●	●	49.35	15		50	65			
	KGDF$^{R}_{L}$ -65-3B-C	●	●				65	85			
	KGDF$^{R}_{L}$ -85-3B-C	●	●				85	110			
	KGDF$^{R}_{L}$ -110-3B-C	●	●				110	145			
	KGDF$^{R}_{L}$ -50-3C-C	●	●	56.35	22		50	65			
	KGDF$^{R}_{L}$ -65-3C-C	●	●				65	85			
	KGDF$^{R}_{L}$ -85-3C-C	●	●	59.35	25		85	110			
	KGDF$^{R}_{L}$ -110-3C-C	●	●				110	145			
	KGDF$^{R}_{L}$ -25-4A-C	●	●	47.35	13	3	25	35	4	GDFM4020N-040GM GDFM4020N-040GH GDFM4020N-040DM GDFMS4020N-040DM GDFM4020N-200R-CM	
	KGDF$^{R}_{L}$ -35-4B-C	●	●	49.35	15		35	50			
	KGDF$^{R}_{L}$ -50-4B-C	●	●				50	70			
	KGDF$^{R}_{L}$ -70-4B-C	●	●				70	100			
	KGDF$^{R}_{L}$ -100-4B-C	●	●				100	150			
	KGDF$^{R}_{L}$ -150-4B-C	●	●				150	220			
	KGDF$^{R}_{L}$ -220-4B-C	●	●				220	∞			
	KGDF$^{R}_{L}$ -35-4C-C	●	●	59.35	25		35	50			
	KGDF$^{R}_{L}$ -50-4C-C	●	●				50	70			
	KGDF$^{R}_{L}$ -70-4C-C	●	●				70	100			
	KGDF$^{R}_{L}$ -100-4C-C	●	●				100	150			
	KGDF$^{R}_{L}$ -150-4C-C	●	●				150	220			
	KGDF$^{R}_{L}$ -220-4C-C	●	●				220	∞			
	KGDF$^{R}_{L}$ -25-5B-C	●	●	49.35	15	4	25	35	5	GDFM5020N-040GM GDFM5020N-080GM GDFM5020N-040GH GDFM5020N-080GH GDFM5020N-040DM GDFMS5020N-040DM GDFM5020N-250R-CM	
	KGDF$^{R}_{L}$ -35-5B-C	●	●				35	50			
	KGDF$^{R}_{L}$ -50-5B-C	●	●				50	75			
	KGDF$^{R}_{L}$ -75-5B-C	●	●				75	115			
	KGDF$^{R}_{L}$ -115-5B-C	●	●				115	180			
	KGDF$^{R}_{L}$ -180-5B-C	●	●				180	235			
	KGDF$^{R}_{L}$ -235-5B-C	●	●				235	∞			
	KGDF$^{R}_{L}$ -25-5C-C	●	●	54.35	20		25	35			
	KGDF$^{R}_{L}$ -35-5C-C	●	●	59.35	25		35	50			
	KGDF$^{R}_{L}$ -50-5C-C	●	●				50	75			
	KGDF$^{R}_{L}$ -75-5C-C	●	●				75	115			
	KGDF$^{R}_{L}$ -115-5C-C	●	●				115	180			
	KGDF$^{R}_{L}$ -180-5C-C	●	●				180	235			
	KGDF$^{R}_{L}$ -235-5C-C	●	●				235	∞			
	KGDF$^{R}_{L}$ -75-5D-C	●	●	66.35	32		75	115			
	KGDF$^{R}_{L}$ -115-5D-C	●	●				115	180			
	KGDF$^{R}_{L}$ -180-5D-C	●	●				180	235			
	KGDF$^{R}_{L}$ -235-5D-C	●	●				235	∞			
	KGDF$^{R}_{L}$ -25-6B-C	●	●	49.35	15	5	25	35	6	GDFM6020N-040GM GDFM6020N-080GM GDFM6020N-040GH GDFM6020N-080GH GDFM6020N-040DM GDFMS6020N-040DM GDFM6020N-300R-CM	
	KGDF$^{R}_{L}$ -35-6B-C	●	●				35	50			
	KGDF$^{R}_{L}$ -50-6B-C	●	●				50	75			
	KGDF$^{R}_{L}$ -75-6B-C	●	●				75	115			
	KGDF$^{R}_{L}$ -115-6B-C	●	●				115	180			
	KGDF$^{R}_{L}$ -180-6B-C	●	●				180	235			
	KGDF$^{R}_{L}$ -235-6B-C	●	●				235	∞			
	KGDF$^{R}_{L}$ -25-6C-C	●	●	54.35	20		25	35			
	KGDF$^{R}_{L}$ -35-6C-C	●	●	59.35	25		35	50			
	KGDF$^{R}_{L}$ -50-6C-C	●	●				50	75			
	KGDF$^{R}_{L}$ -75-6C-C	●	●				75	115			
	KGDF$^{R}_{L}$ -115-6C-C	●	●				115	180			
	KGDF$^{R}_{L}$ -180-6C-C	●	●				180	235			
	KGDF$^{R}_{L}$ -235-6C-C	●	●				235	∞			
	KGDF$^{R}_{L}$ -75-6D-C	●	●	66.35	32		75	115			
	KGDF$^{R}_{L}$ -115-6D-C	●	●				115	180			
	KGDF$^{R}_{L}$ -180-6D-C	●	●				180	235			
	KGDF$^{R}_{L}$ -235-6D-C	●	●				235	∞			

Right-hand shown

● : Std. Item

Recommended Cutting Conditions

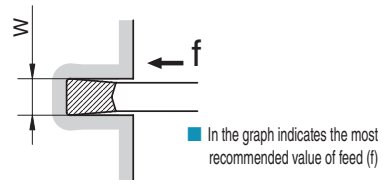
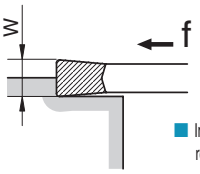
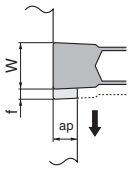
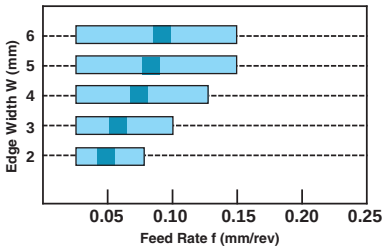
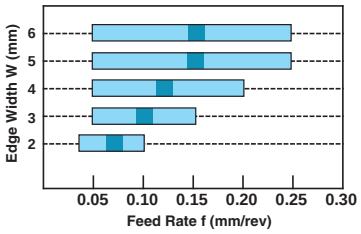
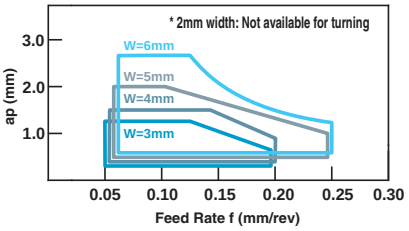
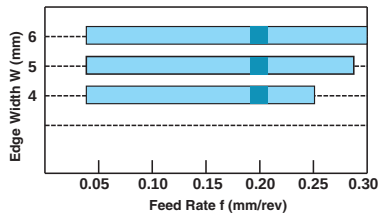
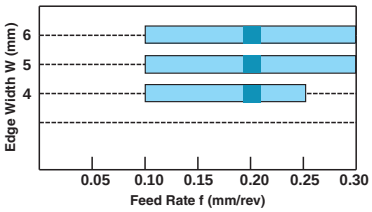
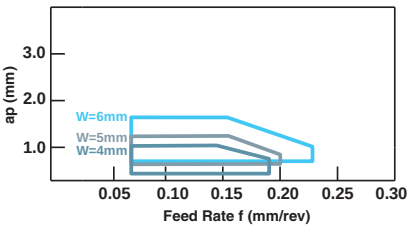
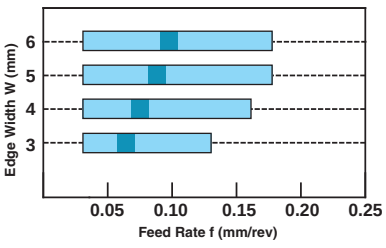
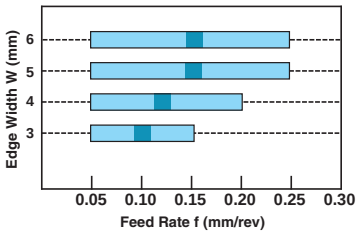
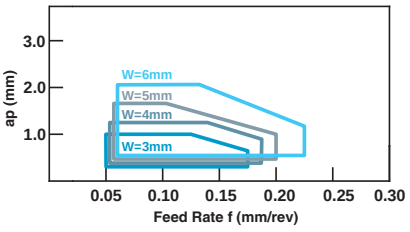
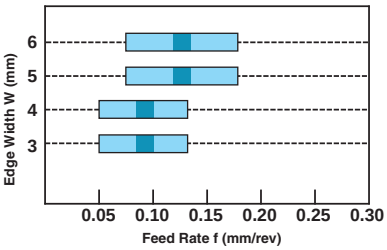
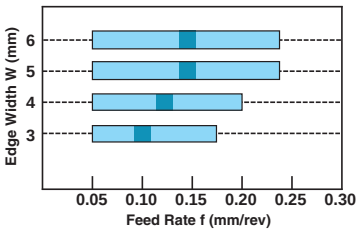
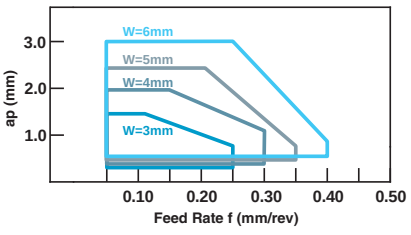
◆ Recommended Cutting Conditions (Vc)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)				Remarks
	Cermet		MEGACOAT		
	TN620	TN90	PR1225	PR1215	
Carbon Steel	☆ 60~200	☆ 80~200	★ 60~160	☆ 80~160	Coolant
Alloy Steel	☆ 60~160	☆ 70~160	★ 60~150	☆ 60~150	
Stainless Steel	-	-	★ 50~120	☆ 50~120	
Cast Iron	-	-	-	★ 80~160	

★: 1st Recommendation ☆: 2nd Recommendation

◆ Recommended Cutting Conditions (Feed Rate / ap)

[Workpiece material: S50C]

Chipbreaker	Grooving	Shoulder grooving (Side grooving)	Turning
	 ■ In the graph indicates the most recommended value of feed (f)	 ■ In the graph indicates the most recommended value of feed (f)	
GM (Grooving and Turning)			
GH (Grooving, Turning and High Feed Grooving)			
DM (Deep grooving and Turning)			
CM (Copying)			

● When shoulder grooving
- · If ap is set smaller, set feed higher.
- · If ap is set larger, set feed lower.

1) The above values are based on the condition that the dimension T of toolholder is 15 mm or less.
2) If the toolholder's dimension T is over 15 mm, set the values for turning to less than 90% of those above.

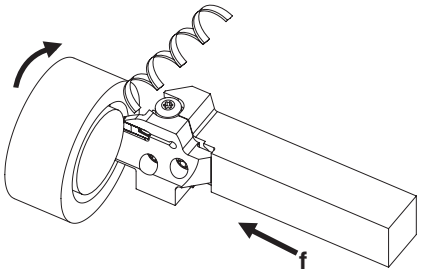
Guide for Face Grooving

1) Toolholder Selection

Check the range of applicable "face grooving diameter" as well as the groove width and depth.

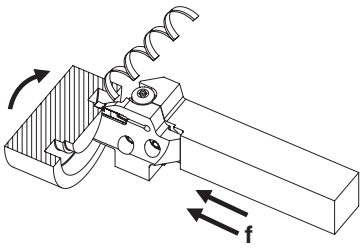
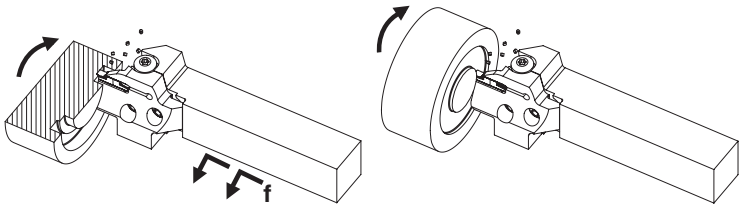
2) Cutting conditions (Feed rate : f)

When machining on steel, set the feed rate (f) so that chips are created in a helical form in cut-off.



3) How to widen the groove (Plunge milling and Turning)

Start machining from the outside and then proceed to the inside. Chip control will be better in this way.

Plunge milling (Grooving + Side grooving)	Turning
	

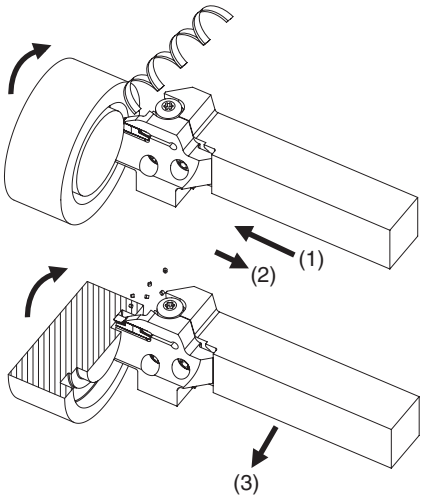
4) Guide for turning

A. When the cutting amount (ap) is over 0.5 mm

(1) Perform Plunge milling.

(2) Return the cutting by 0.1 mm.

(3) Perform turning (Ref. to Fig.1)



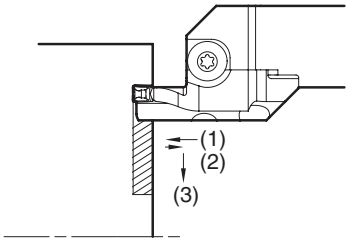


Fig.1

● When widening the face groove width (Ref. to Fig.2)
Apply the “Step Turning”.
Then perform finishing.

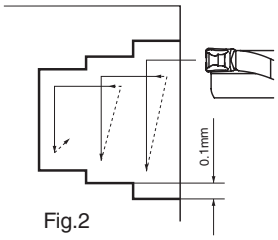
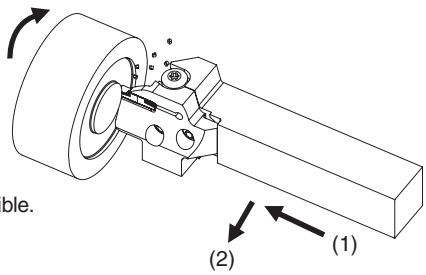


Fig.2

B. When the cutting amount (ap) is under 0.5 mm

(1) Perform Plunge milling.

(2) Perform turning.
Machining without interruption is possible.
(Ref. to Fig.3)



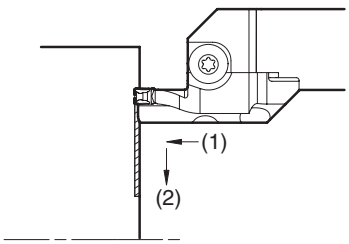
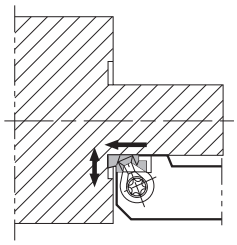
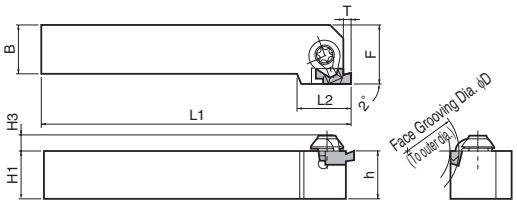


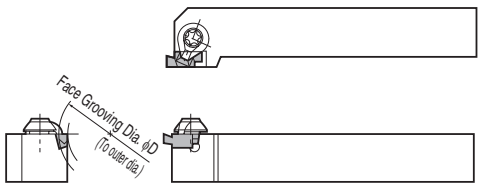
Fig.3

GFVS-AA





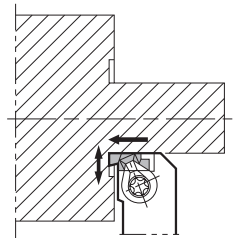
•Right-hand shown

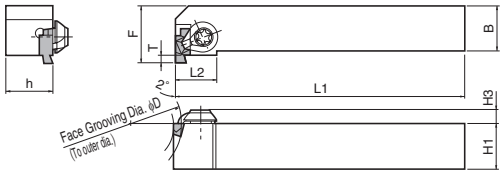


•Left-hand shown

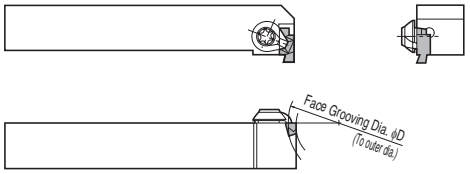
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

GFVT-AA





•Right-hand shown



•Left-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1	h	H3	B	L1	L2	F	T	Face Grooving Dia. φD MIN.	Face Grooving Dia. φD MAX.	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts (G89)
GFVS$^{R}_{L}$	2020K-08AA	●	●	20	20	5.5	20	125	18	25	2.2	8 (0)	∞ (∞)	CPS-5V	FT-15	GVF$^{L}_{R}$100-005AA ~ GVF$^{L}_{R}$300-005AA
	2525M-08AA	●	●	25	25		25	150		32						
GFVT$^{R}_{L}$	2020K-08AA	●	●	20	20	5.5	20	125	14	25	2.2	8 (0)	∞ (∞)	CPS-5V	FT-15	GVF$^{L}_{R}$100-005AA ~ GVF$^{L}_{R}$300-005AA
	2525M-08AA	●	●	25	25		25	150		32						

Note 1. Dimension T shows available grooving depth.

2. The value ( ) of Face Grooving Dia. (φD MAX.) is the maximum outer diameter value after the initial groove between MIN.~MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving Dia. (φD MIN.) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between MIN.~MAX.

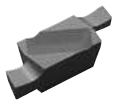
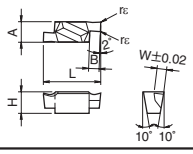
● : Std. Item

Applicable Inserts

(mm)

Description		A	L	H
GVF$^{R}_{L}$	100-…AA	4.3	12	4.5
	200-…AA			
	300-…AA			

P	Carbon steel / Alloy steel	●	○		Classification of usage
M	Stainless Steel	●	○		
K	Cast Iron			◕	◕: Continuous-Light Interruption / 1st Choice
N	Non-ferrous Metals			◕	◔: Continuous-Light Interruption / 2nd Choice
S	Titanium Alloys			◕	●: Continuous / 1st Choice
H	Hard materials (~40HRC)	●	○		○: Continuous / 2nd Choice
	Hard materials (40HRC~)				

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) W	B	rε	MEGACOAT PR1225 R	PR1225 L	PVD Coated Carbide PR930 R	PR930 L	Carbide KW10 R	KW10 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
		GVF$^{R}_{L}$ 100-005AA	1.00	2.2	0.05	●	●	●	●	●	●	GFVS$^{L}_{R}$····08AA GFVT$^{L}_{R}$····08AA	G88
		200-005AA	2.00			●	●	●	●	●	●		
		300-005AA	3.00			●	●	●	●	●	●		

· Dimension B shows available grooving depth.

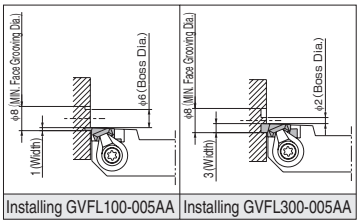
· GVF$^{R}_{L}$···005AA inserts are not compatible with GVF$^{R}_{L}$···–○○○A (Ref. to Page **G95**) inserts because their Side Relief Angle is 10˚.

◆ Face Grooving Diameter of GFVS-AA (also GFVT-AA)

Description		Face Grooving Dia. ϕD MIN.	MAX.	Applicable Inserts
GFVS$^{R}_{L}$	2020K-08AA	8	∞	GVF$^{L}_{R}$100-005AA ~ GVF$^{L}_{R}$300-005AA
	2525M-08AA			
GFVT$^{R}_{L}$	2020K-08AA	(0)	(∞)	
	2525M-08AA			

- It is available to infinity ∞ in case of machining the first groove bigger than MIN.
- When machining towards the outer diameter then there is no MAX. limit to the further groove machining.
- When machining the initial groove on the face at MIN. (ϕ8)

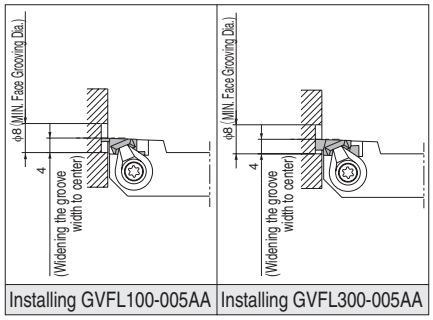
  If the initial groove is made smaller than this, the toolholder interferes with the workpiece.



Installing GVFL100-005AA | Installing GVFL300-005AA

- When widening the groove width to inner diameter.

  For machining up to the center of the workpiece regardless of insert width.



Installing GVFL100-005AA | Installing GVFL300-005AA

◆ Recommended Cutting Conditions (GFVS-AA / GFVT-AA)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT PR1225	PVD Coated Carbide PR930	Carbide KW10	Grooving f (mm/rev)	Turning* ap (mm)	Turning* f (mm/rev)	Remarks
Carbon steel / Alloy steel	★ 50~100	☆ 50~100		0.01~0.05	Max.0.5	0.01~0.05	Coolant
Stainless Steel	★ 50~80	☆ 50~80		0.01~0.03	Max.0.3	0.01~0.02	
Non-ferrous Metals			★ ~200	0.01~0.08	Max.0.5	0.01~0.08	

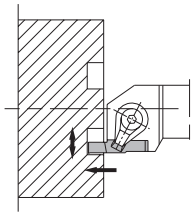
* ap has to be set for less than corner-R(rε) when turning of edge width 1.0 mm (GVF$^{R}_{L}$100-005AA).

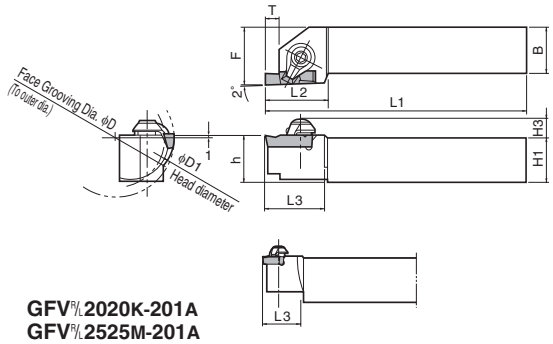
★ :1st Recommendation ☆ :2nd Recommendation

● : Std. Item

Inserts are sold in 10 piece boxes.

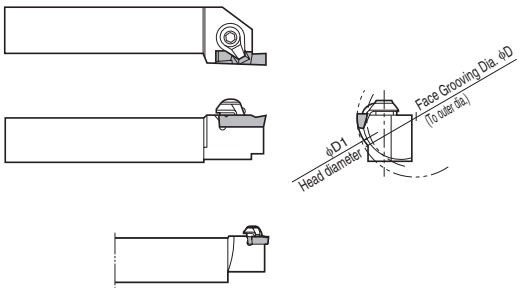
GFV





GFV$^{R}_{L}$2020K-201A
GFV$^{R}_{L}$2525M-201A
shows right figure

•Right-hand shown



•Left-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

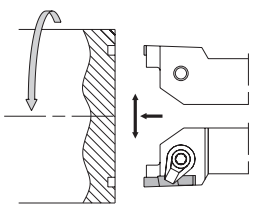
Toolholder Dimensions

Description		Std. R	Std. L	H1	h	H3	B	L1	L2	L3	F	T	φD1	Face Grooving Dia. φD MIN.	Face Grooving Dia. φD MAX.	Spare Parts: Clamp Set	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts (G95)
GFV$^{R}_{L}$	2020K-201A	●	●	20	21	6.5	20	125	20	19	25	2.2	40	20 (12)	∞	CPS-5V	-	FT-15	GVF$^{R}_{L}$200~340-020A
	2525M-201A	●	●	25	26		25	150	23	22	32								GVF$^{R}_{L}$200-…~300-…AR
GFV$^{R}_{L}$	2020K-351B	●	●	20	21	8.0	20	125	28	26	25	4.6	35	35 (25)	50 (∞)	-	CPS-6V	LW-3	GVF$^{R}_{L}$250~350-020B
	2525M-351B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$300-150BR
	2020K-352B	●	●	20	21		20	125	28	26	25	5.1							GVF$^{R}_{L}$400~490-020B
	2525M-352B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$400-200BR
	2020K-501B	●	●	20	21		20	125	28	26	25	4.6	50	50 (25)	70 (∞)				GVF$^{R}_{L}$250~350-020B
	2525M-501B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$300-150BR
	2020K-502B	●	●	20	21		20	125	28	26	25	5.1							GVF$^{R}_{L}$400~490-020B
	2525M-502B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$400-200BR
	2020K-701B	●	●	20	21		20	125	28	26	25	4.6	70	70 (25)	100 (∞)				GVF$^{R}_{L}$250~350-020B
	2525M-701B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$300-150BR
	2020K-702B	●	●	20	21		20	125	28	26	25	5.1							GVF$^{R}_{L}$400~490-020B
	2525M-702B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$400-200BR
GFV$^{R}_{L}$	2525M-501C	●	●	25	26	9.5	25	150	35	33	32	6.6	50	50 (25)	70 (∞)	-	CPS-8V	LW-4	GVF$^{R}_{L}$350~450-040C
	2525M-502C	●	●									8.1							GVF$^{R}_{L}$500~600-040C
	2525M-701C	●	●									6.6	70	70 (25)	100 (∞)				GVF$^{R}_{L}$350~450-040C
	2525M-702C	●	●									8.1							GVF$^{R}_{L}$500~600-040C
	2525M-1001C	●	●							35		6.6	100	100 (25)	150 (∞)				GVF$^{R}_{L}$350~450-040C
	2525M-1002C	●	●									8.1							GVF$^{R}_{L}$500~600-040C
	2525M-1501C	●	●									6.6	150	150 (25)	250 (∞)				GVF$^{R}_{L}$350~450-040C
	2525M-1502C	●	●									8.1							GVF$^{R}_{L}$500~600-040C

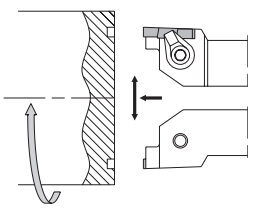
Note 1. Dimension T shows available grooving depth.
2. φD1 shows toolholder head diameter to L3.
3. The value ( ) of Face Grooving Dia. (φD MAX.) is the maximum outer diameter value after the initial groove between MIN.~MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving Dia. (φD MIN.) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between MIN.~MAX.
4. Standard toolholders are designed with the edge position 1.0mm above the center. When using non-standard toolholders, set the edge position 1.0mm above the center.

Selection of Toolholder & Insert

Toolholder	Right-hand (R)
Insert	Right-hand (R)



Toolholder	Left-hand (L)
Insert	Left-hand (L)



● : Std. Item

◆ Face Grooving Diameter of GFV

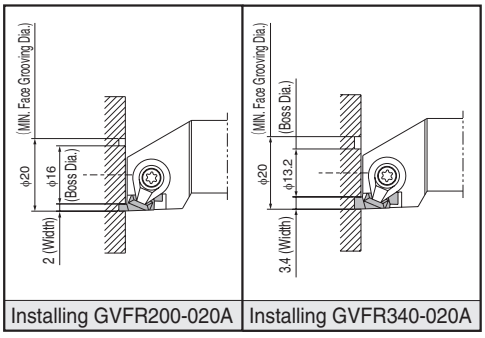
(1) e.g.) GFV$^{R}_{L}$····-201A

Description		Face Grooving Dia. ϕD MIN.	Face Grooving Dia. ϕD MAX.	Applicable Inserts
GFV$^{R}_{L}$	**2020K-201A**	20	∞	GVF$^{R}_{L}$200~340-020A
	2525M-201A	(12)	(∞)	GVF$^{R}_{L}$200-…~300-…AR

- It is available to infinity ∞ in case of machining the first groove bigger than MIN.
- When machining towards the outer diameter then there is no MAX. limit to the further groove machining.

- When machining the initial groove on the face at MIN. ϕ20

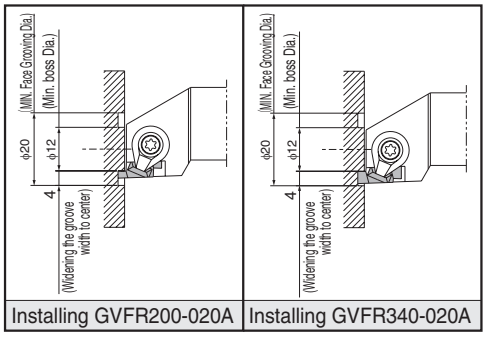
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.
Boss Dia. depends on insert width.



Installing GVFR200-020A | Installing GVFR340-020A

- When widening the groove width to inner diameter.

Face groove diameter ϕD MIN. (12) is the limit; the toolholder interferes with the workpiece in case of smaller than ϕ12.
The toolholder interferes with the workpiece when closer to the center.



Installing GVFR200-020A | Installing GVFR340-020A

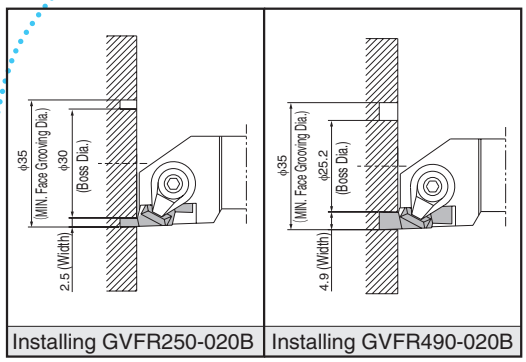
(2) e.g.) GFV$^{R}_{L}$····-351B/352B (same as GFV$^{R}_{L}$····-○○○B or GFV$^{R}_{L}$...-○○○C)

Description		Face Grooving Dia. ϕD MIN.	Face Grooving Dia. ϕD MAX.	Applicable Inserts
GFV$^{R}_{L}$	**2020K-351B**	35	50	GVF$^{R}_{L}$250~350-020B
	2525M-351B			GVF$^{R}_{L}$300-150BR
	2020K-352B	(25)	(∞)	GVF$^{R}_{L}$400~490-020B
	2525M-352B			GVF$^{R}_{L}$400-200BR

- It is possible to widen the groove to infinity ∞ when machining the initial groove within MIN.-MAX. and then widening to outer diameter.

- When machining the initial groove on the face at MIN. ϕ35

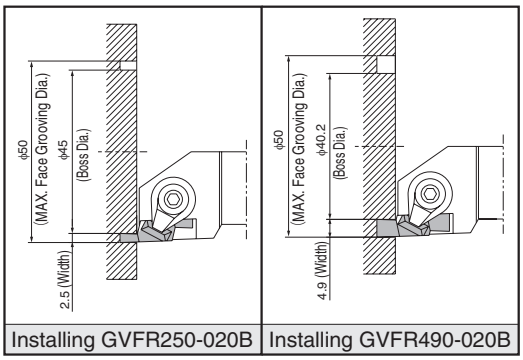
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.
Boss Dia. depends on insert width.



Installing GVFR250-020B | Installing GVFR490-020B

- When machining the initial groove on the face at MAX. ϕ50.

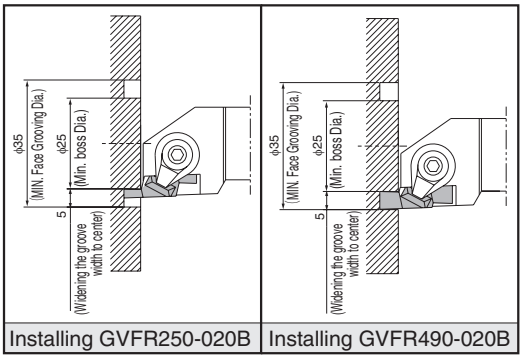
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.
Boss Dia. depends on insert width.



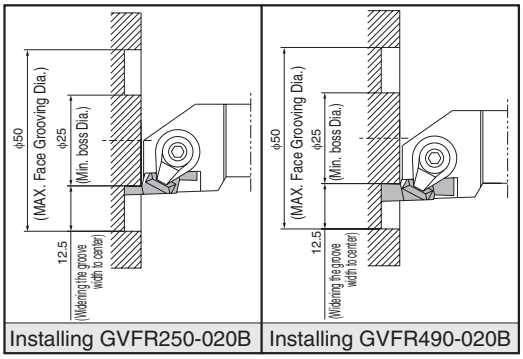
Installing GVFR250-020B | Installing GVFR490-020B

- When widening the groove width to inner diameter.

Face Grooving Dia. ϕD MIN. (ϕ25 Boss Dia.) is the limitation regardless of insert width,
even widening the groove width to the center from the initial groove at ϕD MIN. (ϕ35) or ϕD MAX. (ϕ50).
The toolholder interferes with the workpiece when closer to the center.



Installing GVFR250-020B | Installing GVFR490-020B

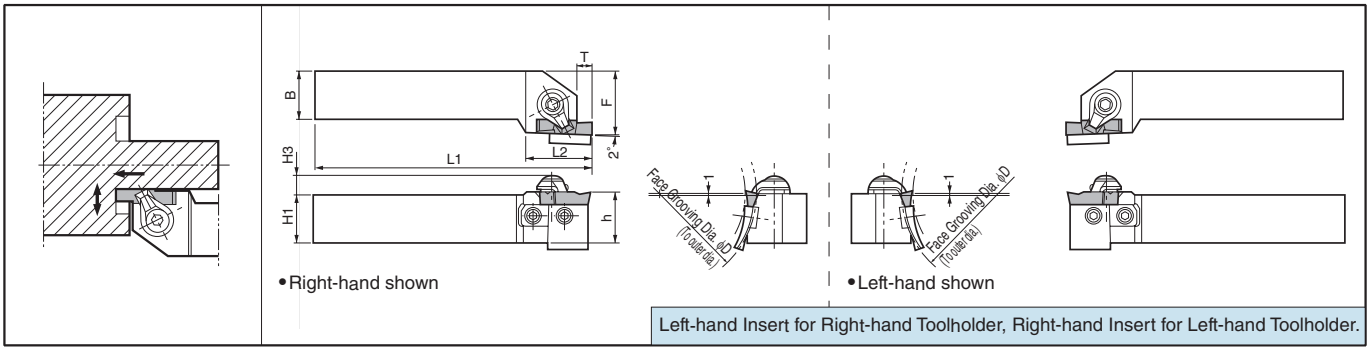


Installing GVFR250-020B | Installing GVFR490-020B

Face Grooving Toolholders [GVF Insert]

GFVS

This toolholder can machine various face grooving diameters by replacing the blade.



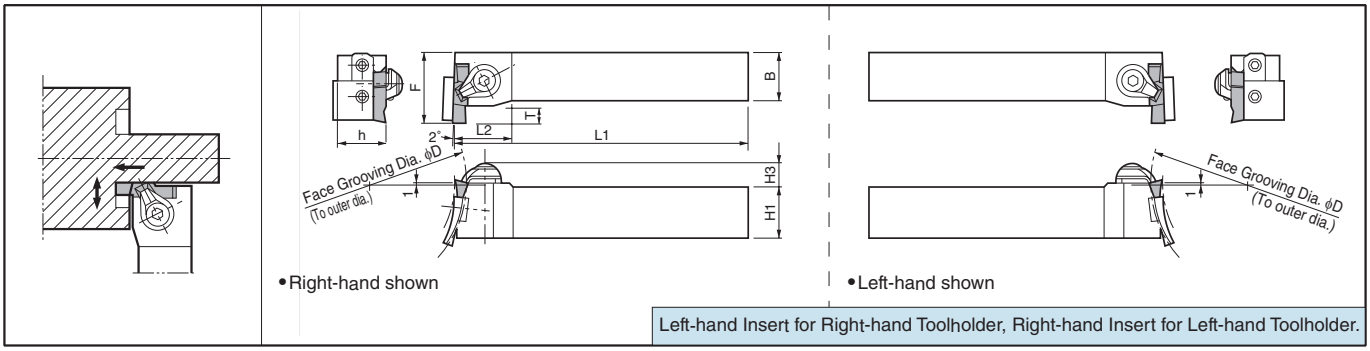
•Right-hand shown

•Left-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

GFVT

This toolholder can machine various face grooving diameters by replacing the blade.



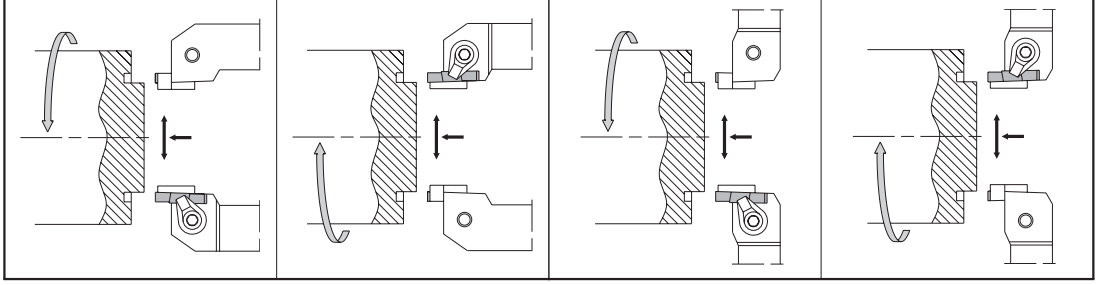
•Right-hand shown

•Left-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

◆ Selection of Toolholder & Insert

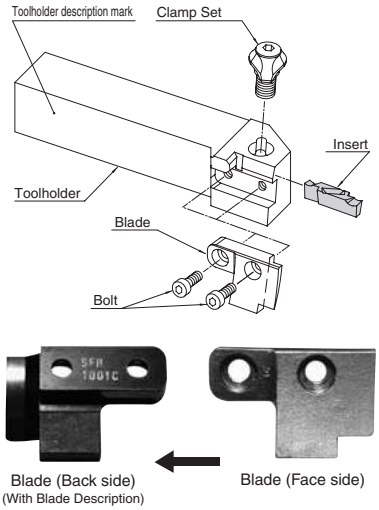
GFVS		GFVT	
Toolholder: Right-hand (R) / Insert: Left-hand (L)	Toolholder: Left-hand (L) / Insert: Right-hand (R)	Toolholder: Right-hand (R) / Insert: Left-hand (L)	Toolholder: Left-hand (L) / Insert: Right-hand (R)



● Combination of Base-Holder & Blade

Toolholder Description (Stamped below)	Std. R	Std. L	Blade Description	Toolholder Description (Unit Description)
GFVS$^{R}_{L}$2020K-HB GFVT$^{R}_{L}$2020K-HB	●	●	SF$^{R}_{L}$ -351B	GFVS$^{R}_{L}$2020K -351B GFVT$^{R}_{L}$2020K -352B
			-352B	-501B
			-501B	-502B
			-502B	-701B
			-701B	-702B
			-702B	
GFVS$^{R}_{L}$2525M-HB GFVT$^{R}_{L}$2525M-HB	●	●	SF$^{R}_{L}$ -351B	GFVS$^{R}_{L}$2525M -351B GFVT$^{R}_{L}$2525M -352B
			-352B	-501B
			-501B	-502B
			-502B	-701B
			-701B	-702B
			-702B	
GFVS$^{R}_{L}$2525M-HC GFVT$^{R}_{L}$2525M-HC	●	●	SF$^{R}_{L}$ -501C	GFVS$^{R}_{L}$2525M -501C GFVT$^{R}_{L}$2525M -502C
			-502C	-701C
			-701C	-702C
			-702C	-1001C
			-1001C	-1002C
			-1002C	-1501C
			-1501C	-1502C
			-1502C	

Example of installation (GFVS)



Blade (Back side)
(With Blade Description)

Blade (Face side)

How to refer to the face grooving toolholder and blade

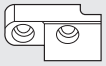
Q: Though "GFVSR2525M-HC" is marked on the face grooving toolholder, the size of cutting dia. is unknown.
How could it be found out?

A: Take off the blade.
Description of the blade is listed on the back of the blade.
Using the description, check the description of the toolholder in the catalog.
If "SFR-1001C" is integrated to "GFVSR2525M-HC", the description of the toolholder is "GVFSR2525M-1001C"

· Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.
· Installation of GFVT type is also pursuing example of installation of GFVS type.

● : Std. Item

● Toolholder Dimensions

Description		Std.		Dimension (mm)								Face Grooving Dia. ϕD		Spare Parts				Applicable Inserts ➔ G95
														Clamp Set	Wrench	Blade	Bolt	
		R	L	H1	h	H3	B	L1	L2	F	T	MIN.	MAX.					
GFVS$^{R}_{L}$	2020K-351B	●	●	20	21	8.0	20	125	30	25	5.1	35 (25)	50 (∞)	CPS-6V	LW-3	SF$^{R}_{L}$-351B	HH4X12	GVF$^{R}_{L}$250~350-020B
	2525M-351B	●	●	25	26		25	150	32	32	(4.6)							GVF$^{R}_{L}$300-150BR
	2020K-352B	●	●	20	21		20	125	30	25	5.1					SF$^{R}_{L}$-352B		GVF$^{R}_{L}$400~490-020B
	2525M-352B	●	●	25	26		25	150	32	32	(5.1)							GVF$^{R}_{L}$400-200BR
	2020K-501B	●	●	20	21		20	125	30	25	5.1	50 (25)	70 (∞)			SF$^{R}_{L}$-501B		GVF$^{R}_{L}$250~350-020B
	2525M-501B	●	●	25	26		25	150	32	32	(4.6)							GVF$^{R}_{L}$300-150BR
	2020K-502B	●	●	20	21		20	125	30	25	5.1					SF$^{R}_{L}$-502B		GVF$^{R}_{L}$400~490-020B
	2525M-502B	●	●	25	26		25	150	32	32	(5.1)							GVF$^{R}_{L}$400-200BR
	2020K-701B	●	●	20	21		20	125	30	25	5.1	70 (25)	100 (∞)			SF$^{R}_{L}$-701B		GVF$^{R}_{L}$250~350-020B
	2525M-701B	●	●	25	26		25	150	32	32	(4.6)							GVF$^{R}_{L}$300-150BR
	2020K-702B	●	●	20	21		20	125	30	25	5.1					SF$^{R}_{L}$-702B		GVF$^{R}_{L}$400~490-020B
	2525M-702B	●	●	25	26		25	150	32	32	(5.1)							GVF$^{R}_{L}$400-200BR
GFVS$^{R}_{L}$	2525M-501C	●	●	25	26	9.5	25	150	32	32	8.1(6.6)	50 (25)	70 (∞)	CPS-8V	LW-4	SF$^{R}_{L}$-501C	HH4X12	GVF$^{R}_{L}$350~450-040C
	2525M-502C	●	●								8.1(8.1)					SF$^{R}_{L}$-502C		GVF$^{R}_{L}$500~600-040C
	2525M-701C	●	●								8.1(6.6)	70 (25)	100 (∞)			SF$^{R}_{L}$-701C		GVF$^{R}_{L}$350~450-040C
	2525M-702C	●	●								8.1(8.1)					SF$^{R}_{L}$-702C		GVF$^{R}_{L}$500~600-040C
	2525M-1001C	●	●								8.1(6.6)	100 (25)	150 (∞)			SF$^{R}_{L}$-1001C		GVF$^{R}_{L}$350~450-040C
	2525M-1002C	●	●								8.1(8.1)					SF$^{R}_{L}$-1002C		GVF$^{R}_{L}$500~600-040C
	2525M-1501C	●	●								8.1(6.6)	150 (25)	250 (∞)			SF$^{R}_{L}$-1501C		GVF$^{R}_{L}$350~450-040C
	2525M-1502C	●	●								8.1(8.1)					SF$^{R}_{L}$-1502C		GVF$^{R}_{L}$500~600-040C
GFVT$^{R}_{L}$	2020K-351B	●	●	20	21	8.0	20	125	22	30	5.1	35 (25)	50 (∞)	CPS-6V	LW-3	SF$^{R}_{L}$-351B	HH4X12	GVF$^{R}_{L}$250~350-020B
	2525M-351B	●	●	25	26		25	150	25	35	(4.6)							GVF$^{R}_{L}$300-150BR
	2020K-352B	●	●	20	21		20	125	22	30	5.1					SF$^{R}_{L}$-352B		GVF$^{R}_{L}$400~490-020B
	2525M-352B	●	●	25	26		25	150	25	35	(5.1)							GVF$^{R}_{L}$400-200BR
	2020K-501B	●	●	20	21		20	125	22	30	5.1	50 (25)	70 (∞)			SF$^{R}_{L}$-501B		GVF$^{R}_{L}$250~350-020B
	2525M-501B	●	●	25	26		25	150	25	35	(4.6)							GVF$^{R}_{L}$300-150BR
	2020K-502B	●	●	20	21		20	125	22	30	5.1					SF$^{R}_{L}$-502B		GVF$^{R}_{L}$400~490-020B
	2525M-502B	●	●	25	26		25	150	25	35	(5.1)							GVF$^{R}_{L}$400-200BR
	2020K-701B	●	●	20	21		20	125	22	30	5.1	70 (25)	100 (∞)			SF$^{R}_{L}$-701B		GVF$^{R}_{L}$250~350-020B
	2525M-701B	●	●	25	26		25	150	25	35	(4.6)							GVF$^{R}_{L}$300-150BR
	2020K-702B	●	●	20	21		20	125	22	30	5.1					SF$^{R}_{L}$-702B		GVF$^{R}_{L}$400~490-020B
	2525M-702B	●	●	25	26		25	150	25	35	(5.1)							GVF$^{R}_{L}$400-200BR
GFVT$^{R}_{L}$	2525M-501C	●	●	25	26	9.5	25	150	27	38	8.1(6.6)	50 (25)	70 (∞)	CPS-8V	LW-4	SF$^{R}_{L}$-501C	HH4X12	GVF$^{R}_{L}$350~450-040C
	2525M-502C	●	●								8.1(8.1)					SF$^{R}_{L}$-502C		GVF$^{R}_{L}$500~600-040C
	2525M-701C	●	●								8.1(6.6)	70 (25)	100 (∞)			SF$^{R}_{L}$-701C		GVF$^{R}_{L}$350~450-040C
	2525M-702C	●	●								8.1(8.1)					SF$^{R}_{L}$-702C		GVF$^{R}_{L}$500~600-040C
	2525M-1001C	●	●								8.1(6.6)	100 (25)	150 (∞)			SF$^{R}_{L}$-1001C		GVF$^{R}_{L}$350~450-040C
	2525M-1002C	●	●								8.1(8.1)					SF$^{R}_{L}$-1002C		GVF$^{R}_{L}$500~600-040C
	2525M-1501C	●	●								8.1(6.6)	150 (25)	250 (∞)			SF$^{R}_{L}$-1501C		GVF$^{R}_{L}$350~450-040C
	2525M-1502C	●	●								8.1(8.1)					SF$^{R}_{L}$-1502C		GVF$^{R}_{L}$500~600-040C

Note 1. Dimension T shows the distance from the toolholder to the cutting edge. The grooving depth is the mentioned in ( ).

2. The value ( ) of Face Grooving Dia. (ϕD MAX.) is the maximum outer diameter value after the initial groove between MIN.~MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving Dia. (ϕD MIN.) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between MIN.~MAX.

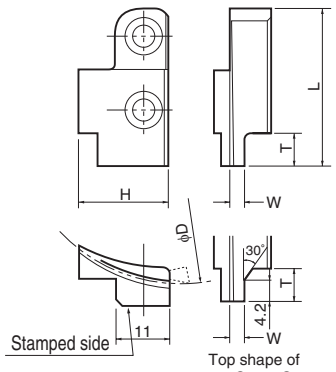
3. Standard toolholders are designed with the edge position 1.0mm above the center.
When using non-standard toolholders, set the edge position 1.0mm above the center.

4. GFVS and GFVT are composed of a base-holder and a blade.
If the blade should be damaged, replace it with a new blade as listed in the left table.
(e.g.) GFVSR2020K-HB + SFR-351B = GFVSR2020K-351B
(e.g.) GFVTR2020K-HB + SFR-351B = GFVTR2020K-351B

● : Std. Item

Face Grooving Toolholders

● Blade Dimensions

Shape	Description	Std. R	Std. L	Dimension (mm) L	H	T	W	Face Grooving Dia. ϕD MIN.	MAX.	Applicable Inserts	Applicable Toolholders
 Top shape of 501C, 701C, 1001C. 1501C	SF R/L -351B	●	●	30.5	11	4.7	2.0	35	50	GVF R/L 250~350-020B GVF R/L 300-150BR	GFV(S/T) R/L ○○○○ □ -○○○B (Toolholder Stamp GFV(S/T) R/L ○○○○ □ -HB)
	-352B	●	●				3.4			GVF R/L 400~490-020B GVF R/L 400-200BR	
	SF R/L -501B	●	●		15		2.0	50	70	GVF R/L 250~350-020B GVF R/L 300-150BR	
	-502B	●	●				3.4			GVF R/L 400~490-020B GVF R/L 400-200BR	
	SF R/L -701B	●	●		17		2.0	70	100	GVF R/L 250~350-020B GVF R/L 300-150BR	
	-702B	●	●				3.4			GVF R/L 400~490-020B GVF R/L 400-200BR	
	SF R/L -501C	●	●	35	15	7.5	2.8	50	70	GVF R/L 350~450-040C	GFV(S/T) R/L ○○○○ □ -○○○C (Toolholder Stamp GFV(S/T) R/L ○○○○ □ -HC)
	-502C	●	●				4.3			GVF R/L 500~600-040C	
	SF R/L -701C	●	●		20		2.8	70	100	GVF R/L 350~450-040C	
	-702C	●	●				4.3			GVF R/L 500~600-040C	
• Right-hand shown	SF R/L -1001C	●	●		23		2.8	100	150	GVF R/L 350~450-040C	
	-1002C	●	●				4.3			GVF R/L 500~600-040C	
· Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.	SF R/L -1501C	●	●		23		2.8	150	250	GVF R/L 350~450-040C	
	-1502C	●	●				4.3			GVF R/L 500~600-040C	

◆ Face Grooving Diameter of GFVS / GFVT

e.g.) GFVS R/L ···-351B / 352B

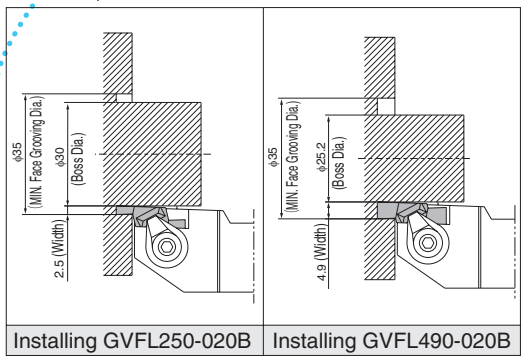
(same as **GFVS R/L …-○○○B, …-○○○C** ➡ **G93**
GFVT R/L …-○○○B, …-○○○C ➡ **G93)**

Description		Face Grooving Dia. ϕD MIN.	MAX.	Applicable Inserts
GFVS R/L	2020K-351B	35	50	GVF L/R 250~350-020B
	2525M-351B			GVF L/R 300-150BR
	2020K-352B	(25)	(∞)	GVF L/R 400~490-020B
	2525M-352B			GVF L/R 400-200BR

• It is possible to widen the groove to infinity ∞ when machining the initial groove within MIN.-MAX. and then widening to outer diameter.

• When machining the initial groove on the face at MIN. ϕ35

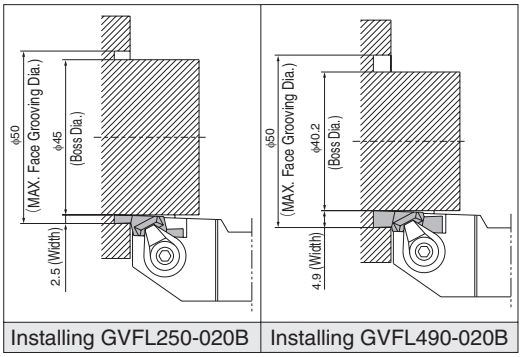
If the initial groove is made smaller than this, the toolholder interferes with the workpiece. Boss Dia. depends on insert width.



Installing GVFL250-020B | Installing GVFL490-020B

• When machining the initial groove on the face at MAX. ϕ50.

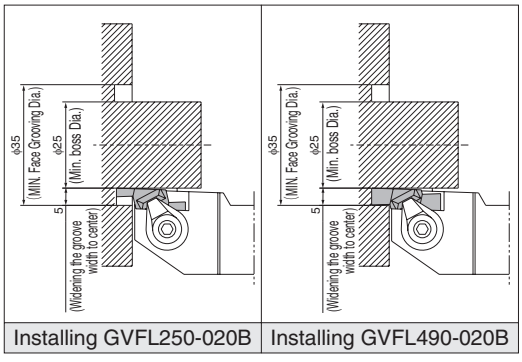
If the initial groove is made larger than this, the toolholder interferes with the workpiece. Boss Dia. depends on insert width.



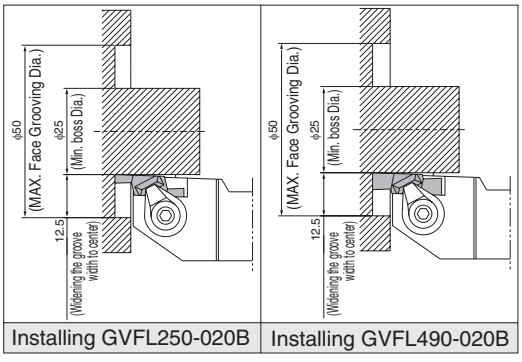
Installing GVFL250-020B | Installing GVFL490-020B

• When widening the groove width to inner diameter.

Face Grooving Dia. ϕD MIN. (ϕ25 Boss Dia.) is the limitation regardless of insert width, even widening the groove width to the center from the initial groove at ϕD MIN. (ϕ35) or ϕD MAX. (ϕ50). The toolholder interferes with the workpiece when closer to the center.



Installing GVFL250-020B | Installing GVFL490-020B



Installing GVFL250-020B | Installing GVFL490-020B

● : Std. Item

Applicable Inserts

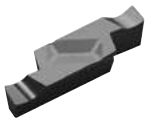
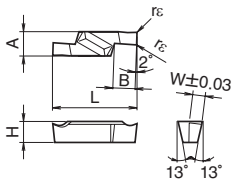
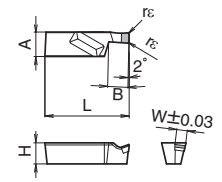
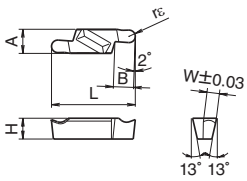
(mm)

Description	A	L	H
GVF$^{R}_{L}$ …-○○○**A**	4.3	12	4.5
…-○○○**B**	5.8	20	5.0
…-○○○**C**	7.0	27	7.0
…-○○○**AR**	4.3	12	4.5
…-○○○**BR**	5.8	20	5.0

		Cermet			MEGA COAT	PVD Coated Carbide	Carbide	PCD
		TN90	TC40N	TC60M	PR1225	PR930	KW10	KPD010
P	Carbon steel / Alloy steel				●	◔		
M	Stainless Steel				●	◔		
K	Cast Iron						●	
N	Non-ferrous Metals						●	●
S	Titanium Alloys						●	●
H	Hard materials (~40HRC)				●	○		
	Hard materials (40HRC~)							

Classification of usage

●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) W	B	rε	Cermet TN90 R	Cermet TN90 L	Cermet TC40N R	Cermet TC40N L	Cermet TC60M R	Cermet TC60M L	MEGA COAT PR1225 R	MEGA COAT PR1225 L	PVD Coated Carbide PR930 R	PVD Coated Carbide PR930 L	Carbide KW10 R	Carbide KW10 L	PCD KPD010 R	PCD KPD010 L	Applicable Toolholders	Ref. to Page for Applicable Toolholders
 	GVF$^{R}_{L}$	**200-020A**	2.00	2.3	0.2	●	●	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ …-**201A** GIFV$^{R}_{L}$ …-**201A**	G90 G100
		230-020A	2.30					●	●	●	●	●	●	●	□	●	●				
		250-020A	2.50			●		●	●	●		●	●	●	●	●	●				
		270-020A	2.70					●	●	●		●	●	●	●	●	●				
		290-020A	2.90					●	●	●		●	●	●	●	●	●				
		340-020A	3.40					●	●	●		●	●	●	●	●	●				
	GVF$^{R}_{L}$	**250-020B**	2.50	4.8	0.2	●	●	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ …-○○**1B** GFVS$^{L}_{R}$ …-○○**1B** GFVT$^{L}_{R}$ …-○○**1B** GIFV$^{R}_{L}$ …-○○**1B**	G90 G93 G100
		300-020B	3.00			●	●	●	●	●	●	●	●	●	●	●	●				
		350-020B	3.50			●	●	●	●	●	●	●	●	●	●	●	●				
		400-020B	4.00	5.3		●	●	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ …-○○**2B** GFVS$^{L}_{R}$ …-○○**2B** GFVT$^{L}_{R}$ …-○○**2B** GIFV$^{R}_{L}$ …-○○**2B**	
		430-020B	4.30					●	●	●	●	●	●	●	●	●	●				
		460-020B	4.60					●	●	●	●	●	●	●	●	●	●				
		490-020B	4.90					●	●	●	●	●	●	●	●	●	●				
	GVF$^{R}_{L}$	**350-040C**	3.50	6.8	0.4	●	●	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ …-○○**1C** GFVS$^{L}_{R}$ …-○○**1C** GFVT$^{L}_{R}$ …-○○**1C** GIFV$^{R}_{L}$ …-○○**1C**	
		400-040C	4.00			●	●	●	●	●	●	●	●	●	●	●	●				
		450-040C	4.50					●	●	●	●	●	●	●	●	●	●				
		500-040C	5.00	8.3		●	●	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ …-○○**2C** GFVS$^{L}_{R}$ …-○○**2C** GFVT$^{L}_{R}$ …-○○**2C** GIFV$^{R}_{L}$ …-○○**2C**	
		550-040C	5.50					●	●	●	●	●	●	●	●	●	●				
		600-040C	6.00					●	●	●	●	●	●	●	●	●	●				
1-edge 	GVF$^{R}_{L}$	**250-020B**	2.50	4.8	0.2													●	●	GFV$^{R}_{L}$ …-○○**1B** GFVS$^{L}_{R}$ …-○○**1B** GFVT$^{L}_{R}$ …-○○**1B** GIFV$^{R}_{L}$ …-○○**1B**	G90 G93 G100
		300-020B	3.00															●	●		
		400-020B	4.00	5.3														MTO	MTO	GFV$^{R}_{L}$ …-○○**2B** GFVS$^{L}_{R}$ …-○○**2B** GFVT$^{L}_{R}$ …-○○**2B** GIFV$^{R}_{L}$ …-○○**2B**	
	GVF$^{R}_{L}$	**350-020C**	3.50	6.8	0.2													MTO	MTO	GFV$^{R}_{L}$ …-○○**1C** GFVS$^{L}_{R}$ …-○○**1C** GFVT$^{L}_{R}$ …-○○**1C** GIFV$^{R}_{L}$ …-○○**1C**	
		400-020C	4.00															MTO	MTO		
	GVF$^{R}_{L}$	**350-040C**	3.50	6.8	0.4													MTO	MTO		
		400-040C	4.00															MTO	MTO		
Full-R 	GVF$^{R}_{L}$	**200-100AR**	2.00	2.3	1.00							●	●	●	●	●	●			GFV$^{R}_{L}$ …-**201A** GIFV$^{R}_{L}$ …-**201A**	G90 G100
		250-125AR	2.50		1.25							●	●	●	□	●	●				
		300-150AR	3.00		1.50							●	●	●	●	●	●				
	GVF$^{R}_{L}$	**300-150BR**	3.00	4.8	1.50							●	●	●	●	●	●			GFV$^{R}_{L}$ …-○○**1B** GFVS$^{L}_{R}$ …-○○**1B** GFVT$^{L}_{R}$ …-○○**1B** GIFV$^{R}_{L}$ …-○○**1B**	G90 G93 G100
		400-200BR	4.00	5.3	2.00							●	●	●	●	●	●			GFV$^{R}_{L}$ …-○○**2B** GFVS$^{L}_{R}$ …-○○**2B** GFVT$^{L}_{R}$ …-○○**2B** GIFV$^{R}_{L}$ …-○○**2B**	

· Dimension B shows available grooving depth.

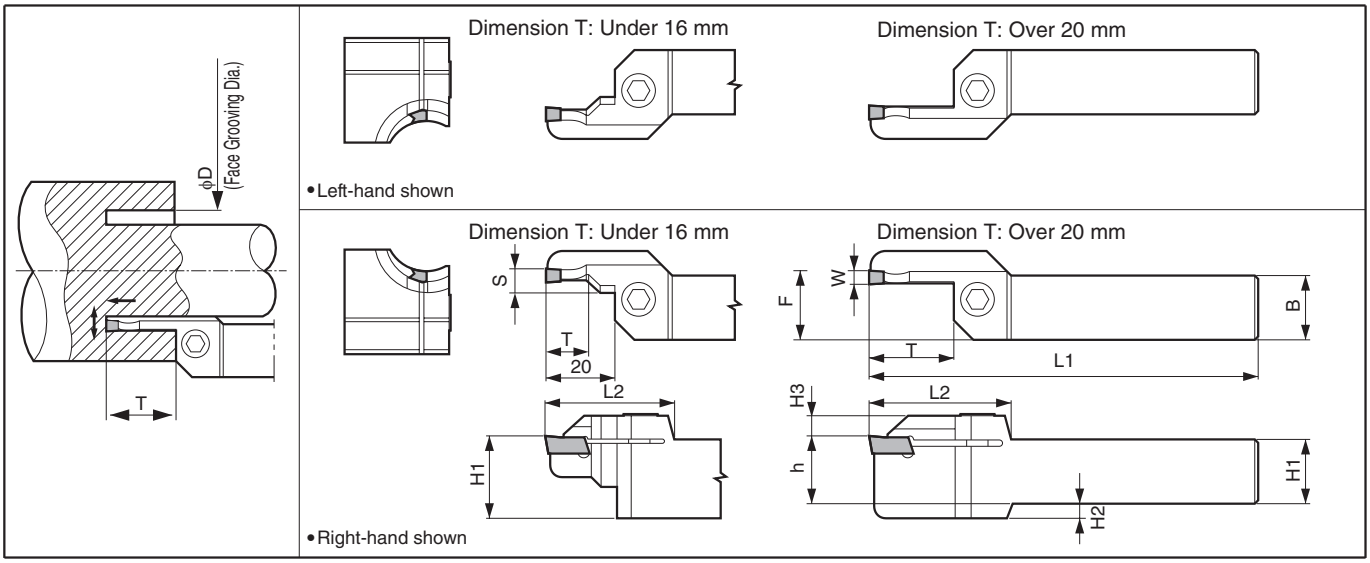
Recommended Cutting Conditions ➡ G104

●: Std. Item
□: Deleted from the next catalogue
MTO : Made to order

Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

KFMS (Will be switched to KGDF → G74~G80)



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F	S	T	Edge Width (mm) W	Face Grooving Dia. ϕD MIN.	ϕD MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
KFMS R/L	2020K2530-3	●		20	-	10	20	125	39	20.7	6.1	13	3	25	30	HH5X20	LW-4
	2020K3040-3	●												30	40		
	2020K4050-3	●												40	50		
	2020K5065-3	●							41		-	22		50	65		
	2020K6585-3	●												65	85		
	2020K85110-3	●			5				44			25		85	110		
	2020K110145-3	●												110	145		
	2525M2530-3	●	●	25	-	10	25	150	39	25.7	6.1	13		25	30	HH5X25	LW-4
	2525M3040-3	●	●											30	40		
	2525M4050-3	●	●											40	50		
	2525M5065-3	●	●						41		-	22		50	65		
	2525M6585-3	●	●											65	85		
	2525M85110-3	●	●						44			25		85	110		
	2525M110145-3	●	●											110	145		
KFMS R/L	2020K2535-4	●		20	-	10	20	125	39	20.7	7.1	12	4	25	35	HH5X20	LW-4
	2020K3550-4	●										20		35	50		
	2020K5070-4	●							44		-	25		50	70		
	2020K70100-4	●			5									70	100		
	2020K100150-4	●												100	150		
	2020K150220-4	●												150	220		
	2020K220800-4	●												220	∞		
	2525M2535-4	●	●	25	-	10	25	150	39	25.7	7.1	12		25	35	HH5X25	LW-4
	2525M3550-4	●	●									20		35	50		
	2525M5070-4	●	●						44		-	25		50	70		
	2525M70100-4	●	●											70	100		
	2525M100150-4	●	●											100	150		
	2525M150220-4	●	●											150	220		
	2525M220800-4	●	●											220	∞		

● : Std. Item

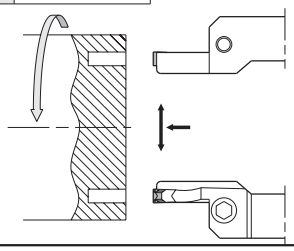
● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F	S	T	Edge Width (mm) W	Face Grooving Dia. ϕD MIN.	ϕD MAX.	Spare Parts: Clamp Bolt	Wrench
KFMS$^{R}_{L}$	2020K2535-5	●		20	-	10	20	125	39	20.7 (21.2)	-	20	5 (6)	25	35	HH5X20	LW-4
	2020K3550-5	●												35	50		
	2020K5075-5	●							44			25		50	75		
	2020K75115-5	●			5	10								75	115		
	2020K115180-5	●												115	180		
	2020K180235-5	●												180	235		
	2020K235800-5	●												235	∞		
	2525M2535-5	●	●	25	-	10	25	150	39	25.7 (26.2)	-	20		25	35	HH5X25	LW-4
	2525M3550-5	●	●											35	50		
	2525M5075-5	●	●						44			25		50	75		
	2525M75115-5	●	●											75	115		
	2525M115180-5	●	●						51			32		115	180		
	2525M180235-5	●	●											180	235		
	2525M235800-5	●	●											235	∞		

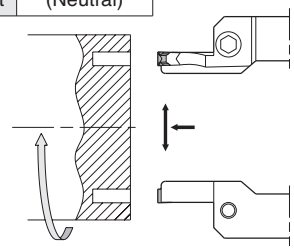
· Dimension T shows available grooving depth.
· Face Grooving Dia. ϕD: The diameter range of the initial groove.
· For KFMS$^{R}_{L}$····-5 toolholder can hold a 6mm width insert. ( ) value shows the dimension of a 6mm width insert.

◆ Selection of Toolholder & Insert

Toolholder	Right-hand (R)
Insert	(Neutral)



Toolholder	Left-hand (L)
Insert	(Neutral)

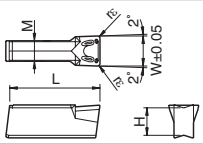
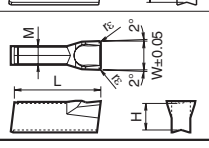


■ Applicable Inserts (mm)

Description	L	H
FMM30-03 ~ FMM60-04	12	3.5
FMN3 ~ FMN6	12	3.5

		Cermet TN90	Cermet CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	PVD Coated Carbide PR905	Carbide KW10
P	Carbon steel / Alloy steel				●		
M	Stainless Steel				●		
K	Cast Iron					●	◔
N	Non-ferrous Metals						●
S	Titanium Alloys						●
H	Hard materials (~40HRC)				○		
	Hard materials (40HRC~)						

Classification of usage
●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

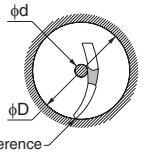
Insert		Description		Dimension (mm) W	rε	M	TN90	CR9025	PR915	PR930	PR905	KW10	Applicable Toolholders
Face Grooving Chip Control Oriented / M Class		FMM	30-03	3.0	0.3	2.0	●	●	●	●	●	●	KFMS$^{R}_{L}$...3
			40-04	4.0	0.4	2.6	●	●	●	●	●	●	KFMS$^{R}_{L}$...4
			50-04	5.0		3.4	●	●	●	●	●	●	KFMS$^{R}_{L}$...5
			60-04	6.0		4.0	●	●		●	●	●	
Face Grooving Sharp-Cutting Oriented / M Class		FMN	3	3.0	0.25	2.0	●	●		●		●	KFMS$^{R}_{L}$...3
			4	4.0		2.6	●	●		●		●	KFMS$^{R}_{L}$...4
			5	5.0		3.4	●	●		●		●	KFMS$^{R}_{L}$...5
			6	6.0		4.0		●		●		●	

· FMN type inserts are only for Deep Grooving and not applicable for Turning.

Recommended Cutting Conditions G103

◆ Limit of Turning toward Center

Turning towards the Center causes the toolholder to interfere with the groove wall depending on the initial cut's diameter.



Remaining Boss Dia. ϕd

Description \ ϕD	25	26	27	28 and over
	ϕd (mm)			
KFMS$^{R}_{L}$ 2020K2530-3 / KFMS$^{R}_{L}$ 2525M2530-3	4	2	0	0
KFMS$^{R}_{L}$ 2020K2535-4 / KFMS$^{R}_{L}$ 2525M2535-4	6	3	0	(No remaining Boss)
KFMS$^{R}_{L}$ 2020K2535-5 / KFMS$^{R}_{L}$ 2525M2535-5	7 *(5)	4 *(2)	1 *(0)	

e.g.)
KFMSR 2525M2530-3 with ϕ25 as first cut towards the center, it will cause a rubbing with the toolholder cartridge if ϕd is 4.0mm.

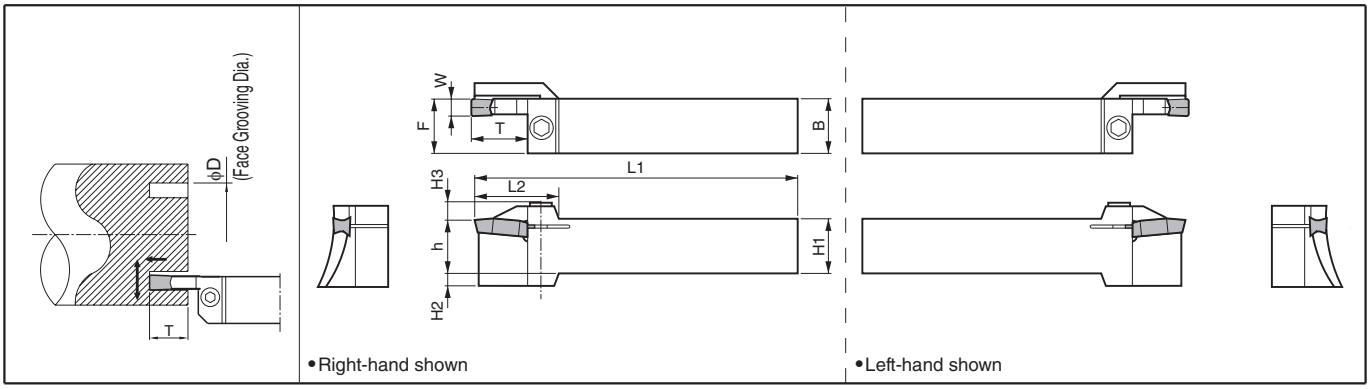
*( ) value shows the Dimension using FMM60-04 Insert.

● : Std. Item

Inserts are sold in 10 piece boxes.

Face Grooving Toolholders

KFMS-8



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F	T		Edge Width (mm) W	Face Grooving Dia. ϕD MIN.	Face Grooving Dia. ϕD MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
KFMS$^{R/L}$	2525M5464-8	●	●	25	-	9	25	150	41	26	25		8	54 (0)	64 (∞)	HH6X25	LW-5
	2525M6382-8	●	●		2.4									63 (0)	82 (∞)		
	2525M80115-8	●	●		6	8			40					80 (0)	115 (∞)		
	2525M105160-8	●	●											105 (0)	160 (∞)		
	2525M155510-8	●	●	25	6	8	25	150	43	26	25		8	155 (0)	510 (∞)		
	3232P155510-8	●		32	-		32	170		33							

· Dimension T shows available grooving depth.

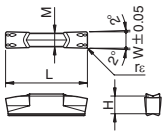
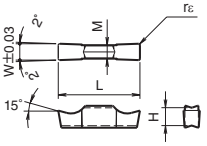
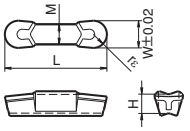
· The value ( ) of Face Grooving Dia. (ϕD MAX.) is the maximum outer diameter value after the initial groove between MIN.~MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving Dia. (ϕD MIN.) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between MIN.~MAX..

Applicable Inserts

(mm)

Description	L	H
GMM 8030-080MW	30	5.5
GMG 8030-050MG		
GMGA 8030-400R		

P	Carbon steel / Alloy steel			◔	●			Classification of usage
M	Stainless Steel			●	◔			
K	Cast Iron					●	◔	●: Continuous-Light Interruption / 1st Choice
N	Non-ferrous Metals						●	◔: Continuous-Light Interruption / 2nd Choice
S	Titanium Alloys						●	●: Continuous / 1st Choice
H	Hard materials (~40HRC)			○	●			○: Continuous / 2nd Choice
	Hard materials (40HRC~)							

Insert		Description	Dimension (mm) W	rε	M	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PR930	PR905	Carbide KW10	Applicable Toolholders
Chip Control Oriented / M Class		GMM 8030-080MW	8.0	0.8	6.0		●	●	●	●	●	KFMS$^{R/L}$...8
Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG 8030-050MG	8.0	0.5	6.0	●	●		●	●	●	
Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMGA 8030-400R	8.0	4.0	6.0						●	

· If using a full-R insert with KFMS-8 type toolholder, you need to modify the corner of insert adapter of toolholder.

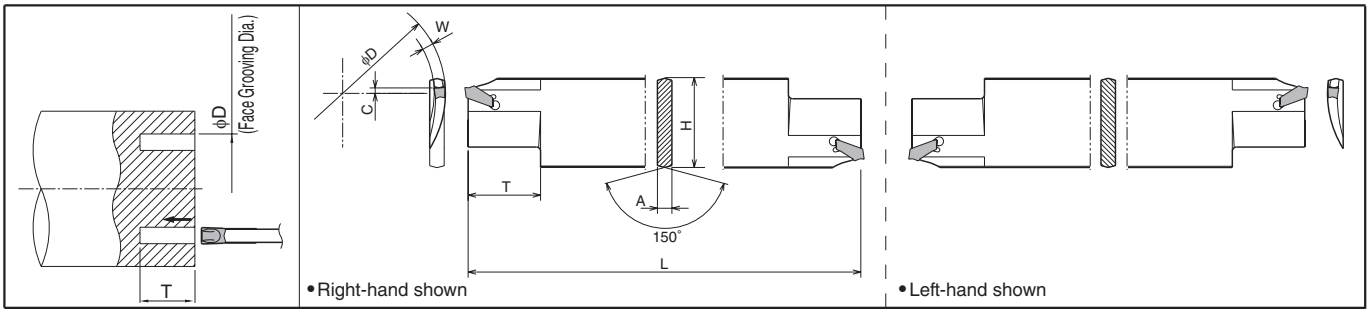
Recommended Cutting Conditions ➔ G105

Inserts are sold in 10 piece boxes.

● : Std. Item

Face Grooving Blade

KFTB-S



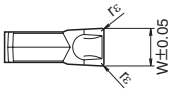
Blade Dimensions

Description		Std. R	Std. L	Dimension (mm) *H	L	A	T	C			Edge Width W	Face Grooving Dia. φD MIN.	MAX.	Spare Parts Releasing Wrench	Applicable Inserts	Applicable Blocks ➔ H27
KFTB R/L	65100-4S	●	●	32	150	5.2	25	4			4.0	65	100	LTK-5	FTK4	KTKTB20-32 25-32 32-32
	90150-4S	●	●				30	0				90	150			
	150250-4S	●	●									140	250			
	250800-4S	●	●			3.2						230	∞			KTKTBF25-32 32-32
KFTB R/L	90150-5S	●	●	32	150	5.2	30	0			5.0	90	150		FTK5	
	150250-5S	●	●				32					150	250			
	250800-5S	●	●			4.0	38					250	∞			

· Dimension T shows available grooving depth.
· Face Grooving Dia.φD: The diameter range of the initial groove.
· The insert has Self-Clamping system and it is not suitable for tight tolerance grooves (tolerance±0.05mm).
· KFTB R/L 65100-4S toolholder is designed with the edge position 4mm above the Center.
*Dimension H shows virtual apex distance.

Applicable Inserts

P	Carbon steel / Alloy steel				●		Classification of usage
M	Stainless Steel				●		
K	Cast Iron					●	●: Continuous-Light Interruption / 1st Choice
N	Non-ferrous Metals					●	◔: Continuous-Light Interruption / 2nd Choice
S	Titanium Alloys					●	●: Continuous / 1st Choice
H	Hard materials (~40HRC)				○		○: Continuous / 2nd Choice
	Hard materials (40HRC~)						

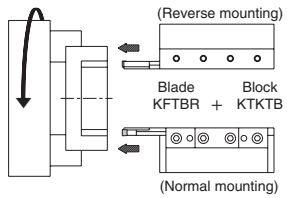
Insert		Description		Dimension (mm) W	rε	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR660	PVD Coated Carbide PR930	Carbide KW10	Applicable Toolholders
		FTK	4	4.0	0.25	●	●	○	●	●	KFTB R/L 65100-4S 90150-4S 150250-4S 250800-4S
			5	5.0		●	●	○	●	●	KFTB R/L 90150-5S 150250-5S 250800-5S

Recommended Cutting Conditions ➔ G104

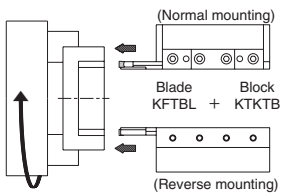
Selection of Blade and Insert

Combination of Blade + KTKTB

Blade	Right-hand (R)
Insert	Neutral

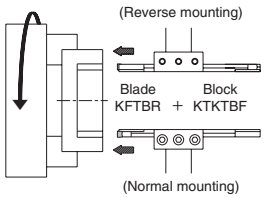


Blade	Left-hand (L)
Insert	Neutral

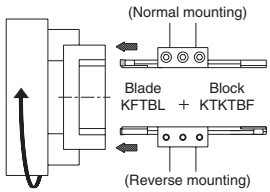


Combination of Blade + KTKTBF

Blade	Right-hand (R)
Insert	Neutral

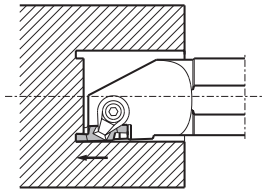


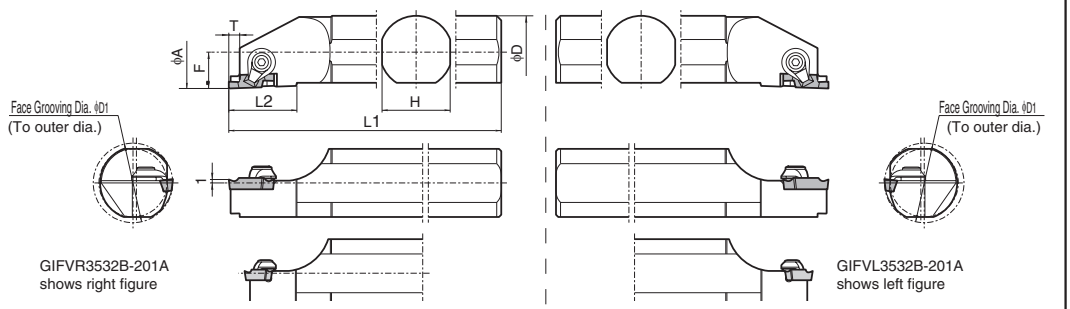
Blade	Left-hand (L)
Insert	Neutral



●: Std. Item
○: Check Availability

GIFV





•Right-hand shown

•Left-hand shown

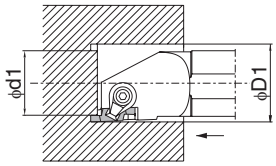
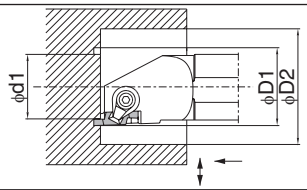
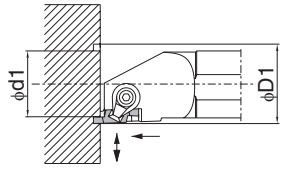
Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) φA	φD	H	L1	L2	F	T	Face Grooving Dia. φD1 MIN.	φD1 MAX.	Spare Parts: Clamp Set		Spare Parts: Wrench		Applicable Inserts (G95)
GIFV$^{R}_{L}$	3532B-201A	●	●	35	32	30	250	23	16	2.2	35 (12)	∞	CPS-5V	-	FT-15	-	GVF$^{R}_{L}$...-...A GVF$^{R}_{L}$...-...AR
GIFV$^{R}_{L}$	3532B-351B	●	●	35				30		4.6	35 (25)	50 (∞)	-	CPS-6V	-	LW-3	GVF$^{R}_{L}$250~350-020B GVF$^{R}_{L}$300-150BR
	3532B-352B	●	●							5.1	35 (25)	50 (∞)					GVF$^{R}_{L}$400~490-020B GVF$^{R}_{L}$400-200BR
	5032B-501B	●	●	50						4.6	50 (25)	70 (∞)					GVF$^{R}_{L}$250~350-020B GVF$^{R}_{L}$300-150BR
	5032B-502B	●	●							5.1	50 (25)	70 (∞)					GVF$^{R}_{L}$400~490-020B GVF$^{R}_{L}$400-200BR
GIFV$^{R}_{L}$	5032B-501C	●	●	50				35		6.6	50 (25)	70 (∞)		CPS-8V		LW-4	GVF$^{R}_{L}$350~450-040C
	5032B-502C	●	●							8.1	50 (25)	70 (∞)					GVF$^{R}_{L}$500~600-040C

Note 1. Dimension T shows available grooving depth.
2. Standard toolholders are designed with the edge position 1.0mm above the center.

◆Face Grooving Dia. φD1 depends on the application.

Applications	Description		Face Grooving Dia. φd1 (MIN.)	Face Grooving Dia. φD1 MIN.	φD1 MAX.	φD1 (MAX.)	Remarks
	GIFV$^{R}_{L}$	3532B-201A	-	35	∞	∞	-
	GIFV$^{R}_{L}$	3532B-351B			50		
		3532B-352B					
		5032B-501B		50	70		
		5032B-502B					
	GIFV$^{R}_{L}$	5032B-501C					
		5032B-502C					
	GIFV$^{R}_{L}$	3532B-201A	12	35	∞	∞	If φD2 ≥ 58-2W, the Face Grooving Dia. can be expanded to φd1 (MIN.) toward the Center. W = Edge Width If φD2 ≥ 75-2W, the Face Grooving Dia. can be expanded to φd1 (MIN.) toward the Center. W = Edge Width
	GIFV$^{R}_{L}$	3532B-351B	25		50		
		3532B-352B					
		5032B-501B		50	70		
		5032B-502B					
	GIFV$^{R}_{L}$	5032B-501C					
		5032B-502C					
	GIFV$^{R}_{L}$	3532B-201A	12	35	∞	∞	-
	GIFV$^{R}_{L}$	3532B-351B	25		50		
		3532B-352B					
		5032B-501B		50	70		
		5032B-502B					
	GIFV$^{R}_{L}$	5032B-501C					
		5032B-502C					

· The value ( ) of Face Grooving Dia. (φD1 MAX.) is the maximum outer diameter value after the initial groove between MIN.~MAX. (It is possible to widen the groove to infinity ∞)
· The value ( ) of Face Grooving Dia. (φd1 MIN.) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between MIN.~MAX.

● : Std. Item

Recommended Cutting Conditions

◆ GBA inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)											(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	MC	Cermet			MEGA	PVD Coated Carbide			Carbide	CBN	PCD						
	PV7040	TN620	TC40N	TN90	PR1215	PR930	PR1115	PR905	KW10	KBN510 KBN525	KPD001 (KPD010)	GBA○○R/L 033~100-...	GBA○○R/L 125~200-...	GBA○○R/L 230~300-...	GBA○○R/L 330~400-...	GBA○○R/L 400~480-...	
Carbon Steel	☆ 150-240	★ 80-220	☆ 150-220	☆ 150-220	★ 80-200	☆ 80-180	☆ 80-180	-	-	-	-	(1) 0.03~0.08 (2) Not recom. (3) Not recom.	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	☆ 130-220	★ 80-200	☆ 130-200	☆ 130-200	★ 80-180	☆ 80-160	☆ 80-160	-	-	-	-	(1) 0.03~0.07 (2) Not recom. (3) Not recom.	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	-	-	-	☆ 70-150	☆ 60-150	☆ 60-130	★ 60-130	-	-	-	-	(1) 0.03~0.07 (2) Not recom. (3) Not recom.	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Cast Iron	-	-	-	-	-	-	-	★ 80-180	☆ 60-120	★ 150-400	-	(1) 0.03~0.08 (2) Not recom. (3) Not recom.	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	
Aluminum	-	-	-	-	-	-	-	-	★ 150-400	-	★ 150-2,000	(1) 0.05~0.12 (2) Not recom. (3) Not recom.	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	
Brass	-	-	-	-	-	-	-	-	★ 150-300	-	★ 200-800	(1) 0.05~0.12 (2) Not recom. (3) Not recom.	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	
Hard materials	-	-	-	-	-	-	-	-	-	★ 80-120	-	-	(1) 0.02~0.05 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.01~0.04 (3) Max. 0.1	-	-	

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.
MC indicates MEGACOAT Cermet. MEGA indicates MEGACOAT

★ :1st Recommendation ☆ :2nd Recommendation

◆ GBA inserts (GM Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet	MEGACOAT						
	TN620	PR1215	GBA43R/L 140-010GM	GBA43R/L 150-020GM	GBA43R/L 175-020GM~ 230-020GM	GBA43R/L 250-030GM~ 350-030GM	GBA43R/L 400-040GM	
Carbon Steel	★ 80~240	☆ 80~220	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.2	(1) 0.03~0.12 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.12 (2) 0.03~0.09 (3) Max. 0.3	(1) 0.04~0.15 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	★ 80~220	☆ 80~200	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.2	(1) 0.03~0.12 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.12 (2) 0.03~0.09 (3) Max. 0.3	(1) 0.04~0.15 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	-	★ 60~150	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.2	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.1 (2) 0.03~0.09 (3) Max. 0.3	(1) 0.04~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.04~0.12 (2) 0.05~0.1 (3) Max. 0.8	

* Above cutting condition is for external grooving. Set both cutting speed and feed 20% lower for internal grooving.

◆ GBA inserts (MY Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet		MEGA	PVD Coated Carbide		Carbide	CBN	PCD						
	TN6020	TC40N	PR1215	PR930	PR1115	KW10	KBN510	KPD001 (KPD010)	GBA43R/L 175-020MY~ 200-020MY	GBA43R/L 230-020MY~ 265-030MY	GBA43R/L 300-030MY	GBA43R/L 330-030MY~ 350-030MY	GBA43R/L 400-040MY	
Carbon Steel	☆ 150-220	-	★ 80-200	☆ 80-200	☆ 80-200	-	-	-	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	☆ 130-200	-	★ 80-180	☆ 80-180	☆ 80-180	-	-	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	☆ 70-150	-	☆ 60-150	☆ 60-150	★ 60-150	-	-	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.
MEGA indicates MEGACOAT

★ :1st Recommendation ☆ :2nd Recommendation

◆ GB inserts (Ground Chipbreaker) will be switched to GBA.

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet			PVD Coated Carbide		Carbide	CBN	PCD						
	TN90	TC40N	TC60M	PR630	PR930	KW10	KBN510	KPD001 (KPD010)	GB○○R/L 050~100	GB○○R/L 125~200	GB○○R/L 230~300	GB○○R/L 330~400	GB○○R/L 400~480	
Carbon Steel	-	☆ 150-220	☆ 100-150	☆ 80-200	★ 80-180	-	-	-	(1) 0.03~0.08 (2) Not recom. (3) Not recom.	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	-	☆ 130-200	☆ 80-130	☆ 80-180	★ 80-160	-	-	-	(1) 0.03~0.07 (2) Not recom. (3) Not recom.	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	-	-	☆ 60-100	☆ 60-150	★ 60-130	-	-	-	(1) 0.03~0.07 (2) Not recom. (3) Not recom.	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Cast Iron	-	-	-	-	-	★ 60-100	-	-	(1) 0.03~0.08 (2) Not recom. (3) Not recom.	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	
Aluminum	-	-	-	-	-	★ 150-400	-	★ 150-2,000	(1) 0.05~0.12 (2) Not recom. (3) Not recom.	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	
Brass	-	-	-	-	-	★ 150-300	-	★ 200-800	(1) 0.05~0.12 (2) Not recom. (3) Not recom.	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	

★ :1st Recommendation ☆ :2nd Recommendation

Recommended Cutting Conditions

◆ TGF inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)							(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)				Remarks
	Cermet	MEGA	PVD Coated Carbide		Carbide	CBN	PCD					
	TC40N	PR1215	PR930	PR1115	KW10	KBN510	KPD001 (KPD010)	TGF32R/L 033~050-005	TGF32R/L 075~095-010	TGF32R/L 100~145-010	TGF32R/L 150~250-010	
Carbon Steel	☆ 150-220	★ 80-180	☆ 80-180	☆ 80-180	-	-	-	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	Coolant
Alloy Steel	☆ 130-200	★ 80-160	☆ 80-160	☆ 80-160	-	-	-	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	
Stainless Steel	-	☆ 60-130	☆ 60-130	★ 60-130	-	-	-	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	
Cast Iron	-	-	-	-	★ 60-100	-	-	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	
Aluminum	-	-	-	-	★ 150-400	-	★ 150-2,000	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	
Brass	-	-	-	-	★ 150-300	-	★ 200-800	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	

MEGA indicates MEGACOAT.

★ :1st Recommendation ☆ :2nd Recommendation

◆ TG inserts (Ground Chipbreaker) ➡ will be switched to GBA.

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)								f (mm/rev)					Remarks
	Cermet			PVD Coated Carbide		Carbide	CBN	PCD						
	TN60	TC40N	TC60M	PR630	PR930	KW10	KBN510	KPD001 (KPD010)	TG○○R/L 075~095	TG○○R/L 125~200	TG○○R/L 230~300	TG○○R/L 330~400	TG○○R/L 430~450	
Carbon Steel	★ 150-220	-	-	-	-	-	-	-	0.03~0.07	0.03~0.08	0.05~0.1	0.05~0.12	0.05~0.12	Coolant
Alloy Steel	★ 130-200	-	-	-	-	-	-	-	0.02~0.06	0.03~0.07	0.05~0.09	0.05~0.1	0.05~0.1	

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.

★ :1st Recommendation ☆ :2nd Recommendation

◆ GH inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet			PVD Coated Carbide	Carbide	Ceramic								
	TN90	TC40N	TC60M	PR930	KW10	A65	A66N	PT600M	GH 40~50...	GH 55~70...	GH 75~80...	GH 100~120...		
Carbon Steel	☆ 150-220	☆ 150-220	☆ 100-150	★ 80-180	-	-	-	-	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5	(1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0		Coolant
Alloy Steel	☆ 130-200	☆ 130-200	☆ 80-130	★ 80-160	-	-	-	-	(1) 0.07~0.18 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.07~0.18 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.1~0.23 (2) 0.1~0.18 (3) Max. 1.5	(1) 0.15~0.27 (2) 0.15~0.22 (3) Max. 2.0		
Stainless Steel	☆ 70~150	-	☆ 60-100	★ 60-130	-	-	-	-	(1) 0.07~0.16 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.07~0.16 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.1~0.21 (2) 0.1~0.18 (3) Max. 1.5	(1) 0.15~0.25 (2) 0.15~0.22 (3) Max. 2.0		
Cast Iron	-	-	-	-	★ 60-100	☆ 150-300	☆ 150-300	☆ 150-300	KW10 (1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0 A65/A66N (1) 0.03~0.07 (2) Not recom. (3) Not recom.	KW10 (1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0 A65/A66N (1) 0.03~0.07 (2) Not recom. (3) Not recom.	KW10 (1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5 A65/A66N (1) 0.05~0.09 (2) Not recom. (3) Not recom.	KW10 (1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0 A65/A66N (1) 0.05~0.09 (2) Not recom. (3) Not recom.		
Aluminum	-	-	-	-	★ 150-400	-	-	-	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5	(1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0		
Brass	-	-	-	-	★ 150-300	-	-	-	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5	(1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0		
Hard materials	-	-	-	-	-	☆ 40-80	☆ 40-80	☆ 40-80	(1) 0.02~0.05 (2) 0.01~0.03 (3) Max. 0.1	(1) 0.02~0.05 (2) 0.01~0.03 (3) Max. 0.2	(1) 0.02~0.05 (2) 0.01~0.04 (3) Max. 0.2			

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.

★ :1st Recommendation ☆ :2nd Recommendation

◆ GHU Inserts (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)							(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet			CVD Coated Carbide	PVD Coated Carbide		Ceramic						
	TN60	TC40N	TC60M	CR9025	PR630	PR930	A65	A66N	GHU 40-20	GHU 50-20	GHU 60-20			
Carbon Steel	☆ 130-200	-	-	☆ 80-180	-	-	-	-	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.15 (2) 0.05~0.12 (3) Max. 1.5			Coolant
Alloy Steel	☆ 100-180	-	-	☆ 80-160	-	-	-	-	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.15 (2) 0.05~0.12 (3) Max. 1.5			
Stainless Steel	-	-	-	☆ 60-130	-	-	-	-	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.2			

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.

★ :1st Recommendation ☆ :2nd Recommendation

◆ GA Inserts (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide		Carbide						
	TN60	TN90	TC40N	TC60M	CR9025	PR630	PR930	KW10	GA 30	GA 40	GA 50			
Carbon Steel	☆ 130~200	-	-	-	★ 80~180	-	-	-	(1) 0.06~0.18 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.06~0.21 (2) 0.05~0.17 (3) Max. 1.0	(1) 0.06~0.25 (2) 0.05~0.2 (3) Max. 1.3			Coolant
Alloy Steel	☆ 100~180	-	-	-	★ 80~160	-	-	-	(1) 0.06~0.15 (2) 0.05~0.12 (3) Max. 0.3	(1) 0.06~0.18 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.06~0.22 (2) 0.05~0.18 (3) Max. 0.8			
Stainless Steel	-	-	-	-	★ 60~130	-	-	-	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.2			

★ :1st Recommendation ☆ :2nd Recommendation

◆ GIA Inserts (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide		Carbide						
	TN60	TN90	TC40N	TC60M	CR9025	PR630	PR930	KW10	GIA 30	GIA 40	GIA 50			
Carbon Steel	☆ 60~120	-	-	-	★ 60~120	-	-	-	(1) 0.04~0.08 (2) 0.02~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.02~0.08 (3) Max. 0.4	(1) 0.05~0.1 (2) 0.05~0.08 (3) Max. 0.5			Coolant
Alloy Steel	☆ 60~100	-	-	-	★ 60~100	-	-	-	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.3	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.4	(1) 0.05~0.08 (2) 0.05~0.08 (3) Max. 0.5			
Stainless Steel	-	-	-	-	★ 60~80	-	-	-	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.3	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.4	(1) 0.05~0.08 (2) 0.05~0.08 (3) Max. 0.5			

★ :1st Recommendation ☆ :2nd Recommendation

◆ PSG-S (Tip-Bars)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			PSG05	PSG06 PSG07 PSG08	Remarks
	PVD Coated Carbide		Carbide			
	PR930		KW10	f (mm/rev)		
Carbon Steel	★ 30~100			~0.03	~0.05	Coolant
Stainless Steel	★ 30~80			~0.02	~0.03	
Non-ferrous Metals			★ ~300	~0.05	~0.08	

★ :1st Recommendation

Note for using the grooving tip-bars PSG-S type

How to Install

Small dia. internal grooving requires accurate installation because an error of insert height or angle can affect the machining precision. When installing, set the cutting edge higher than the center line as shown in the Table 1. The cutting edge of all the PSG-S type tip-bars is designed to be higher than the center line. (L4 of Tip-Bars dimension)

■ FMM / FMN

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						Face Grooving (FMM / FMN) Edge Width (mm)			Turning (FMM) Edge Width (mm)			Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide							
	TN90	CR9025	PR915	PR930	PR905	KW10	3.0	4.0	5.0 / 6.0	3.0	4.0	5.0 / 6.0	
							f (mm/rev)			f (mm/rev)			
Carbon Steel	☆ 100~220	☆ 80~200	☆ 80~200	★ 80~200	-	-	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	Coolant
Alloy Steel	☆ 80~200	☆ 70~180	☆ 70~180	★ 70~180	-	-	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Stainless Steel	☆ 70~160	☆ 60~150	★ 60~150	☆ 60~150	-	-	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Cast Iron	-	-	-	-	★ 80~180	☆ 70~150	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Aluminum	-	-	-	-	-	★ 200~500	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Brass	-	-	-	-	-	★ 100~200	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	

· Set the feed rate 1/100 of edge width on the first groove and check chip evacuation.

· FMN type Inserts are only for Deep Grooving, and when used for turning, set to ap=0.2mm and under.

★ :1st Recommendation ☆ :2nd Recommendation

◆ Ref. to the notes below for turning conditions.

ap and f of FMM

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 50% of Edge Width	·ap ≤ 0.5w
f (MAX.) (mm/rev)	under 3~5% of Edge Width	·f ≤ [0.03(Min.) ~ 0.05(Max.)]w

ap x f should be as follows.

Load(mm²) \ Edge Width(mm)	3.0	4.0	5.0	6.0	
ap × f	~0.09	~0.14	~0.25	~0.36	·ap×f ≤ 0.01w²

Recommended Cutting Conditions

◆ GV Inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)						Remarks
	Cermet			MEGACOAT	PVD Coated Carbide	Carbide	GV$^{R}_{L}$ 100~300-...SS 100~300-...S	GV$^{R}_{L}$ 145~185-...B	GV$^{R}_{L}$ 200~280-...B	GV$^{R}_{L}$ 300~400-...B			
	TN90	TC40N	TC60M	PR1225	PR930	KW10	GV$^{R}_{L}$ 100~340-...A 200~300-...AR		GV$^{R}_{L}$ 200-100BR	GV$^{R}_{L}$ 300-150BR	GV$^{R}_{L}$ 280~300-...C	GV$^{R}_{L}$ 340~400-...C	GV$^{R}_{L}$ 430~500-...C	
Carbon Steel	☆ 120-180	☆ 120-180	☆ 80-120	★ 80-160	☆ 80-140	-	(1) 0.03-0.08 (2) 0.03-0.08 (3) Max. 0.3	(1) 0.03-0.08 (2) 0.03-0.08 (3) Max. 0.3	(1) 0.04-0.09 (2) 0.04-0.09 (3) Max. 0.3	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.04-0.09 (2) 0.04-0.09 (3) Max. 0.3	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	Coolant
Alloy Steel	☆ 100-160	☆ 100-160	☆ 80-100	★ 80-140	☆ 80-120	-	(1) 0.03-0.07 (2) 0.03-0.1 (3) Max. 0.3	(1) 0.03-0.07 (2) 0.03-0.1 (3) Max. 0.3	(1) 0.04-0.08 (2) 0.04-0.08 (3) Max. 0.3	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.04-0.08 (2) 0.04-0.08 (3) Max. 0.3	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	
Stainless Steel	☆ 70-130	-	☆ 60-100	★ 60-130	☆ 60-110	-	(1) 0.03-0.07 (2) 0.03-0.1 (3) Max. 0.3	(1) 0.03-0.07 (2) 0.03-0.1 (3) Max. 0.3	(1) 0.04-0.08 (2) 0.04-0.08 (3) Max. 0.3	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.04-0.08 (2) 0.04-0.08 (3) Max. 0.3	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	
Cast Iron	-	-	-	-	-	★ 60-100	(1) 0.03-0.08 (2) 0.03-0.08 (3) Max. 0.3	(1) 0.03-0.08 (2) 0.03-0.08 (3) Max. 0.3	(1) 0.04-0.09 (2) 0.04-0.09 (3) Max. 0.3	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.04-0.09 (2) 0.04-0.09 (3) Max. 0.3	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	
Aluminum	-	-	-	-	-	★ 150-300	(1) 0.05-0.12 (2) 0.05-0.12 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.12 (3) Max. 0.5	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.5	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.5	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	
Brass	-	-	-	-	-	★ 100-250	(1) 0.05-0.12 (2) 0.05-0.12 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.12 (3) Max. 0.5	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.5	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.5	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	

* Use MEGACOAT, PVD coated grade or carbide for turning with edge width 1mm (GV$^{R}_{L}$100SS / 100S / 100A)

★ :1st Recommendation ☆ :2nd Recommendation

◆ GVF Inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)							(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet				MEGACOAT	PVD Coated Carbide	Carbide	GVF$^{R}_{L}$ 200~340...A	GVF$^{R}_{L}$ 250~350...B	GVF$^{R}_{L}$ 400~490...B	GVF$^{R}_{L}$ 350~450...C	GVF$^{R}_{L}$ 500~600...C	
	TN60	TN90	TC40N	TC60M	PR1225	PR930	KW10	GVF$^{R}_{L}$ 200-100AR ~300-150AR	GVF$^{R}_{L}$ 300-150BR	GVF$^{R}_{L}$ 400-200BR			
Carbon Steel	-	☆ 150-220	☆ 150-220	☆ 100-150	★ 80-200	☆ 80-180	-	(1) 0.03-0.08 (2) 0.03-0.08 (3) Max. 0.3	(1) 0.04-0.09 (2) 0.04-0.09 (3) Max. 0.3	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.8	Coolant
Alloy Steel	-	☆ 130-200	☆ 130-200	☆ 80-130	★ 80-180	☆ 80-160	-	(1) 0.03-0.07 (2) 0.03-0.1 (3) Max. 0.3	(1) 0.04-0.08 (2) 0.04-0.08 (3) Max. 0.3	(1) 0.05-0.09 (2) 0.05-0.09 (3) Max. 0.5	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.8	
Stainless Steel	-	☆ 70-150	-	☆ 60-100	★ 80-150	☆ 60-130	-	(1) 0.03-0.07 (2) 0.03-0.1 (3) Max. 0.3	(1) 0.04-0.08 (2) 0.04-0.08 (3) Max. 0.3	(1) 0.05-0.09 (2) 0.05-0.09 (3) Max. 0.5	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.8	
Cast Iron	-	-	-	-	-	-	★ 60-100	(1) 0.03-0.08 (2) 0.03-0.08 (3) Max. 0.3	(1) 0.04-0.09 (2) 0.04-0.09 (3) Max. 0.3	(1) 0.05-0.1 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.5	(1) 0.05-0.12 (2) 0.05-0.1 (3) Max. 0.8	
Aluminum	-	-	-	-	-	-	★ 150-400	(1) 0.05-0.12 (2) 0.05-0.12 (3) Max. 0.5	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.5	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.8	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	
Brass	-	-	-	-	-	-	★ 150-300	(1) 0.05-0.12 (2) 0.05-0.12 (3) Max. 0.5	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.5	(1) 0.05-0.15 (2) 0.05-0.15 (3) Max. 0.8	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	(1) 0.08-0.15 (2) 0.08-0.15 (3) Max. 0.8	

· Apply a sufficient amount of coolant.

· The ap should be under 0.5mm if a good surface finish is required.

★ :1st Recommendation ☆ :2nd Recommendation

◆ FTK

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)					Edge Width (mm)					Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide		Carbide	4.0	5.0				
	TN90	CR9025	PR660	PR930	KW10	f (mm/rev)					
Carbon Steel	☆ 120~200	★ 80~180	☆ 60~130	☆ 60~130	-	0.05~0.15	0.05~0.15				Coolant
Alloy Steel	☆ 100~160	★ 70~150	☆ 60~130	☆ 60~130	-	0.05~0.15	0.05~0.15				
Stainless Steel	☆ 80~150	☆ 60~140	★ 50~120	☆ 50~120	-	0.05~0.15	0.05~0.15				
Cast Iron	-	-	-	-	★ 50~100	0.10~0.30	0.10~0.30				
Aluminum	-	-	-	-	★ 200~450	0.05~0.25	0.05~0.25				
Brass	-	-	-	-	★ 100~200	0.05~0.25	0.05~0.25				

★ :1st Recommendation ☆ :2nd Recommendation

◆ GMN Inserts (CBN / PCD)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)				Remarks
	CBN	PCD					
	KBN510 KBN525	KPD001 (KPD010)	GMN2	GMN3	GMN4 GMN5	GMN6	
Aluminum	-	★ 150-2,000	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.18 (2) 0.08~0.18 (3) Max. 0.8	(1) 0.10~0.20 (2) 0.10~0.20 (3) Max. 0.8	Coolant
Brass	-	★ 200-800	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.18 (2) 0.08~0.18 (3) Max. 0.8	(1) 0.10~0.20 (2) 0.10~0.20 (3) Max. 0.8	
Cast Iron	★ 150-400	-	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	
Hard materials	★ 80-120	-	(1) 0.02~0.05 (2) 0.01~0.03 (3) Max. 0.1	(1) 0.03~0.07 (2) 0.01~0.05 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.4	

★ :1st Recommendation

Recommended Cutting Conditions

GMG / GMM / GMN / GMGA

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						Grooving				Turning				Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Edge Width W (mm)				Edge Width W (mm)				
	TN90	CR9025	PR915	PR930	PR905	KW10	2.0~3.0	4.0	5.0	6.0 / 8.0	2.0~3.0	4.0	5.0	6.0 / 8.0	
							f (mm/rev)				f (mm/rev)				
Carbon Steel	☆ 100~220	☆ 80~200	☆ 80~200	★ 80~200	-	-	0.05~0.15	0.10~0.25	0.15~0.35	0.20~0.35	0.10~0.20	0.15~0.30	0.20~0.40	0.25~0.40	Coolant
Alloy Steel	☆ 80~200	☆ 70~180	☆ 70~180	★ 70~180	-	-	0.05~0.15	0.10~0.25	0.15~0.35	0.20~0.35	0.10~0.20	0.15~0.30	0.20~0.40	0.25~0.40	
Stainless Steel	☆ 70~160	☆ 60~150	★ 60~150	☆ 60~150	-	-	0.05~0.15	0.10~0.20	0.15~0.35	0.20~0.35	0.10~0.20	0.15~0.25	0.20~0.40	0.25~0.40	
Cast Iron	-	-	-	-	★ 100~200	☆ 70~150	0.05~0.20	0.10~0.30	0.15~0.40	0.20~0.40	0.10~0.25	0.15~0.35	0.20~0.45	0.25~0.45	
Aluminum	-	-	-	-	-	★ 200~500	0.05~0.20	0.08~0.25	0.10~0.25	0.12~0.30	0.10~0.20	0.10~0.25	0.10~0.25	0.15~0.30	
Brass	-	-	-	-	-	★ 100~200	0.05~0.15	0.08~0.20	0.10~0.25	0.12~0.30	0.10~0.20	0.10~0.25	0.10~0.25	0.15~0.30	

◆ **Ref. to the notes below for turning conditions.**

★ :1st Recommendation ☆ :2nd Recommendation

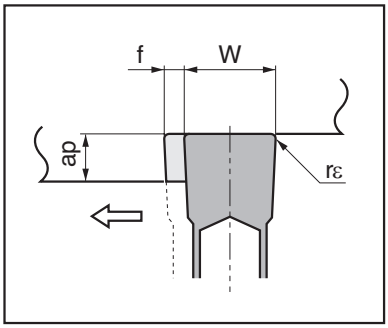
(1) When using KGM Toolholder

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 80% of Edge Width	·ap ≤ 0.8W
f (MAX.) (mm/rev)	under 10% of Edge Width	·f ≤ 0.1W

(ap) × (f) shall not exceed 1/2 of ap (MAX.) × f (MAX.)

Load (mm²) \ Edge Width (mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap × f	~0.20	~0.36	~0.64	~1.00	~1.44	~2.56

·ap×f ≤ $\frac{1}{2}$×0.8W×0.1W = 0.04W²



(2) When using KGM-T Toolholder (Deep grooving type)

Use 90% of KGM conditions

(3) When using KGMM / KGMS / KFMS-8 Toolholder

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 50% of Edge Width	·ap ≤ 0.5W
f (MAX.) (mm/rev)	under 4% of Edge Width	·f ≤ 0.04W

should be as follows. **(under 50% of KGM)**

Load (mm²) \ Edge Width (mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap × f	~0.10	~0.18	~0.32	~0.50	~0.72	~1.28

·ap×f ≤ 0.02W²

(4) When using KIGM Toolholder

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 70% of Edge Width	·ap ≤ 0.7W
f (MAX.) (mm/rev)	under 8% of Edge Width	·f ≤ 0.08W

should be as follows. **(under 70% of KGM)**

Load (mm²) \ Edge Width (mm)	3.0	4.0	5.0
ap × f	~0.25	~0.44	~0.70

·ap×f ≤ 0.04W²

GMG / GMM / GMGA 8030 (Face Grooving)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						Face Grooving			Turning			Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Edge Width W (mm)			Edge Width W (mm)			
	TN90	CR9025	PR915	PR930	PR905	KW10	8.0			8.0			
							f (mm/rev)			f (mm/rev)			
Carbon Steel	☆ 100~220	☆ 80~160	☆ 80~160	★ 80~160	-	-	0.1~0.2			0.1~0.25			Coolant
Alloy Steel	☆ 80~160	☆ 70~160	☆ 70~160	★ 70~160	-	-	0.1~0.2			0.1~0.25			
Stainless Steel	☆ 70~140	☆ 60~130	★ 60~130	☆ 60~130	-	-	0.1~0.2			0.1~0.25			
Cast Iron	-	-	-	-	★ 80~180	☆ 70~130	0.1~0.3			0.1~0.35			
Aluminum	-	-	-	-	-	★ 200~300	0.08~0.25			0.08~0.30			
Brass	-	-	-	-	-	★ 100~150	0.08~0.25			0.08~0.30			

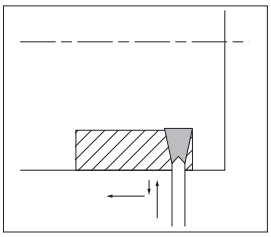
★ :1st Recommendation ☆ :2nd Recommendation

Guide for External Grooving

Point (I) (Turning after Grooving)

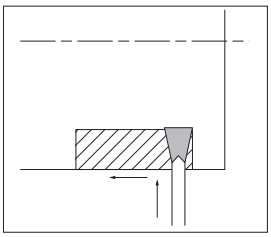
1) Grooving Depth Over 0.5mm: For roughing (Refer to Fig.1)
Before turning, pull the tool back about 0.1mm after grooving, instead of turning subsequent to grooving.
(Failure to pull the tool back before traverse machining will result in an unbalanced load applied on only one side of the cutting edge.)

2) Grooving Depth under 0.5mm: For finishing (Refer to Fig.2)
Turning subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Retention time is not necessary.)



Before turning, pull the tool back about 0.1mm after grooving.
(Grooving Depth Over 0.5mm: At roughing)

Fig.1



Turning subsequent to grooving
(Grooving Depth under 0.5mm: At finishing)

Fig.2

Point (II)

1) When widening the groove width (Refer to Fig.3), apply the "Step Turning."
2) The widened groove and side walls should be finished last.
(For better chip control, ap over 0.5mm is recommended.)

Note) If the workpiece is not supported at the center, reduce the feed rate when grooving towards center.

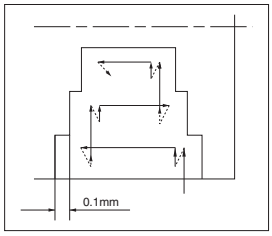


Fig.3

Guide for Face Grooving

<Toolholder Selection>

(1) Choose the best tool depending on the groove width.
The Cutting Dia. ϕD listed in the catalog indicates the depth of the first plunge of face grooving as shown in Fig.1.

(2) Confirm Grooving Depth (dimension T)

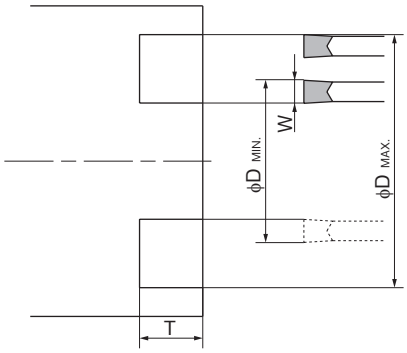


Fig.1

(3) It is recommended to install the toolholder in the reverse position. (Fig. 2)
(This will provide smooth chip flow and chip clearance.)

Toolholder	Right-hand (R)	Toolholder	Left-hand (L)
Insert	(Neutral)	Insert	(Neutral)

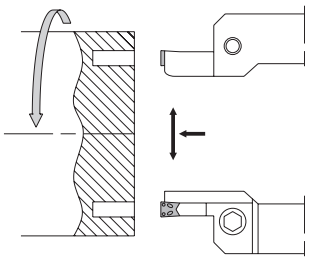


Fig.2 Toolholder's Hand and Rotation

<Guide for turning>

Turning direction should be from the outer diameter to the inner diameter as shown in Fig.3
This improves chip evacuation.

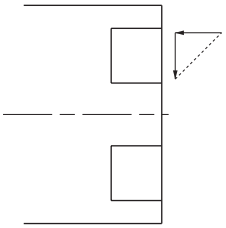
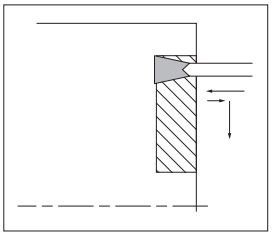


Fig.3

Guide for Face Grooving (Continued)

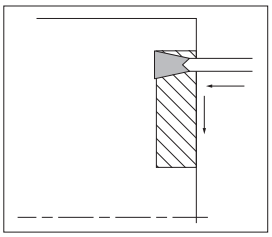
Point (I) (Turning after Grooving)

1) Grooving Depth Over 0.5mm: For roughing (Refer to Fig.4)
Before turning, pull the tool back about 0.1mm after grooving, instead of turning subsequent to grooving.
(Failure to pull the tool back before traverse machining will result in an unbalanced load applied on only one side of the cutting edge.)



Before turning, pull the tool back about 0.1mm after grooving.
(Grooving Depth Over 0.5mm: At roughing)
Fig.4

2) Grooving Depth under 0.5mm: For finishing (Refer to Fig.5)
Turning subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Retention time is not necessary.)



Turning subsequent to grooving
(Grooving Depth under 0.5mm: At finishing)
Fig.5

Point (II)

1) When widening the groove width. (Ref. to Fig.6)
Apply the "Step Turning".
2) The widened groove and side walls should be finished last.
(For better chip control, ap over 0.5mm is recommended.)

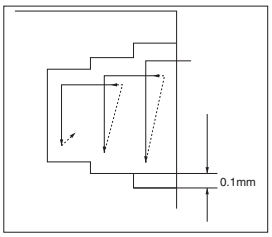
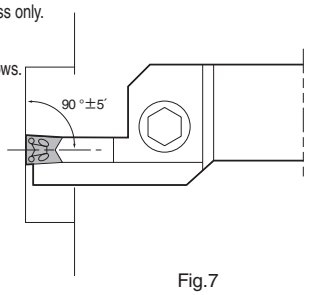


Fig.6

Trouble shooting

Trouble	Countermeasures
Whitish trace remains at the groove bottom.	(1) Increase the cutting speed for finishing process only. (This can handle most of the cases.) If the method is not successful, try (2) as follows. (2) Check the insert edge's parallelness. Adjustment: Apply the insert edge to the workpiece face and adjust the toolholder within the angle of ±5'. (Fig.7)  Fig.7
Chips are entangled.	(1) Install the toolholder in the reverse position. Adjust the coolant flow to the cutting edge. (2) When widening the groove, do not machine one deep groove. Instead, repeat shallow grooving and turning.
Insert cracks when turning.	Reverse the facing direction.
Groove is not straight.	Check the edge's parallelness. Decrease the feed rate.

Guide for Grooving

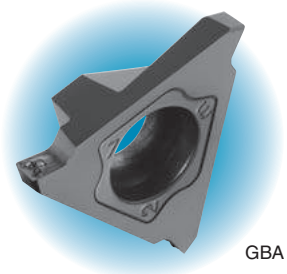
Guide for Grooving with Cermet Insert (Steel)

1. Set the f under 0.12mm/rev (0.05~0.10mm/rev normally).
2. Coolant is recommended.
3. Set the cutting speed Vc=150~220m/min.
4. Set the toolholder overhang as short as possible.

How to Improve Surface Finish (when surface roughness below 3µm Rz is required)

1. Increase the cutting speed (Vc=220m/min MAX.)
2. Program retention time at the groove bottom.
3. Apply a light hone to the cutting edge by hand lapper.

Chip Control of Grooving Insert with Molded Chipbreaker



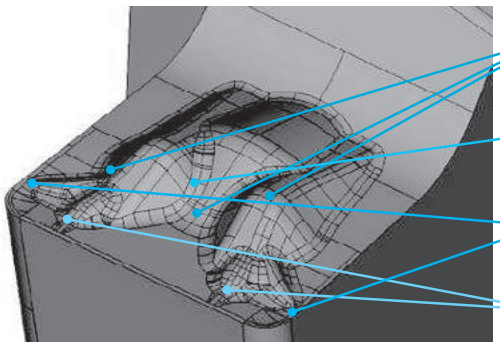
GBA GM Chipbreaker

1.Good chip control to cover wide application range stable chip control
at high cutting speed, covering wide range of feed rate

2.Improved chip control and excellent surface finish
Superior chip control performance and MEGACOAT PR1215 realizes the excellent surface quality

3.Chip control improvement at automated production line.
(prevent frequent machine stop)

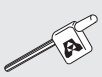
Multi Bump Design



- Center bump and dent squeeze and control chips
- Helps modifying chip shape
- Stable chip control at shoulder grooving and chamfering
- Front bump: Stabilize chip control at low feed rate

Smooth chip control due to optimum bump layout on the chipbreaker

Alternative Toolholder Reference Table for Grooving Toolholder

Conventional Toolholder						Alternative Toolholder				
Description		Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Wrench	Description		Overall length (mm)	Remarks	Ref. to Page
										
KTGF R/L	1010K-16F	125	SB-4070TRW	FT-8	-	KTGF R/L	1010JX-16F	120		G14
	1212M-16F	150					1212JX-16F	120		
	1616M-16F	150					1616JX-16F	120		
KGM R/L	0810K-1.5-125	125	SE-40120TR	-	LTW-15S		-	-	No replacement	G34
	1010K-1.5-125	125				KGM R/L	1010JX-1.5	120		
	1212M-1.5-150	150					1212JX-1.5	120		
KGM R/L	0810K-2-125	125	SE-40120TR	-	LTW-15S		-	-	No replacement	
	1010K-2-125	125				KGM R/L	1010JX-2	120		
	1212M-2-150	150					1212JX-2	120		
	1616M-2-150	150	SE-50125TR	-	LTW-20		1616JX-2	120		
KGM R/L	1010K-2.5-125	125	SE-40120TR	-	LTW-15S	KGM R/L	1010JX-2.5	120		
	1212M-2.5-150	150					1212JX-2.5	120		
	1616M-2.5-150	150	SE-50125TR	-	LTW-20		1616JX-2.5	120		
KGM R/L	1616M-3-150	150	SE-50125TR	-	LTW-20	KGM R/L	1616JX-3	120		

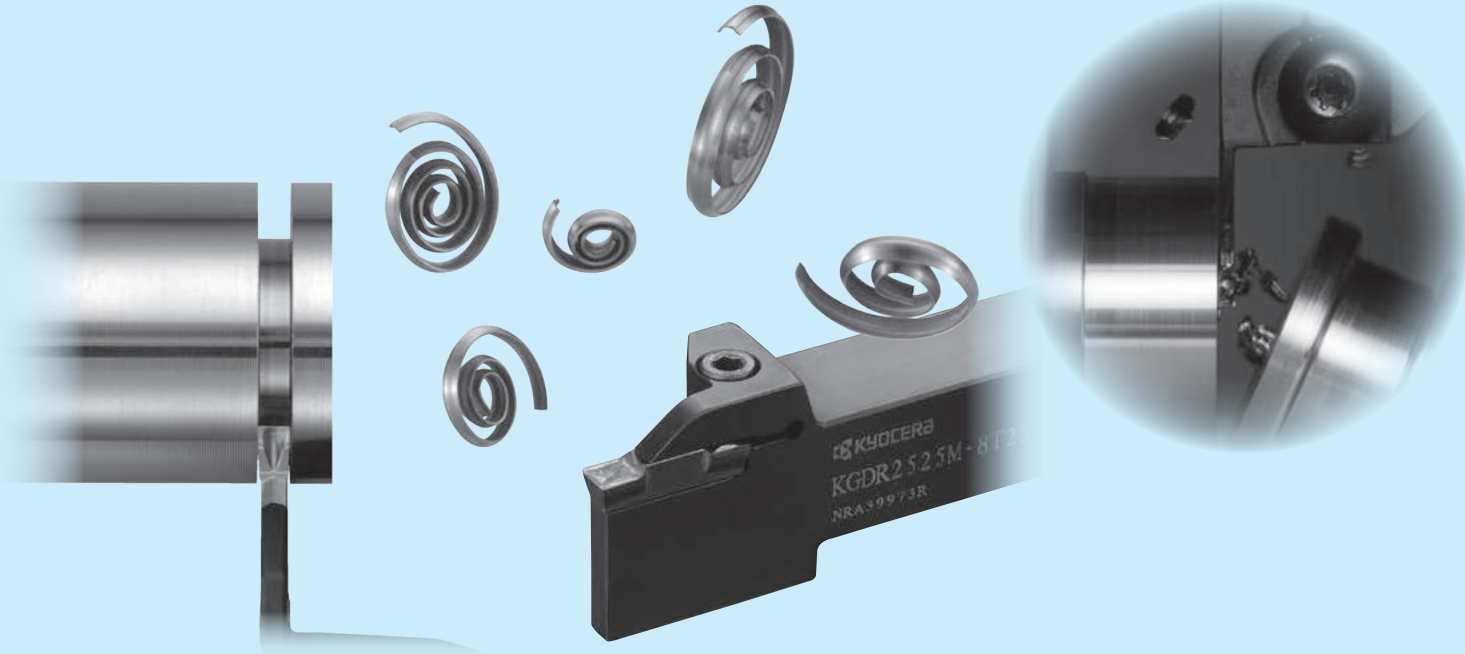
Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Cut-Off

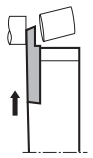
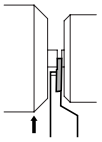
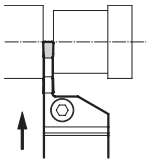
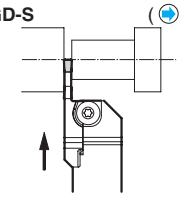
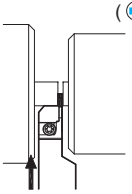
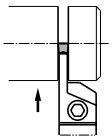
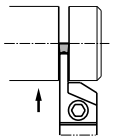
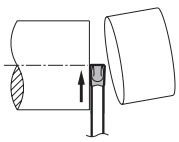
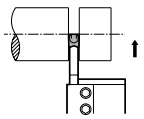
H1~H30

H

Product Lineup		**H2**
Guide for Cut-Off		**H3**
Summary of Cut-Off		**H4~H5**
Cut-Off Toolholders (for small diameter cut-off)		**H6~H11**
KTKF	Lateral side screw clamp toolholder	H8
KTKFS (for sub spindle tooling)	Lateral side screw clamp toolholder	H10
Cut-Off Toolholders (for 2-edge insert , KGD)		**H12~H19**
KGD (for automatic lathe)	Integral Toolholder	H14
KGDS (for sub spindle tooling)	Integral Toolholder	H15
KGD	Integral Toolholder	H16
KGD-S	Separate Toolholder	H17
Cut-Off Toolholders (for 2-edge insert , KGM)		**H20~H24**
KGM (for automatic lathe)	Integral Toolholder	H22
KGM	Integral Toolholder	H22
KGM-T	Integral Toolholder	H23
Cut-Off Toolholders (for 1-edge insert)		**H25~H28**
KTKB-SS / KTKB-S	Blade	H26
KTKTB / KTKTBF	Toolblock	H27
KTKH-S	Integral Toolholder	H28
Technical Information		**H29**
Recommended Cutting Conditions		H29
Alternative Toolholder Reference Table for Cut-off Toolholder		**H30**



Product Lineup

For Small Diameter Cut-Off	For Automatic Lathe Cut-off Dia. ϕ5~ϕ12 ~ϕ6	**KTKF** (H8)  Edge Width:0.5~2.0mm		For sub spindle tooling Cut-off Dia. ϕ6~ϕ12 ϕ14~ϕ16	**KTKFS** (H10)  Edge Width:1.0~2.0mm
KGD	Bolt Clamp Cut-off Dia. ϕ12~ϕ50	**KGD** (H14)  Edge Width:1.3~4.0mm	**KGD-S** (H17)  Edge Width:2.0~4.0mm	For sub spindle tooling Cut-off Dia. ~ϕ24	**KGDS** (H15)  Edge Width:1.3~3.0mm
KGM	Bolt Clamp Cut-off Dia. ϕ18~ϕ60	**KGM** (H22)  Edge Width:1.5~4.0mm,3~8mm	**KGM-T** (H23)  Edge Width:2.0~6.0mm		
KTKB KTKH (1-edge)	Toolholder Type Cut-off Dia. ϕ30~ϕ79	**KTKH-S** (H28)  Edge Width:2.2~5.1mm		Blade type Cut-off Dia. ϕ32~ϕ120	**KTKB-S(S)** (H26)  Edge Width:1.6~9.6mm

Cut-Off Tools

Series Name	Shape	Advantage	Applications
For Small Diameter Cut-Off		1) Insert clamp is side screw type from lateral side 2) 2-edge insert 3) Max. Cut-off Dia. :ϕ16	1) For cut-off and grooving of small workpieces 2) For automatic lathe, small machine
KGD		1) Insert is clamped from top side 2) 1-edge and 2-edge inserts available 3) Integral type and separate type are available 4) Max. Cut-off Dia. : ϕ50	1) PM Chipbreaker ··· For Cut-Off 2) PH Chipbreaker ··· For Cut-Off (High Feed Rate) For Grooving 3) PG Chipbreaker ··· For Cut-Off (for automatic lathe) Sharp-Cutting Oriented 4) PF Chipbreaker ··· For Cut-Off (for automatic lathe) Low feed 5) PQ Chipbreaker ··· For Cut-Off (for automatic lathe) Medium feed
KGM		1) Insert is clamped from top side 2) 1-edge and 2-edge inserts available 3) Max. Cut-off Dia. : ϕ60	1) For cut-off and grooving of small workpieces 2) For automatic lathe, small machine 3) TMR-Chipbreaker provides stable chip control up to high feed rate ranges
KTKB KTKH		1) Self-Clamping System Tap the insert lightly with a plastic hammer to set it in the pocket 2) 1-edge insert 3) Blade type and Integral Shank type 4) Max. Cut-off Dia. : ϕ120	1) For cut-off and deep grooving 2) Standard chipbreaker is general cut-off type Feed rate: over 0.1mm/rev P-Chipbreaker is for cut-off at low feed rates Feed rate: 0.03~0.08mm/rev

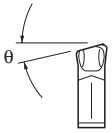
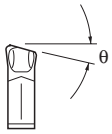
Guide for Cut-Off

Tool Selection

		For Small Diameter Cut-Off	KGD	KGM	KTKB / KTKH
Insert	1. Insert's Edge Number 1-edge Insert···For Larger Dia. Workpiece (Max. ϕ120)	-	-	-	✓
	2-edge Insert···For Smaller Dia. Workpiece Cost per corner is reduced	✓	✓	✓	-
	2. Use a neutral angle insert if there is no limit to the finished shape.	TKF...S TKF...NB TKFS...S	GDM GDMS	GMM	TKN
	3. Use an angled insert to reduce the size of the remaining boss.	TKF...DR	GDM-R/L (➡ Fig. 2)	GMM-R/L (➡ Fig. 2)	TKR/L (➡ Fig.1)
	4. Use a sharp-cornered lead-angled insert to make the remaining boss much smaller when machining small parts and thin parts.	TKF...DR	-	GMM-R/L (➡ Fig. 2)	-
	5. Use the minimum width insert suitable for the machining.	✓	✓	✓	✓
Toolholder	1. Use a suitable toolholder (blade) for the workpiece dia.	✓	✓	✓	✓
	2. Use a more rigid toolholder (blade).	✓	✓	✓	✓
	3. Use a back clamp toolholder if there is no space for clamping tools from top side (automatic lathe).	✓	-	-	-

How to select cut-off inserts with / without lead angle (including sharp corner)

1. Use a neutral angle insert if there is no limit to the finished shape.
2. Use an angled insert to reduce the size of the remaining boss.
3. Use a sharp-cornered lead-angled insert to make the remaining boss much smaller when machining small parts and thin parts.

Hand of Lead Angle	N (Neutral)	R (Right-hand)	L (Left-hand)
			
· Angled (θ) insert can reduce the burr size when cutting off. · When using a larger lead angle (θ), cutting force becomes smaller, but the feed rate should be reduced.			

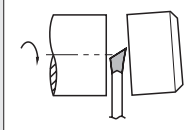
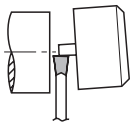
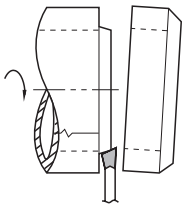
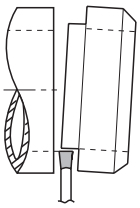
	Right-hand (R) Lead angle	Neutral
Example: Solid Workpiece		
Example: Hollow Workpiece (Pipe)		

Fig.1

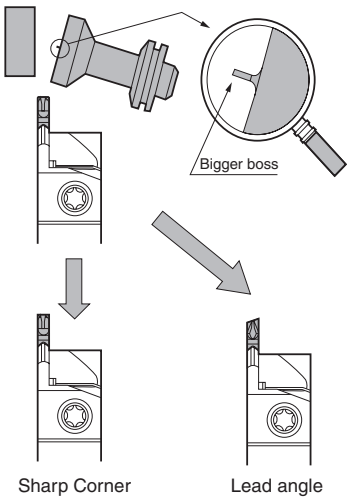


Fig.2

Caution

1. For TKN and TKR/L, set the cutting edge height 0.1~0.2mm above the center height (Fig. 3)
   For other toolholders, set the cutting edge to the center height.
2. Be sure to perform wet processing. Apply enough coolant to the cutting edge.
3. Keep a constant rate during processing so that optimum product life will be achieved.
4. Cut off as close to the chuck as possible.
5. Lower the feed rate to 1/2 to 1/3 at the near center to prevent impact caused by machining.

- Overuse of insert and toolholder (blade) may cause insert breakage and toolholder (blade) damage.
- Do not rework the insert and toolholder (blade) to prevent damage.
- Clean the insert pocket well with compressed air when replacing insert.

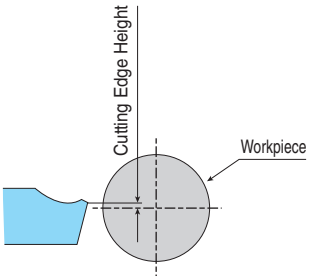
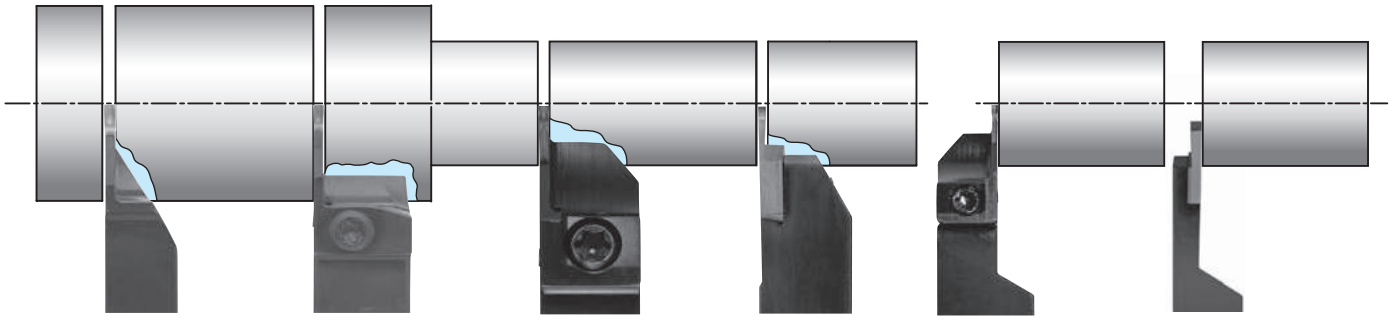


Fig.3 (TKN,TKR/L)

Summary of Cut-Off

Small Dia Cut-Off ~ϕ45

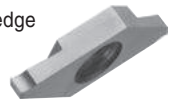
Small Shank



KTKH-S	KGM	KGD	KTKF	KGDS	KTKFS
Cut-off Dia.:~ϕ45 Shank:□10~25 Edge Width:2.2~4.1 Self Clamp	Cut-off Dia.:~ϕ32 Shank:□10~16 Edge Width:1.5~4.0 Top Clamp	Cut-off Dia.:~ϕ42 Shank:□10~20 Edge Width:1.3~4.0 Top Clamp	Cut-off Dia.:~ϕ16 Shank:□10~20 Edge Width:0.5~2.0 Lateral Side Clamp	Cut-off Dia.:~ϕ24 Shank:□16 Edge Width:1.3~3.0 Top Clamp	Cut-off Dia.:~ϕ16 Shank:□10~12 Edge Width:1.0~2.0 Lateral Side Clamp
⇒ H28	⇒ H22	⇒ H14	⇒ H8	⇒ H15	⇒ H10

For KTKF KTKFS

2-edge



Low cutting force

Chipbreaker for General Cut-Off

Chipbreaker for Low Feed Cut-Off

2-edge

Sharp Cutting PG Chipbreaker

Low Feed PF Chipbreaker

Medium Feed PQ Chipbreaker

(15° Lead Angle)

(15° Lead Angle)

(15° Lead Angle)

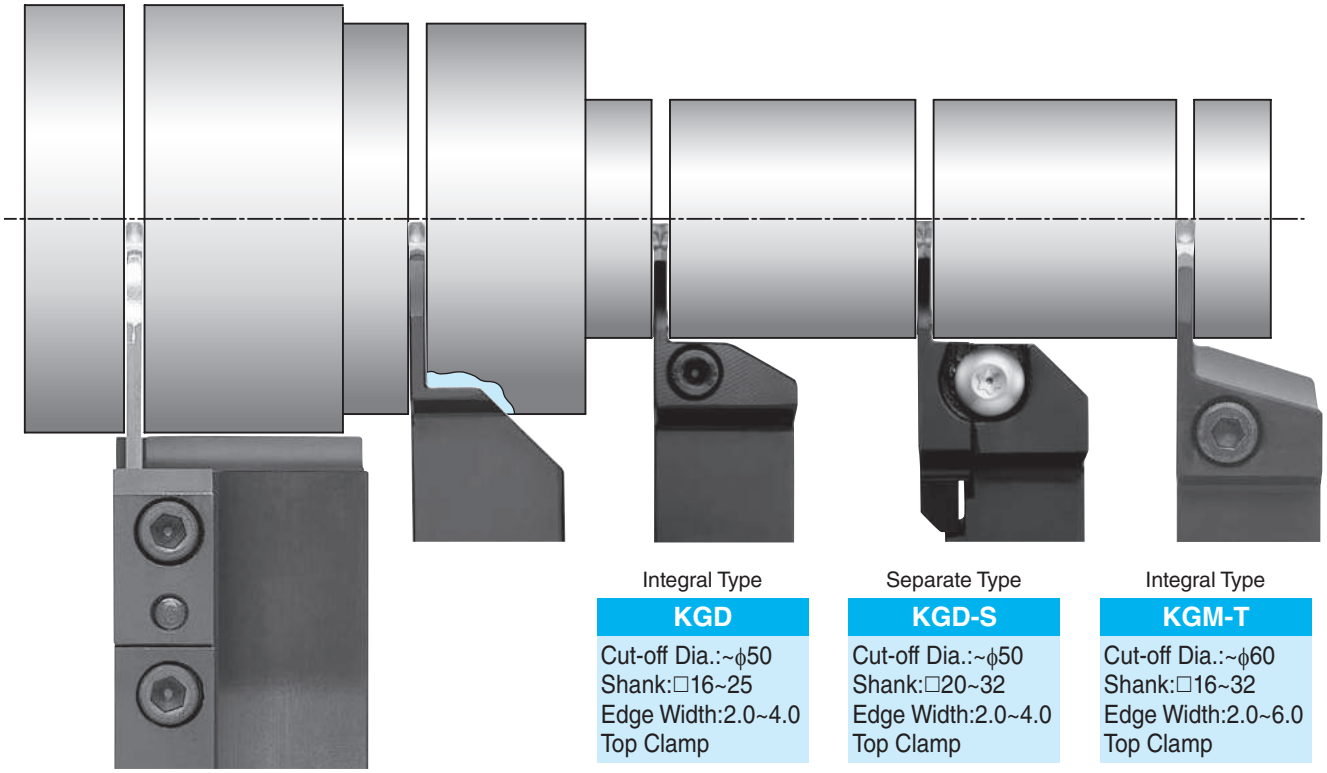
Chipbreaker edge shape	Cut-off (Self Clamp) ⇒ H25		
	General Cut-Off		Low Feed Cut-Off
	Chamfer + Honed	Sharp Edge	R honed

KTKH-S ⇒ H28
(Self Clamp)

KGD ⇒ H14
(Top Clamp)

KTKF ⇒ H8
(Lateral Side Clamp)

General Cut-Off ~ϕ120



Integral Type
KGD
Cut-off Dia.:~ϕ50
Shank:□16~25
Edge Width:2.0~4.0
Top Clamp

Separate Type
KGD-S
Cut-off Dia.:~ϕ50
Shank:□20~32
Edge Width:2.0~4.0
Top Clamp

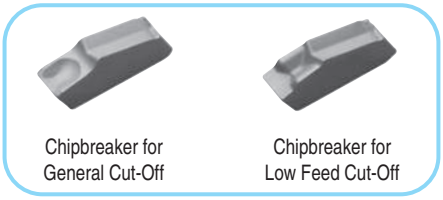
Integral Type
KGM-T
Cut-off Dia.:~ϕ60
Shank:□16~32
Edge Width:2.0~6.0
Top Clamp

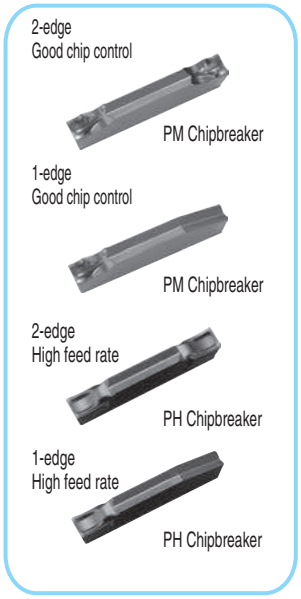
H16 H17 H23

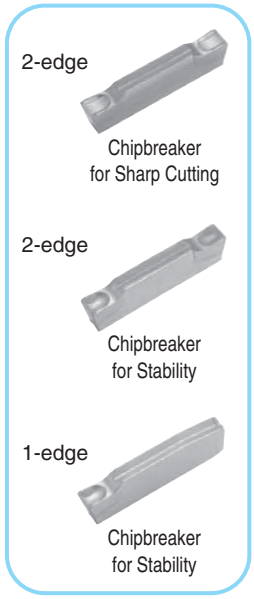
Blade + Toolblock
KTKB
Cut-off Dia.:~ϕ120
Shank:□16~32
Edge Width:1.6~9.6
Self Clamp

Integral Type
KTKH-S
Cut-off Dia.:~ϕ79
Shank:□20~25
Edge Width:3.1~5.1
Self Clamp

H26 H28







Blade + Toolblock	Separate Type	Integral Type		
KTKB ➡ H26	**KGD-S** ➡ H17	**KTKH-S** ➡ H28	**KGD** ➡ H16	**KGM** ➡ H22,H23

TKF

Classification of usage									
◕:Continuous-Light Interruption / 1st Choice ◔:Continuous-Light Interruption / 2nd Choice ●:Continuous / 1st Choice ○:Continuous / 2nd Choice	P	Carbon steel / Alloy steel	◕	◔	◔	◔			Ref. to Page for Applicable Toolholders
	M	Stainless Steel	◔	◕	◔	◔			
	K	Cast Iron						◕	
	N	Non-ferrous Metals					◕	◔	

Applicable Inserts (TKF12)

Insert (Handed Insert shows Right-hand)	Description	W	φD max	rε	T	H	φd	θ	MEGACOAT NANO PR1425 R	PR1425 L	PR1535 R	PR1535 L	MEGACOAT PR1225 R	PR1225 L	PVD Coated Carbide PR1025 R	PR1025 L	DLC Coated Carbide PDL025 R	PDL025 L	Carbide KW10 R	KW10 L	Ref. to Page for Applicable Toolholders
Right lead angle	TKF12R/L 050-S-16DR	0.5	5	0.03	3	8.7	5	16°	●	●	●	●	●	●	●	●			●	●	H8
	070-S-16DR	0.7	8						●	●	●	●	●	●	●	●			●	●	
	100-S-16DR	1.0	12						●	●	●	●	●	●	●	●	●	●	●	●	
	125-S-16DR	1.25							●	●	●	●	●	●			●	●			
	150-S-16DR	1.5							●	●	●	●	●	●	●	●	●	●	●	●	
	200-S-16DR	2.0							●	●	●	●	●	●	●	●	●	●	●	●	
	TKF12R/L 050-S	0.5	5	0.03	3	8.7	5	0°	●	●	●	●	●	●	●	●	●	●	●	●	
	070-S	0.7	8						●	●	●	●	●	●	●	●	●	●	●	●	
	100-S	1.0	12						●	●	●	●	●	●	●	●	●	●	●	●	
	125-S	1.25							●	●	●	●	●	●			●	●			
	150-S	1.5							●	●	●	●	●	●	●	●	●	●	●	●	
	200-S	2.0							●	●	●	●	●	●	●	●	●	●	●	●	
Right lead angle / Tough Edge	TKF12R/L 100-T-16DR	1.0	12	0.08	3	8.7	5	16°	●	●	●	●	●	●							
	150-T-16DR	1.5							●	●	●	●	●	●							
	200-T-16DR	2.0							●	●	●	●	●	●							
Tough Edge	TKF12R/L 100-T	1.0	12	0.08	3	8.7	5	0°	●	●	●	●	●	●							
	150-T	1.5							●	●	●	●	●	●							
	200-T	2.0							●	●	●	●	●	●							
Right lead angle Without Chipbreaker	TKF12R/L 050-NB-20DR	0.5	5	0	3	8.7	5	20°	●	●	●	●			●	□			●	●	
	070-NB-20DR	0.7	8						●	●	●	●			●	□			●	●	
	100-NB-20DR	1.0	12						●	●	●	●			●	●			●	●	
	150-NB-20DR	1.5							●	●	●	●			●	●			●	●	
	200-NB-20DR	2.0							●	●	●	●			●	●			●	●	
Without Chipbreaker	TKF12R/L 050-NB	0.5	5	0	3	8.7	5	0°	●	●	●	●			●	□			●	●	
	070-NB	0.7	8						●	●	●	●			●	●			●	●	
	100-NB	1.0	12						●	●	●	●			●	●			●	●	
	150-NB	1.5							●	●	●	●			●	●			●	●	
	200-NB	2.0							●	●	●	●			●	●			●	●	

· Lead angle shows the angle when installed in toolholder.

· As Fig.1 of **H8** shows, the cut-off diameter of the insert is indicated when the top of the cut-off edge progresses 1mm from the center.

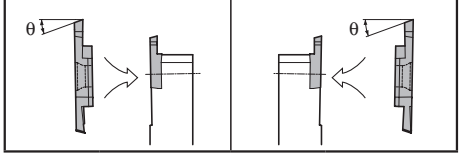
Inserts Identification System (Ref. to Table.1)

TKF 12 R 050 — S — 16D R

- TKF — Insert Type
- 12 — Insert Size
- R — Insert Hand: R: Right-hand; L: Left-hand
- 050 — Edge Width
- S — Name of Chipbreaker: S: S-Chipbreaker; T: T-Chipbreaker (Tough Edge); NB: Without Chipbreaker
- 16D — Lead Angle (θ) (Front cutting edge angle)
- R — Hand of Lead Angle: R: Right-hand; L: Left-hand

Table 1

Toolholder	Right-hand	Toolholder	Left-hand
Insert	Right-hand	Insert	Left-hand
Lead Angle	Right-hand	Lead Angle	Right-hand

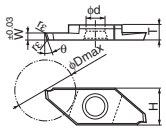
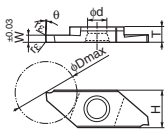
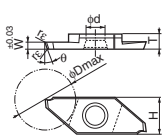
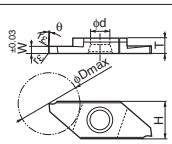
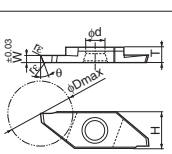
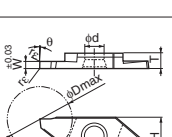


Inserts are sold in 10 piece boxes.

● : Std. Item
□ : Deleted from the next catalogue

Applicable Inserts (TKF16)

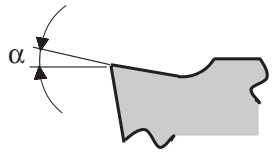
Classification of usage			P	Carbon steel / Alloy steel	●	◔	◔	◔			Ref. to Page for Applicable Toolholders
●:Continuous-Light Interruption / 1st Choice			M	Stainless Steel	◔	●	◔	◔			
◔:Continuous-Light Interruption / 2nd Choice			K	Cast Iron						●	
●:Continuous / 1st Choice			N	Non-ferrous Metals					●	◔	
○:Continuous / 2nd Choice											

Insert (Handed Insert shows Right-hand)		Description	W	ϕD max	rε	T	H	ϕd	θ	MEGACOAT NANO PR1425 R	PR1425 L	MEGACOAT NANO PR1535 R	PR1535 L	MEGACOAT PR1225 R	PR1225 L	PVD Coated Carbide PR1025 R	PR1025 L	DLC Coated Carbide PDL025 R	PDL025 L	Carbide KW10 R	KW10 L	Ref. to Page for Applicable Toolholders
Right lead angle		TKF16R/L 150-S-16DR	1.5	16	0.05	4	9.5	5	16°	●	●	●	●	●	●	●	●	●	●	●	●	H8
		200-S-16DR	2.0							●	●	●	●	●	●	●	●	●	●	●	●	
		TKF16R/L 150-S	1.5	16	0.05	4	9.5	5	0°	●	●	●	●	●	●	●	●	●	●	●	●	
		200-S	2.0							●	●	●	●	●	●	●	●	●	●	●	●	
Right lead angle / Tough Edge		TKF16R/L 150-T-16DR	1.5	16	0.08	4	9.5	5	16°	●	●	●	●	●	●							
		200-T-16DR	2.0							●	●	●	●	●	●							
Tough Edge		TKF16R/L 150-T	1.5	16	0.08	4	9.5	5	0°	●	●	●	●	●	●							
		200-T	2.0							●	●	●	●	●	●							
Right lead angle Without Chipbreaker		TKF16R/L 150-NB-20DR	1.5	16	0	4	9.5	5	20°	●	●	●	●			●	●			●	●	
		200-NB-20DR	2.0							●	●	●	●			●	●			●	●	
Without Chipbreaker		TKF16R/L 150-NB	1.5	16	0	4	9.5	5	0°	●	●	●	●			●	●			●	●	
		200-NB	2.0							●	●	●	●			●	●			●	●	

· Lead angle shows the angle when installed in toolholder.

· As Fig.1 of **H8** shows, the cut-off diameter of the insert is indicated when the top of the cut-off edge progresses 1mm from the center.

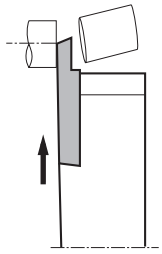
Descriptions of Chipbreaker Edge Shape

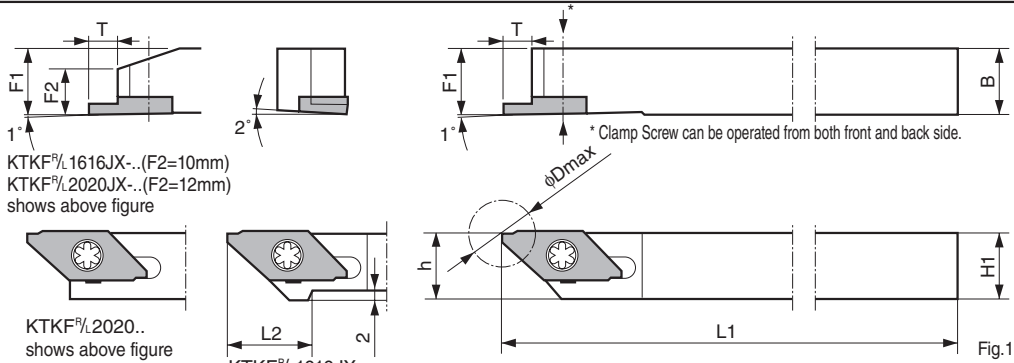
Chipbreaker / Edge Shape	S-Chipbreaker α	S-Chipbreaker Description	T-Chipbreaker (Tough Edge) α	T-Chipbreaker (Tough Edge) Description	NB (Without Chipbreaker) α	NB (Without Chipbreaker) Description
	15°	TKF12···S	12°	TKF···T TKF···T-16DR	0°	TKF···NB TKF···NB-20DR
	20°	TKF16···S TKF16···S-16DR				
	25°	TKF12···S-16DR				

● : Std. Item

Inserts are sold in 10 piece boxes.

KTKF (For small diameter cut-off)

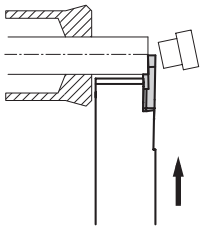




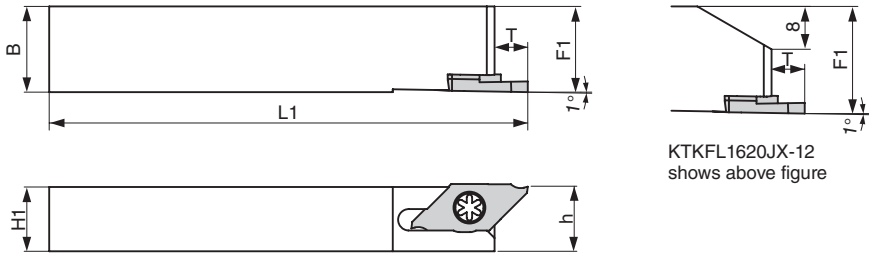
• Right-hand shown

Fig.1

Right-hand Insert for Right-hand Toolholder.



<Goose-neck Holder>



• Left-hand shown

Fig.2

Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	T	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts H6,H7
KTKFR/L	1010JX-12	●	●	10	10	120	15	10	6	Fig.1	SB-4590TRWN	LTW-10S	TKF12R/L…
	1212JX-12	●	●	12	12		-	12					
	1616JX-12	●	●	16	16			16					
	NEW 2020JX-12	●	●	20	20			20					
KTKFR/L	1010JX-16	●	●	10	10	120	20	10	8		SB-4590TRWN	LTW-10S	TKF16R/L…
	1212JX-16	●	●	12	12		-	12					
	1616JX-16	●	●	16	16			16					
	NEW 2020JX-16	●	●	20	20			20					
KTKFR/L	1212F-12	●	●	12	12	85	-	12	6		SB-4590TRWN	LTW-10S	TKF12R/L…
	1212F-16	●	●						8				TKF16R/L…
KTKFL	1216JX-12		●	12	16	120	-	16	6	Fig.2	SB-4590TRWN	LTW-10S	TKF12L…
	1620JX-12		●	16	20			20					

Dimension T shows the distance from the Toolholder to the cutting edge. H6,H7 for the actual cut-off diameter.

Recommended Cutting Conditions H29

Note: Cut-off diameter of -12 type toolholder (ϕDmax) depends on the insert width.

How to Use

1) When using Main Spindle only

Workpiece maximum ϕD1 (Fig.1)=ϕDmax
Even if the cutting edge runs beyond the center line, the insert does not contact the workpiece, since the workpiece falls off.
(The clearance between the insert and the workpiece is 0.2mm)

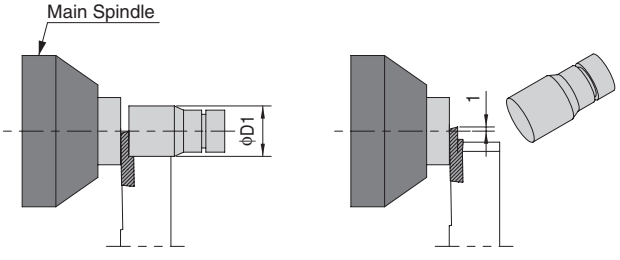


Fig.1
(When the edge is at the center)

Fig.2
(When the edge is 1mm beyond the center)

● : Std. Item

2) When using both Main and Sub spindles

In this case, when the cutting edge runs beyond the center line, the insert will contact the workpiece, since the workpiece does not fall off.
e.g.) When the cutting edge is programmed to run 1mm beyond the center.
Workpiece maximum, ϕD2 (Fig.4) [ϕDmax−1mm×2] (mm)
(The clearance between the insert and the workpiece is 0.2mm)

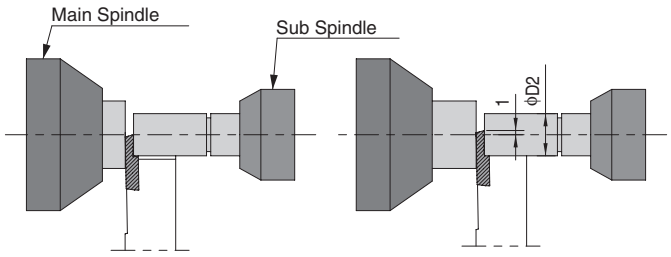


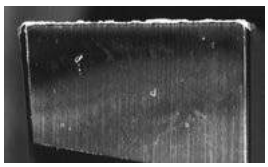
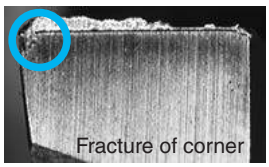
Fig.3 (When the edge is at the center)

Fig.4 (When the edge is 1mm beyond the center)

Tough Edge, T-Chipbreaker

Fracture resistance comparison (Interruption)

Cutting Edge (Front Relief Surface)

T-Chipbreaker (PR1225) 3,000 passes	Competitor C 700 passes	Competitor D 3,000 passes
	Fracture of corner	 Fracture of corner

	1,000 passes	2,000 passes	3,000 passes
Tough Edge, T-Chipbreaker (PR1225)	→	→	→
Competitor C	→ ×		
Competitor D	→	→	→ ×

<Cutting Conditions>

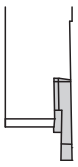
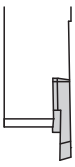
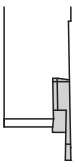
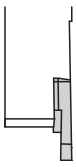
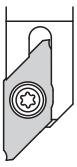
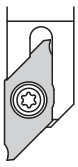
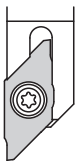
·Vc=80m/min
·f=0.05mm/rev
(At Cut-off: 0.015mm/rev)
·Wet
·Workpiece material: SK4

Workpiece (with flat cuts on two sides)
·TKF12R200-T-16DR (PR1225)

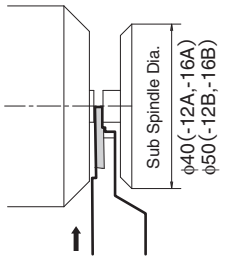
Compared to Comp. C and D, Tough Edge "T-Chipbreaker" achieves superior fracture resistance in interrupted machining.

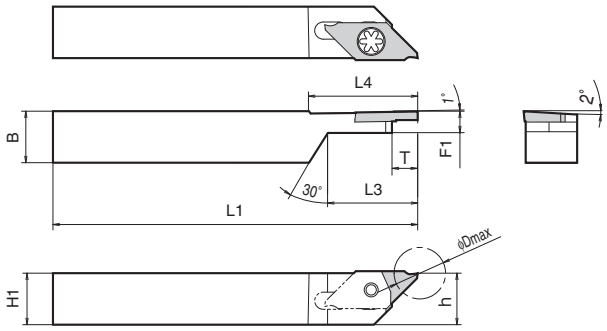
How to select edge prep.

Troubleshooting

Problems	Countermeasures	Countermeasures						
		Lead Angle (θ)		Edge Width		Name of Chipbreaker		
		Neutral (0°)	Yes	Narrower	Wider	S	T	NB
								
Insert Fracture	Insert Fracture Prevention	Effective			Effective		Effective	Effective
Long cutting time	Cutting time reduction	Effective			Effective		Effective	Effective
Entangled chips	Prevention of chip entanglement	Effective		Effective		Effective		
Large boss remain	Small boss remain		Effective	Effective		Effective		
Ring Remain (Hollow Workpiece)	Prevention of Ring Remain		Effective	Effective		Effective		
Deformation of Hollow Workpiece (pipe)	Preventing deformation		Effective	Effective		Effective		

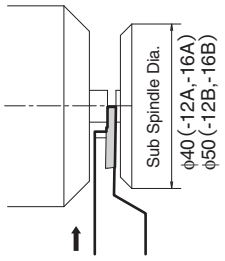
KTKFS (for sub spindle tooling)

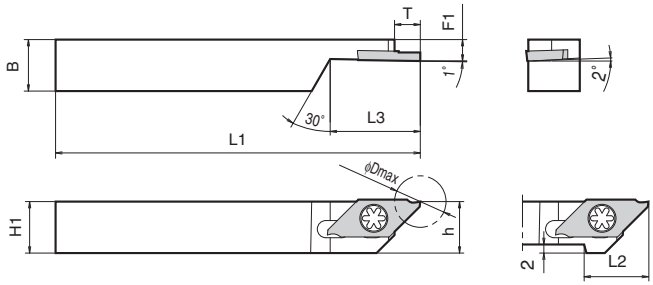




• Right-hand shown

Right-hand Insert for Right-hand Toolholder.





KTKFS$^{R}_{L}$1010K-12A
KTKFS$^{R}_{L}$1010K-16A
shows left figure

• Left-hand shown

Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Cut-off Dia. ϕDmax	Dimension (mm) H1=h	B	L1	L2	L3	*L4	F1	T	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ⇒H11
KTKFS$^{R}_{L}$	1010K-12A	●	●	6~12	10	10	120	15	22	26	5	6	SB-4050TRN	LTW-10S	TKFS12$^{R}_{L}$
	1212F-12A	●	●		12	12	85	-							
	1212K-12B	●	●				120		26						
KTKFS$^{R}_{L}$	1010K-16A	●	●	14~16	10	10	120	20	22	30	5	8	SB-4050TRN	LTW-10S	TKFS16$^{R}_{L}$
	1212F-16A	●	●		12	12	85	-							
	1212K-16B	●	●				120		26						

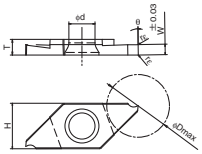
Dimension T shows the distance from the Toolholder to the cutting edge. ⇒**H10** for the actual cut-off diameter.

Recommended Cutting Conditions ⇒**H11**

· Cut-off diameter (ϕDmax) depends on the insert width.

* Only Right-hand is available for L4 dimension.

TKFS (for small diameter cut-off)

Insert (Handed insert shows Left-Hand)		Description		Dimension (mm) W	Dimension (mm) ϕDmax
		TKFS12$^{R}_{L}$	100-S	1.0	6
			150-S	1.5	9
			200-S	2.0	12
		TKFS16$^{R}_{L}$	150-S	1.5	14
			200-S	2.0	16

Notes) As Fig.2 shows, the cut-off diameter of the insert is indicated when the top of the cutting edge progresses 1mm from the center.

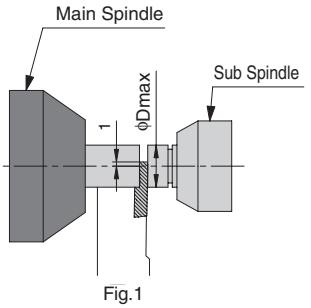


Fig.1

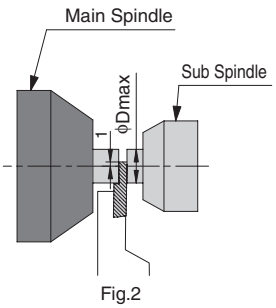


Fig.2

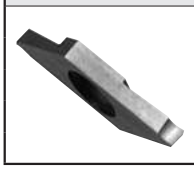
● As Fig.1 shows, use KTKFL (Left-hand) for the distance between main spindle and sub spindle.

● As Fig.2 shows, KTKFS is recommended for small diameters and for the short distance between the main spindle and sub spindle.

● : Std. Item

● Applicable Inserts

Classification of usage							
●:Continuous-Light Interruption / 1st Choice ◔:Continuous-Light Interruption / 2nd Choice ●:Continuous / 1st Choice ○:Continuous / 2nd Choice	P	Carbon steel / Alloy steel	◔	◔	◔	◔	
	M	Stainless Steel	◔	●	◔	◔	
	K	Cast Iron					●
	N	Non-ferrous Metals					●

Insert Handed insert shows Left-Hand	Description		Dimension (mm) W	ϕD max	rε	T	H	ϕd	Angle θ	MEGACOAT NANO PR1425 R	PR1425 L	PR1535 R	PR1535 L	MEGACOAT PR1225 R	PR1225 L	PVD Coated Carbide PR1025 R	PR1025 L	Carbide KW10 R	KW10 L
	TKFS12R/L	100-S	1.0	6	0.05	2.2	8.7	4.4	0°	●	●	●	●	●	●	●	●	●	●
		150-S	1.5	9						●	●	●	●	●	●	●	●	●	●
		200-S	2.0	12						●	●	●	●	●	●	●	●	●	●
	TKFS16R/L	150-S	1.5	14	0.05	2.2	9.5	4.4	0°	●	●	●	●	●	●	●	●	●	●
		200-S	2.0	16						●	●	●	●	●	●	●	●	●	●

· As Fig.2 (H10) of shows, the cut-off diameter of the insert is indicated when the top of the cutting edge progresses 1mm from the center.
· Lead angle shows the angle when installed in toolholder.

◆ Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT NANO PR1425	MEGACOAT NANO PR1535	MEGACOAT PR1225	PVD Coated Carbide PR1025	Carbide KW10	TKFS12 Edge Width (mm) 1.0 f (mm/rev)	TKFS12 1.5	TKFS12 2.0	TKFS16 Edge Width (mm) 1.5 f (mm/rev)	TKFS16 2.0	Remarks
Carbon Steel	★ 70~170	☆ 70~150	☆ 70~150	☆ 60~130	-	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	Coolant
Alloy Steel	★ 70~170	☆ 70~150	☆ 70~150	☆ 60~130	-	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	
Stainless Steel	☆ 60~140	★ 60~120	☆ 60~120	☆ 50~100	-	0.01~0.02	0.01~0.02	0.01~0.03	0.01~0.02	0.01~0.03	
Cast Iron	-	-	-	-	★ 50~100	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	
Aluminum	-	-	-	-	★ 200~450	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	0.01~0.03	
Brass	-	-	-	-	★ 100~200	0.01~0.04	0.01~0.04	0.01~0.04	0.01~0.04	0.01~0.04	

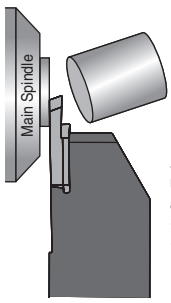
★ : 1st Recommendation ☆: 2nd Recommendation

■ KTKF / KTKFS Selection Reference

● KTKF

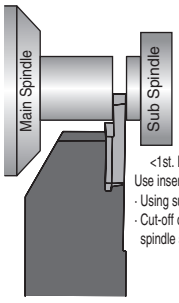
· Both Right-hand and Left-hand types are applicable to gang tool post.
· Basically Left-hand type is used for cut-off operation using a sub spindle.

KTKFR (**Right**-hand toolholder)



<1st. Recommendation>
Use insert with lead angle to remove boss.
· Not using sub spindle
· Cut-off operation near main spindle side

KTKFL (**Left**-hand toolholder)

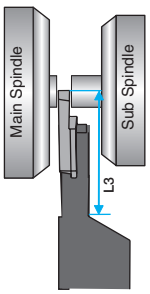


<1st. Recommendation>
Use insert without lead angle.
· Using sub spindle
· Cut-off operation near sub spindle side

● KTKFS

· When machining workpiece with small diameter, use KTKFS to reduce overhang distance from the main spindle.

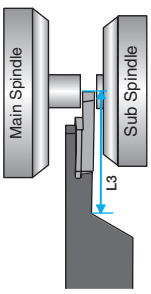
KTKFSR (**Right**-hand toolholder)



<How to select>
Hand of Toolholder
•Long workpiece and more rigidity
•Cut-off operation near main spindle side

<How to select>
L3 dimension
•Sub Spindle Dia.
ϕ40→22(A type)
ϕ50→26(B type)

KTKFSL (**Left**-hand toolholder)



<How to select>
Hand of Toolholder
•Short workpiece and less rigidity
•Cut-off operation near sub spindle side

<How to select>
L3 dimension
•Sub Spindle Dia.
ϕ40→22(A type)
ϕ50→26(B type)

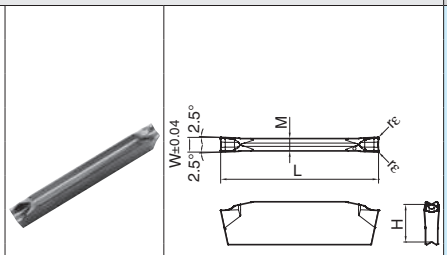
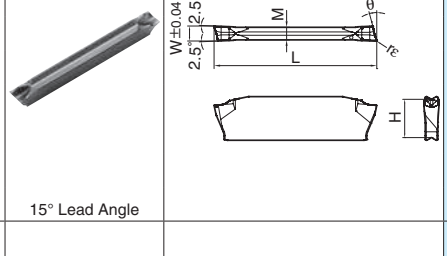
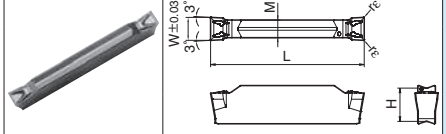
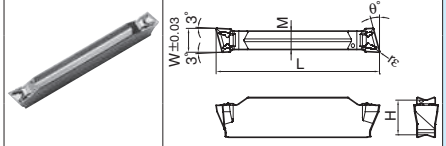
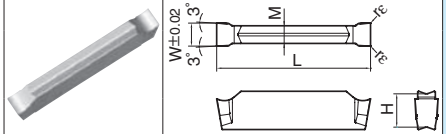
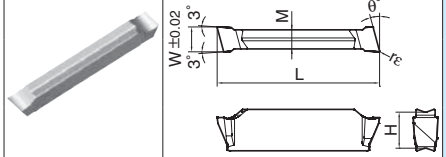
H
Cut-off

● : Std. Item

Inserts are sold in 10 piece boxes.

GDM / GDG

Classification of usage							
◕ :Continuous-Light Interruption / 1st Choice ◔ :Continuous-Light Interruption / 2nd Choice ● :Continuous / 1st Choice ○ :Continuous / 2nd Choice	P	Carbon steel / Alloy steel	◔	◕	◔		
	M	Stainless Steel	◕	◔	◔		
	N	Non-ferrous Metals				◕	◔

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)						Angle	MEGACOAT NANO	MEGACOAT		DLC Coated Carbide	Carbide	Ref. to Page for Applicable Toolholders
				Edge Width(W)	Tolerance	rε	M	L	H	θ	PR1535	PR1225	PR1215	PDL025	GW15	
Cut-Off / Low Feed		GDM	1316N-003PF	1.3	±0.04	0.03	1.0	16	3.7	-	●	●	●			H14 H15
			1316N-015PF			0.15					●	●	●			
			1516N-003PF	1.5		0.03	1.2				●	●	●			
			1516N-015PF			0.15					●	●	●			
			2020N-003PF	2.0		0.03	1.7	20	4.3		●	●	●			
			2020N-015PF			0.15					●	●	●			H14
			2520N-003PF	2.5		0.03	2.1				●	●	●			H15
			2520N-015PF			0.15					●	●	●			H16
			3020N-003PF	3.0		0.03	2.3				●	●	●			H17
			3020N-015PF			0.15					●	●	●			
	 15° Lead Angle	GDM	1316R/L-003PF-15D	1.3	±0.04	0.03	1.0	16	3.7	15°	●	●	●			H14 H15
			1516R/L-003PF-15D	1.5			1.2				●	●	●			
			1516R -015PF-15D			0.15					R	R	R			
			2020R/L-003PF-15D	2.0		0.03	1.7	20	4.3		●	●	●			
			2020R -015PF-15D			0.15					R	R	R			
			2520R/L-003PF-15D	2.5		0.03	2.1				●	●	●			
			2520R -015PF-15D			0.15					R	R	R			
			3020R/L-003PF-15D	3.0		0.03	2.3				●	●	●			
			3020R -015PF-15D			0.15					R	R	R			
Cut-Off / Medium Feed		GDM	2020N-010PQ	2.0	±0.03	0.1	1.7	20	4.3	-	●	●	●			
			2520N-010PQ	2.5			2.1				●	●	●			
			3020N-010PQ	3.0			2.3				●	●	●			
	 15° Lead Angle	GDM	2020R-010PQ-15D	2.0	±0.03	0.1	1.7	20	4.3	15°	R	R	R			H14 H15 H16 H17
			2520R-010PQ-15D	2.5			2.1				R	R	R			
			3020R-010PQ-15D	3.0			2.3				R	R	R			
Cut-Off / Low Cutting Force		GDG	2020N-005PG	2.0	±0.02	0.05	1.7	20	4.3	-	●	●		●	●	
			2520N-005PG	2.5			2.1				●	●		●	●	
			3020N-005PG	3.0			2.3				●	●		●	●	
	 15° Lead Angle	GDG	2020R-005PG-15D	2.0	±0.02	0.05	1.7	20	4.3	15°	R	R		R	R	
			2520R-005PG-15D	2.5			2.1				R	R		R	R	
			3020R-005PG-15D	3.0			2.3				R	R		R	R	

Note) 1. Using the PF / PM chipbreaker (for cut-off) for grooving cannot create a flat bottom (Ref. to the right figure).

Groove bottom created by PF / PM chipbreaker

● : Std. Item
R : Std. Item (Right-hand Only)

Inserts are sold in 10 piece boxes.

GDM / GDMS

Classification of usage					
◕ :Continuous-Light Interruption / 1st Choice ◔ :Continuous-Light Interruption / 2nd Choice ● :Continuous / 1st Choice ○ :Continuous / 2nd Choice	P	Carbon steel / Alloy steel	◔	◕	◔
	M	Stainless Steel	◕	◔	◔
	N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) Edge Width(W)	Tolerance	rε	M	L	H	Angle θ	MEGACOAT NANO PR1535	MEGACOAT PR1225	MEGACOAT PR1215	Ref. to Page for Applicable Toolholders
Cut-Off / General Purpose		GDM	2020N-020PM	2.0	±0.03	0.2	1.5	20	4.3	-	●	●	●	H14 H15 H16 H17
			2520N-020PM	2.5			1.95				●	●	●	
			3020N-025PM	3.0		0.25	2.3				●	●	●	
			4020N-030PM	4.0		0.3	3.3				●	●	●	H14 H16 H17
	6° Lead Angle	GDM	2020R-020PM-6D	2.0	±0.03	0.2	1.5	20	4.3	6°	R	R	R	H14 H15 H16 H17
			2520R-020PM-6D	2.5			1.95				R	R	R	
			3020R-025PM-6D	3.0		0.25	2.3				R	R	R	
	1-edge	GDMS	2020N-020PM	2.0	±0.03	0.2	1.5	20	4.3	-	●	●	●	H14 H15 H16 H17
			3020N-025PM	3.0		0.25	2.3				●	●	●	
			4020N-030PM	4.0		0.3	3.3				●	●	●	
	6° Lead Angle 1-edge	GDMS	2020R-020PM-6D	2.0	±0.03	0.2	1.5	20	4.3	6°	R	R	R	H14 H15 H16 H17
			3020R-025PM-6D	3.0		0.25	2.3				R	R	R	
			4020R-030PM-6D	4.0		0.3	3.3				R	R	R	H14 H16 H17
Grooving and Cut-off / High feed rate		GDM	2020N-020PH	2.0	±0.03	0.2	1.5	20	4.3	-	●	●	●	H14 H15 H16 H17
			3020N-030PH	3.0		0.3	2.3				●	●	●	
			4020N-030PH	4.0		0.3	3.3				●	●	●	H14 H16 H17
	1-edge	GDMS	2020N-020PH	2.0	±0.03	0.2	1.5	20	4.3	-	●	●	●	H14 H15 H16 H17
			3020N-030PH	3.0		0.3	2.3				●	●	●	
			4020N-030PH	4.0		0.3	3.3				●	●	●	H14 H16 H17

Note) 1. Using the PF / PM chipbreaker (for cut-off) for grooving cannot create a flat bottom (Ref. to the right figure).

Recommended Cutting Conditions ➔ H18,H19

Groove bottom created by PF / PM chipbreaker

Inserts Identification System

(1) Series	(2) Tolerance Symbol	(3) No. of edge	(4) Edge Width	(5) Insert Length	(6) Hand of Tool	(7) Corner-R (rε)	(8) Chipbreaker Symbol	(9) Lead Angle
Grooving / Cut-Off GD Series	G: Ground Insert M: M Class	Without Indication:2-edge S: 1-edge	13:1.3mm 25:2.5mm 15:1.5mm 30:3mm 20:2mm 40:4mm	16:16mm 20:20mm	R: Right-hand L: Left-hand N: Neutral	003:0.03mm 020:0.2mm 005:0.05mm 025:0.25mm 010:0.1mm 030:0.3mm 015:0.15mm	PF:Cut-Off / (Low Feed) PM:Cut-Off / (General Purpose) PQ:Cut-Off / (Medium Feed) PH:Grooving and Cut-off / (High feed rate) PG:Cut-Off / (Low Cutting Force)	Without Indication:0° 6D:6° 15D:15°

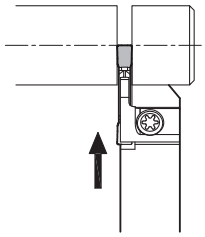
G	D	M	S	30	20	R	-	025	PM	-	6D

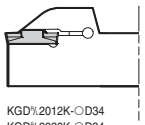
● : Std. Item
R : Std. Item (Right-hand Only)

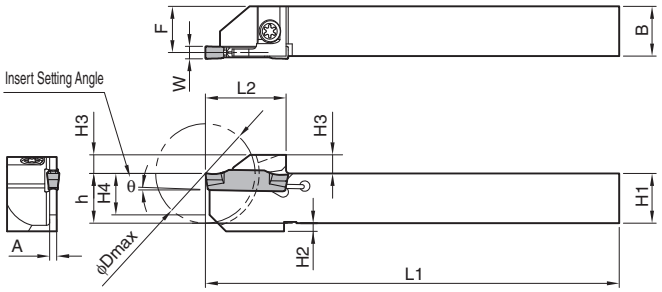
Inserts are sold in 10 piece boxes.

KGD (for automatic lathe)

Edge Width:1.3~4.0mm







• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Cut-off Dia. φDmax	Dimension (mm) H1=h	H2	H3	H4	B	L1	L2	F	A	Angle θ	Edge Width W(mm) MIN.	Edge Width W(mm) MAX.	Spare Parts: Clamp Screw	Spare Parts: Wrench
KGD□/L	1010JX-1.3D16	●	●	16	10	2	5.5	8	10	120	18	9.9	1.0	5°	1.3	1.3	SB-40120TR	LTW-15S
	1010JX-1.3	●	●	20								9.5						
	1212F-1.3D16	●	●	16	12			10	12	85	19.5	11.9						
	1212JX-1.3D16	●	●							120								
	1212F-1.3	●	●	24						85		11.5						
	1212JX-1.3	●	●							120								
KGD□/L	1010JX-1.5D16	●	●	16	10	2	5.5	8	10	120	18	9.7	1.2		1.5	1.5	SB-40120TR	LTW-15S
	1010JX-1.5	●	●	20								9.4						
	1212F-1.5D16	●	●	16	12			10	12	85	19.5	11.7						
	1212JX-1.5D16	●	●							120								
	1212F-1.5	●	●	24						85		11.4						
	1212JX-1.5	●	●							120								
KGD□/L	1010JX-2	●	●	20	10	2	5.5	8	10	120	18	9.2	1.6	1°	2.0	3.0	SB-40120TR	LTW-15S
	1212F-2	●	●	24	12			10	12	85	19.5	11.2						
	1212JX-2	●	●							120								
	1616JX-2	●	●	32	16	-			16		24.5	15.2						
	2012K-2D34	●	●	34	20		9.5	20	12	125	32.5	11.2		0°			HH5X16	LW-4
	2020K-2D34	●	●						20			19.2						
KGD□/L	1010JX-2.4	●	●	20	10	2	5.5	8	10	120	18	9	2.0	1°	2.4	3.0	SB-40120TR	LTW-15S
	1212F-2.4	●	●	24	12			10	12	85	19.5	11						
	1212JX-2.4	●	●							120								
	1616JX-2.4	●	●	32	16	-			16		24.5	15						
	2012K-2.4D34	●	●	34	20		9.5	20	12	125	32.5	11		0°			HH5X16	LW-4
	2020K-2.4D34	●	●						20			19						
KGD□/L	1212JX-3	●	●	24	12	2	5.5	10	12	120	19.5	10.8	2.4	1°	3.0	3.0	SB-40120TR	LTW-15S
	1616JX-3	●	●	32	16	-			16		24.5	14.8				4.0	SE-50125TR	LTW-20
	1616JX-3D38	●	●	38			8	13	13	125	29	11.8						
	1913K-3D38	●	●		19													
	2012JX-3D42	●	●	42	20			14	12	120	31	10.8						
	2012JX-3D51	●	●	51			8.5				36							
	2020JX-3D42	●	●	42			8		20		31	18.8						
	2020JX-3D51	●	●	51			8.5				36							

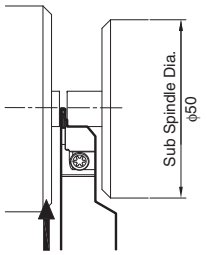
Note) 1. 4mm width Insert can be installed in KGD□/L1212JX-3, but is not recommended due to the toolholder's rigidity.
2. Recommended tightening torque of clamp screw
2.0N·m(SB-40120TR), 2.5N·m(SE-50125TR), 6.5N·m(HH5X16)
3. When machining the material greater than φ36mm with KGD□/L…-3D38, KGD□/L…-3D42 and KGD□/L…-3D51 toolholders, please use 1-edge inserts.
Maximum workpiece diameter for 2-edge inserts is φ36mm.

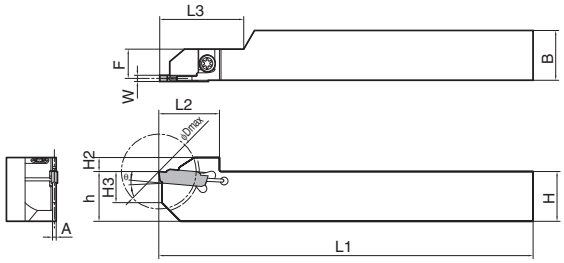
Recommended Cutting Conditions H18,H19

● : Std. Item

KGDS (for sub spindle tooling)

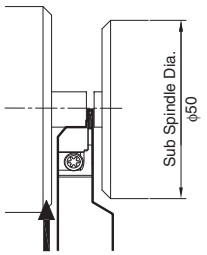
• Right-hand (R)

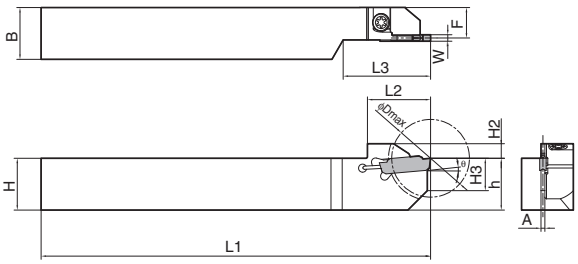




• Right-hand shown

• Left-hand (L)





• Left-hand shown

Toolholder Dimensions

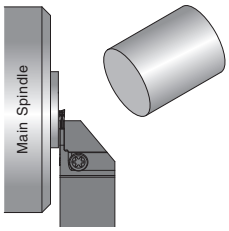
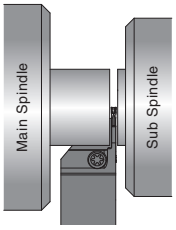
Description		Std. R	Std. L	Cut-off Dia. ϕDmax	Dimension (mm) H=h	H2	H3	B	L1	L2	L3	F	A	Angle θ	Edge Width W (mm) MIN.	MAX.	Spare Parts: Clamp Screw	Spare Parts: Wrench
KGDS R/L	1616JX-1.3B	●	●	24	16	5.5	10	16	120	19.5	27	9.50	1.0	5°	1.3	1.3	SB-40120TR	LTW-15S
	1616JX-1.5B	●	●									9.40	1.2		1.5	1.5		
	1616JX-2B	●	●									9.20	1.6	1°	2.0	3.0		

Recommended Cutting Conditions ➡ H18,H19

KGD / KGDS Selection Reference

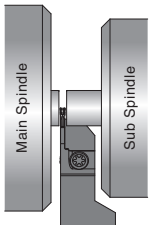
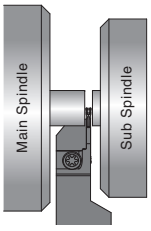
KGD

Standard type
· Both Right-hand and Left-hand types are applicable to gang tool post. · Basically Left-hand type is used for cut-off operation using a sub spindle.

KGDR (Right-hand toolholder)	KGDL (Left-hand toolholder)
	
<1st. Recommendation> Use insert with lead angle to remove boss. · Not using sub spindle · Cut-off operation near main spindle side	<1st. Recommendation> Use insert without lead angle. · Using sub spindle · Cut-off operation near sub spindle side

KGDS

Sub spindle type
· When machining workpiece with small diameter, use KGDS to reduce overhang distance from the main spindle.

KGDSR (Right-hand toolholder)	KGDSL (Left-hand toolholder)
	
· Long workpiece and more rigidity · Cut-off operation near main spindle side	· Short workpiece and less rigidity · Cut-off operation near sub spindle side

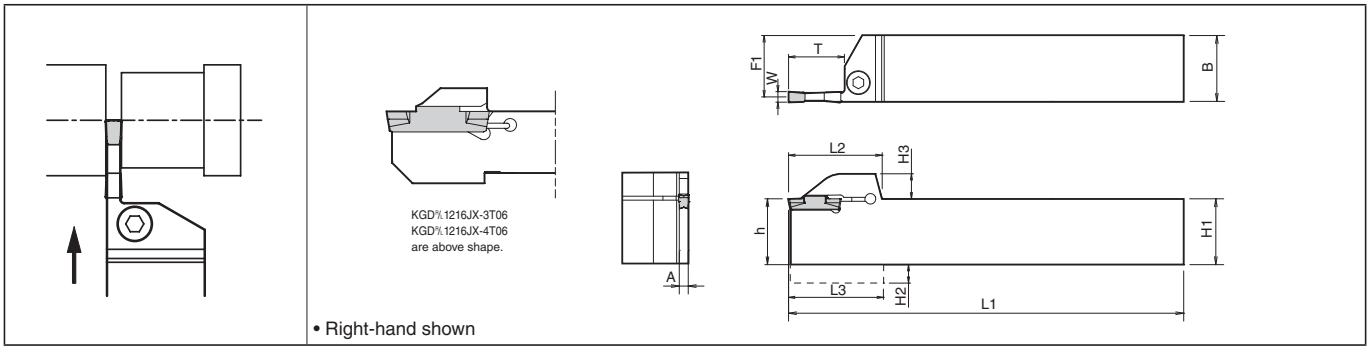
Toolholder Identification System (for automatic lathe)

K G D
KGDS

R	1616	JX	-	3 / 1.3	D38 / B
Toolholder Hand: R: Right-hand, L: Left-hand	Shank Size: 16×16mm	Toolholder Length: 120mm		Applicable Inserts: GDM / GDMS Edge Width: 1.3mm	Others: B: For sub spindle tooling
				Applicable Inserts: GDM / GDMS Edge Width: 3~4mm	Others: D38: ϕDmax 38mm

● : Std. Item

KGD (Integral Type)



• Right-hand shown

Toolholder Dimensions

Width (mm)	Max. depth of cut (mm)	Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	L3	F1	A	T	Edge Width W(mm) MIN.	Edge Width W(mm) MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
2	6	KGDR/L	1616H-2T06	●	●	16	4.0	9.5	16	100	27.7	28.0	15.2	1.7	6	2.0	3.0	HH5X16	LW-4
			2020K-2T06	●	●	20	-		20	125	28.0	-	19.2						
			2525M-2T06	●	●	25			25	150			24.2					HH5X25	
	10	KGDR/L	1616H-2T10	●	●	16	4.0		16	100	30.2	30.5	15.2		10			HH5X16	
			2020K-2T10	●	●	20	-		20	125	30.5	-	19.2						
			2525M-2T10	●	●	25			25	150			24.2					HH5X25	
	17	KGDR/L	1616H-2T17	●	●	16	4.0		16	100	31.2	31.5	15.2		17			HH5X16	
			2012K-2T17	●	●	20	-		12	125	32.5	-	11.2						
			2020K-2T17	●	●				20	125			19.2						
			2525M-2T17	●	●	25			25	150			24.2					HH5X25	
2.4	17	KGDR/L	2012K-2.4T17	●	●	20	-		12	125	32.5	-	11.0	2.0	17	2.4	3.0	HH5X16	LW-4
			2020K-2.4T17	●	●				20	125			19.0						
3	6	KGDR/L	1216JX-3T06	●	●	12	2.0	5.5	16	120	19.5	19	14.8	2.4	6	3.0	4.0	SE-50125TR	LTW-20
			1616H-3T06	●	●	16	4.0	9.5	16	100	27.7	28.0	14.8	2.4	6			HH5X16	LW-4
			2020K-3T06	●	●	20	-		20	125	28.0	-	18.8						
			2525M-3T06	●	●	25			25	150			23.8					HH5X25	
	10	KGDR/L	1616H-3T10	●	●	16	4.0		16	100	30.2	30.5	14.8		10			HH5X16	
			2020K-3T10	●	●	20	-		20	125	30.5	-	18.8						
			2525M-3T10	●	●	25			25	150			23.8					HH5X25	
	20	KGDR/L	1616H-3T20	●	●	16	4.0		16	100	34.2	34.5	14.8		20			HH5X16	
			2012K-3T20	●	●	20	-		12	125	34.5	-	10.8						
			2020K-3T20	●	●				20	125			18.8						
			2525M-3T20	●	●	25			25	150	35.5		23.8					HH5X25	
4	6	KGDR/L	1216JX-4T06	●	●	12	2.0	5.5	16	120	19.5	19	14.3	3.4	6	4.0	5.0	SE-50125TR	LTW-20
	10	KGDR/L	2020K-4T10	●	●	20	-	9.5	20	125	30.5	-	18.3	3.4	10			HH5X16	LW-4
			2525M-4T10	●	●	25			25	150			23.3					HH5X25	
	20	KGDR/L	2020K-4T20	●	●	20			20	125	34.5		18.3		20			HH5X16	
			2525M-4T20	●	●	25			25	150	35.5		23.3					HH5X25	
	25	KGDR/L	2525M-4T25	●	●	25			25	150	40.5		23.3		25				

Note) 1. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)
2. Recommended tightening torque of clamp bolt : 6.5N·m(HH5×○○), 2.5N·m(SE-50125TR)
3. Above toolholders are applicable to external grooving, too.

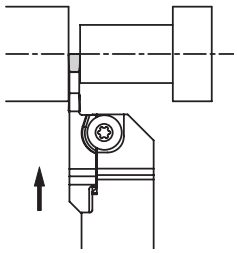
Recommended Cutting Conditions H18,H19

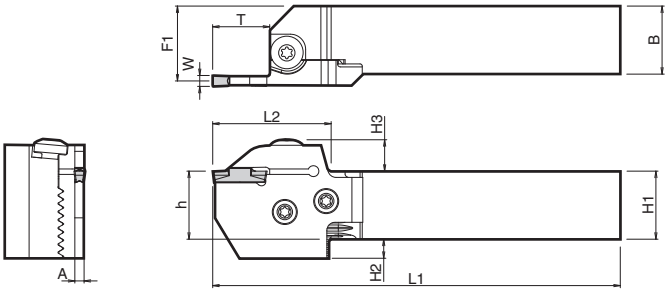
Toolholder Identification System (Integral Type)

K G D	R	1616	H	-	2	T	06
	Toolholder Hand	Shank Size	Toolholder Length		Applicable Inserts		Max. depth of cut
	R: Right-hand L: Left-hand	16×16mm	100mm		GDM/GDMS 2~3mm		06:6mm

● : Std. Item

KGD-S (0° separate type)





• Right-hand shown

Toolholder Dimensions (Blade + Toolholder)

Shank Angle	Width (mm)	Max. depth of cut (mm)	Shank Size (mm)	Unit Description (Standard Stock Description)	Std. R	Std. L	Blade Description ➡G25	Toolholder Description ➡G25	Dimension (mm) H1=h	H2	H3	B	L1	L2	L3	F1	A	T	Edge Width W(mm) MIN.	MAX.
0°	2	17	□20	KGD$^{R}_{L}$ 2020X-2T17S	●	●	KGD$^{R}_{L}$-2T17-C	KGD$^{R}_{L}$2020-C	20	12	11.6	20	122	40	-	23.4	1.7	17	2.0	3.0
			□25	2525X-2T17S	●	●		KGD$^{R}_{L}$2525-C	25	7		25	147			28.4				
			□32	No unit description ➡				KGD$^{R}_{L}$3232-C	32	-		32	167			35.4				
	3	10	□20	KGD$^{R}_{L}$ 2020X-3T10S	●	●	KGD$^{R}_{L}$-3T10-C	KGD$^{R}_{L}$2020-C	20	12		20	115	33		23.0	2.4	10	3.0	4.0
			□25	2525X-3T10S	●	●		KGD$^{R}_{L}$2525-C	25	7		25	140			28.0				
			□32	3232X-3T10S	●	●		KGD$^{R}_{L}$3232-C	32	-		32	160			35.0				
		20	□20	KGD$^{R}_{L}$ 2020X-3T20S	●	●	KGD$^{R}_{L}$-3T20-C	KGD$^{R}_{L}$2020-C	20	12		20	125	43		23.0		20		
			□25	2525X-3T20S	●	●		KGD$^{R}_{L}$2525-C	25	7		25	150			28.0				
			□32	3232X-3T20S	●	●		KGD$^{R}_{L}$3232-C	32	-		32	170			35.0				
	4	10	□20	KGD$^{R}_{L}$ 2020X-4T10S	●	●	KGD$^{R}_{L}$-4T10-C	KGD$^{R}_{L}$2020-C	20	12		20	115	33		22.5	3.4	10	4.0	5.0
			□25	2525X-4T10S	●	●		KGD$^{R}_{L}$2525-C	25	7		25	140			27.5				
			□32	3232X-4T10S	●	●		KGD$^{R}_{L}$3232-C	32	-		32	160			34.5				
		20	□20	KGD$^{R}_{L}$ 2020X-4T20S	●	●	KGD$^{R}_{L}$-4T20-C	KGD$^{R}_{L}$2020-C	20	12		20	125	43		22.5		20		
			□25	2525X-4T20S	●	●		KGD$^{R}_{L}$2525-C	25	7		25	150			27.5				
			□32	3232X-4T20S	●	●		KGD$^{R}_{L}$3232-C	32	-		32	170			34.5				
		25	□20	KGD$^{R}_{L}$ 2020X-4T25S	●	●	KGD$^{R}_{L}$-4T25-C	KGD$^{R}_{L}$2020-C	20	12		20	130	48		22.5		25		
			□25	2525X-4T25S	●	●		KGD$^{R}_{L}$2525-C	25	7		25	155			27.5				
			□32	3232X-4T25S	●	●		KGD$^{R}_{L}$3232-C	32	-		32	175			34.5				

Recommended Cutting Conditions ➡ H18,H19

Note) 1. When using the toolholder in normal mounting position, the lower jaw of toolholder may interfere with the tool presetter.
2. The toolholder and blade descriptions are printed on the toolholder body. (Unit description is not printed.)
KGD-S: Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.
The toolholder is applicable for all blade with suitable hand.
3. In case the unit description is not available (No unit description), please purchase toolholder and blade separately.
4. Dimension T : Maximum depth to which processing can be made. (If the dimension T is 20 mm or more, the maximum depth of groove made by the 2-edge insert will be 18 mm.)
5. Recommended tightening torque of clamp bolt for insert: 6.5N·m (Groove width 2 ~ 4mm)
6. Above toolholders are applicable to external grooving, too.

Toolholder Identification System (Separate type / Unit Description)

K	G	D	R	2020	X	-	2	T	17	S
			Toolholder Hand: R: Right-hand L: Left-hand	Shank Size: 20×20mm	Toolholder Type: Unit Description		Applicable Inserts: GDM/GDMS 2~3mm		Max. depth of cut: 17 : 17mm	

Spare Parts (Common with separate types)

* The parts are included in the toolholder and unit.

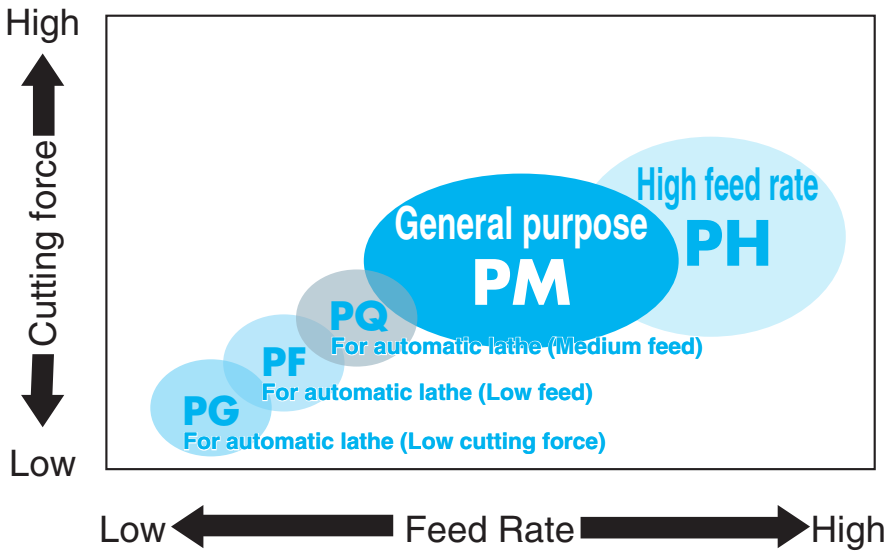
Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
KGD$^{R}_{L}$·····S	BH6X10TR	SB-60120TR	LTW-25

● : Std. Item

KGD Recommended Cutting Conditions

● Application Map

Cut-Off



● Recommended Cutting Conditions (PF / PQ / PG Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			f (mm/rev)						Remarks
				PF (rε=0.03)			**PF** (rε=0.15)			
	MEGACOAT NANO	MEGACOAT		Edge Width W (mm)			Edge Width W (mm)			
	PR1535	**PR1225**	**PR1215**	1.3/1.5	2.0	2.5/3.0	1.5	2.0	2.5/3.0	
Carbon Steel	☆ 70~150	★ 70~150	☆ 70~180	0.01~0.04	0.02~0.06	0.02~0.08	0.01~0.05	0.03~0.08	0.04~0.10	Coolant
Alloy Steel	☆ 70~150	★ 70~150	☆ 70~180							
Stainless Steel	★ 60~120	☆ 60~120	☆ 60~150	0.01~0.03	0.01~0.04	0.01~0.05	0.01~0.04	0.03~0.07	0.04~0.08	
Cast Iron	-	-	★ 80~200	0.01~0.05	0.02~0.07	0.03~0.08	0.01~0.06	0.03~0.09	0.04~0.10	

★: 1st Recommendation ☆: 2nd Recommendation

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)					f (mm/rev)				Remarks
						PQ		**PG**		
	MEGACOAT NANO	MEGACOAT		DLC Coated Carbide	Carbide	Edge Width W (mm)		Edge Width W (mm)		
	PR1535	**PR1225**	**PR1215**	**PDL025**	**GW15**	2.0	2.5/3.0	2.0	2.5/3.0	
Carbon Steel	☆ 70~150	★ 70~150	☆ 70~180	-	-	0.03~0.1	0.04~0.12	0.01~0.04	0.01~0.05	Coolant
Alloy Steel	☆ 70~150	★ 70~150	☆ 70~180	-	-					
Stainless Steel	★ 60~120	☆ 60~120	☆ 60~150	-	-	0.02~0.07	0.02~0.08	0.01~0.03	0.01~0.04	
Cast Iron	-	-	★ 80~200	-	☆ 50~100	0.04~0.1	0.04~0.12	0.01~0.04	0.01~0.05	
Aluminum	-	-	-	★ 200~500	☆ 200~450	-	-	0.01~0.05	0.01~0.06	
Brass	-	-	-	-	★ 100~200	-	-	0.01~0.07	0.01~0.08	

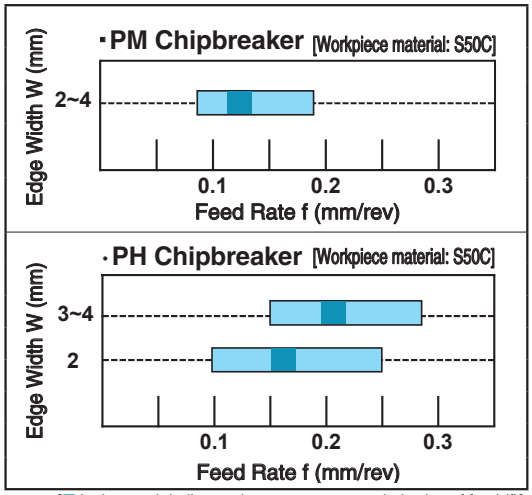
★: 1st Recommendation ☆: 2nd Recommendation

● Recommended Cutting Conditions (PM / PH Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			f (mm/rev)			Remarks
				PM	PH		
	MEGACOAT NANO	MEGACOAT		Edge Width W (mm)	Edge Width W (mm)		
	PR1535	PR1225	PR1215	2~4	2	3~4	
Carbon Steel	☆ 80~200	★ 80~200	☆ 100~200	0.08~0.18	0.10~0.25	0.15~0.28	Coolant
Alloy Steel	☆ 70~180	★ 70~180	☆ 80~180				
Stainless Steel	★ 60~150	☆ 60~150	☆ 60~150	0.06~0.12	0.05~0.12	0.08~0.15	
Cast Iron	-	-	★ 100~200	0.08~0.18	0.10~0.25	0.15~0.28	

★: 1st Recommendation ☆: 2nd Recommendation

◆ Example of feed



[■ in the graph indicates the most recommended value of feed (f)]

◆ Caution (Cut-Off)

1. Be sure to perform wet processing. Apply enough coolant to the cutting edge.
2. Keep a constant rate during processing so that optimum product life will be achieved.
3. Cut-off as close to the chuck as possible.
4. Lower the feed rate to 1/2 to 1/3 at the near center to prevent impact caused by machining.

Cut-Off Inserts

GMM / GMN / GM$^{R}_{L}$

Classification of usage								
◕ :Continuous-Light Interruption / 1st Choice ◔ :Continuous-Light Interruption / 2nd Choice ● :Continuous / 1st Choice ○ :Continuous / 2nd Choice	P	Carbon steel / Alloy steel	○	◔	●	◔	●	
	M	Stainless Steel		◔	●	◔	●	
	K	Cast Iron						●
	N	Non-ferrous Metals						●

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) W	rε	L	H	M	Angle θ	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PR930	PR1115	Carbide KW10	Ref. to Page for Applicable Toolholders
Neutral	Sharp-Cutting 2-edge	GMM	1520-MT	1.5	0 / 0.05	20	4.3	1.2	-				●		●	H22
			2020-MT	2.0	0 / 0.05			1.5			●	●			●	
			2520-MT	2.5	0 / 0.05			1.9					●		●	H22 H23
			3020-MT	3.0	0 / 0.05			2.3		●	●		●		●	
	Sharp-Cutting 2-edge Without Chipbreaker	GMM	1520-NB	1.5	0 / 0.05	20	4.3	1.2	-				●		●	H22
			2020-NB	2.0	0 / 0.05			1.5		●			●		●	
			2520-NB	2.5	0 / 0.05			1.9		●			●		●	
			3020-NB	3.0	0 / 0.05			2.3		●			●		●	
	Stability Oriented 2-edge	GMM	2020-TK	2.0	0.20	20	4.3	1.5	-			●	●		●	
			2520-TK	2.5	0.20			1.9		●	●	●			●	
			3020-TK	3.0	0.25			2.3		●	●	●			●	
	High Feed Rate 2-edge	GMM	2020-TMR	2.0	0.20	20	4.3	1.5	-					●		
			2520-TMR	2.5	0.20			1.9						●		H22 H23
			3020-TMR	3.0	0.25			2.3						●		
	Stability Oriented 1-edge	GMN	2-TK	2.0	0.20	20	4.3	1.5	-			●	●		●	
			3-TK	3.0	0.25			2.3		●	●	●			●	
			4-TK	4.0	0.30			3.3		●	●	●			●	
	Shows GMN2.2 Sharp-Cutting 1-edge	GMN	2.2	2.2	0.17	20	4.3	1.8	-	●	●		●		●	
			3	3.0	0.20			2.3		●	●		●		●	
			4	4.0	0.25			3.3		●	●		●		●	
			5	5.0	0.80			4.2			●		●		●	
			6	6.0	0.80			5.2			●		●		●	
										R L	R L	R L	R L	R L	R L	
Lead Angle	Sharp-Cutting 2-edge	GMM	1520$^{R}_{L}$-MT-15D	1.5	0 / 0.05	20	4.3	1.2	15°			●	●		●	H22
			2020$^{R}_{L}$-MT-15D	2.0	0 / 0.05			1.5		● ●	●		●		●	
			2520$^{R}_{L}$-MT-15D	2.5	0 / 0.05			1.9		● □	●		●		●	
			3020$^{R}_{L}$-MT-15D	3.0	0 / 0.05			2.3		● ●	●		●		●	
	Stability Oriented 2-edge	GMM	2020R-TK-8D	2.0	0.20	20	4.3	1.5	8°		●		●		●	
			2520R-TK-8D	2.5	0.20			1.9		●	●		●		●	
			3020R-TK-8D	3.0	0.25			2.3		●	●		●		●	
	High Feed Rate 2-edge	GMM	2020R-TMR-6D	2.0	0.20	20	4.3	1.5	6°					●		
			2520R-TMR-6D	2.5	0.20			1.9						●		H22 H23
			3020R-TMR-6D	3.0	0.25			2.3						●		
	Stability Oriented 1-edge	GMR	2-TK-8D	2.0	0.20	20	4.3	1.5	8°		□		●		●	
			3-TK-8D	3.0	0.25			2.3		□	●		●		●	
			4-TK-8D	4.0	0.30			3.3		□	●		●		●	
	Shows GMR2.2-8D / 15D Sharp-Cutting 1-edge	GM$^{R}_{L}$	2.2-8D	2.2	0.17	20	4.3	1.8	8°	●	●		●		●	
			2.2-15D	2.2	0.00			1.8	15°	●	●		●		●	
			3-4D	3.0	0.20			2.3	4°	●	● ●		●		●	
			4-4D	4.0	0.25			3.3	4°		● ●		●			

● : Std. Item

Inserts are sold in 10 piece boxes.

Edge Preparation

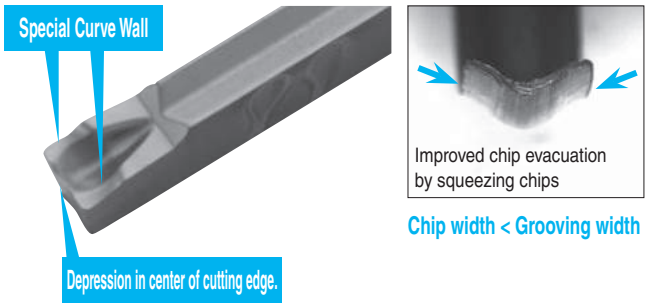
Series	MT-Chipbreaker		TK-Chipbreaker		TMR-Chipbreaker	Without Chipbreaker (NB)	
Edge Prep.	Chamfer + Honed	Chamfer + Honed	Chamfer + Honed	Sharp Edge	Chamfer + Honed	R honed	Sharp Edge
	Corner-R (rε) = 0.05	Sharp Corner	Corner-R (rε) = 0.2~0.3	Corner-R (rε) = 0.2~0.3	Corner-R (rε) = 0.2	Corner-R (rε) = 0.05	Sharp Corner
	CR9025/PR915	**PR930/KW10**	**CR9025/PR915**	**PR930/KW10**	**PR1115**	**CR9025**	**PR930/KW10**

· Sharp Edge Spec. can reduce cutting force by 40% less than that of chamfer edge.

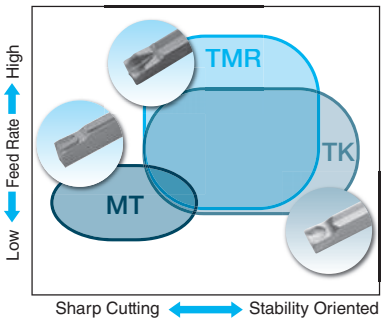
Series	Advantage
GMM-MT	Specific chipbreaker for cut-off operations requiring sharp cutting performance. Minimizes the Boss.
GMM-NB	Cutting edge is flat with non-chipbreaker. It works well for brass, etc.
GMM-TK	Stable design with chipbreaker for cut-off. Large corner-R. 2-edge for economical performance.
GMN-TK	Same chipbreaker geometry as GMM-TK. 1-edge. Wide application range.
GMN (Std.) (Without Indication)	Mainly for deep grooving, but available for groove widening and turning due to projection near side cutting edge. 1-edge and wide application range. Available for cut-off applications.

TMR-Chipbreaker

Advantages of Chipbreaker



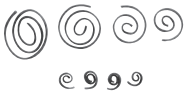
GMM Chipbreaker MAP

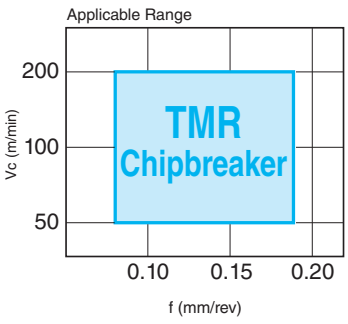


TMR-chipbreaker enables stable chip control also for high feed rates.

Good chip control even when cutting speed (spindle revolution) is increased.

(Workpiece material: SCM415, ϕ30, constant spindle revolution)

Description	n=1,060min^{-1}(Vc=100m/min)		n=2,123min^{-1}(Vc=200m/min)	
	f=0.12mm/rev	f=0.18mm/rev	f=0.12mm/rev	f=0.18mm/rev
GMM 3020-TMR (Neutral)				
GMM 3020R-TMR-6D (Lead angle)				

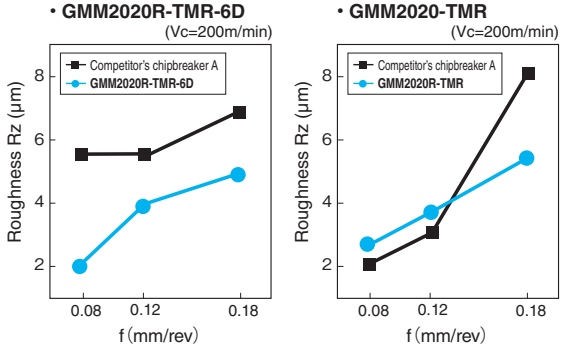


Recommended Cutting Conditions

Workpiece Material	Vc (m/min)	f (mm/rev)
Carbon Steel	60~200	0.08~0.18
Alloy Steel	60~150	
Stainless Steel	50~140	

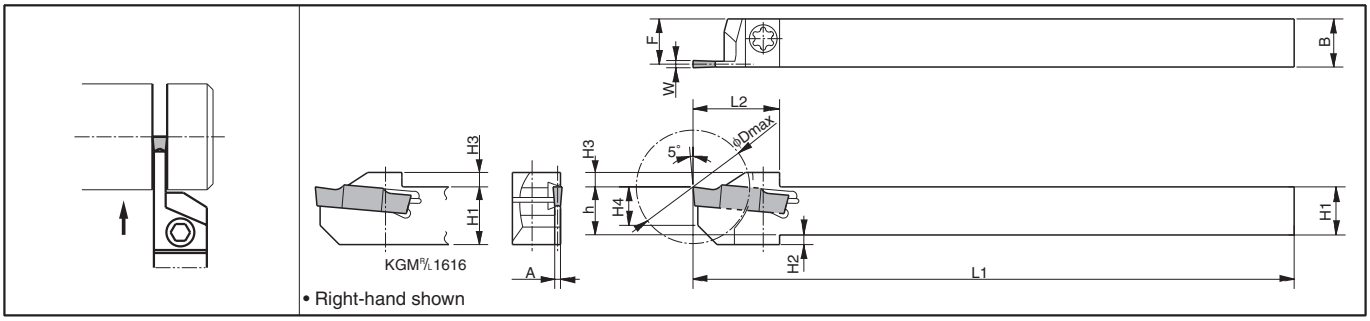
Workpiece Surface Roughness

TMR-Chipbreaker provides good surface roughness on the workpiece end face at high feed rate ranges.



KGM (for automatic lathe)

Edge Width:1.5~4.0mm

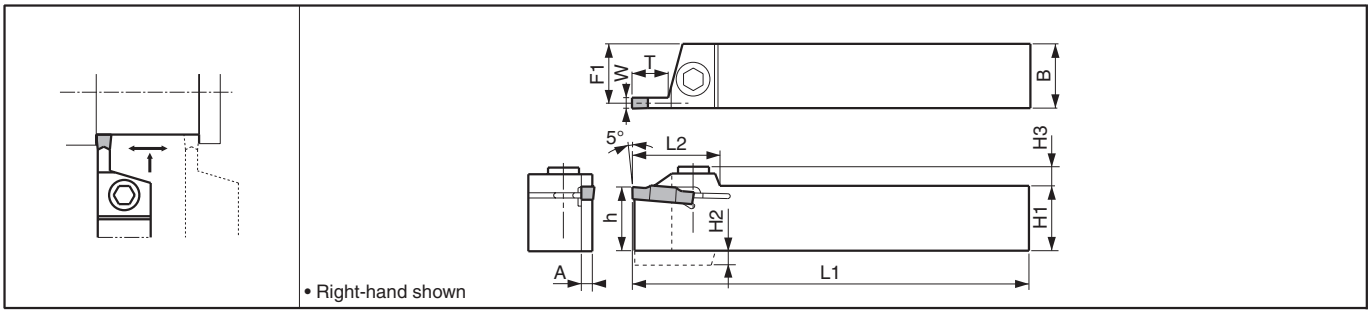


Toolholder Dimensions

Description		Std. R	Std. L	Cut-off Dia. φDmax	Dimension (mm) H1=h	H2	H3	H4	B	L1	L2	F	A	Edge Width W(mm) MIN.	Edge Width W(mm) MAX.	Spare Parts Screw	Spare Parts Wrench
KGMR/L	1010JX-1.5	●	●	20	10	2	3	8	10	120	18	9.4	1.2	1.5	2.0	SE-40120TR	LTW-15S
	1212JX-1.5	●	●	25	12		4	10	12		20.5	11.4					
KGMR/L	1010JX-2	●	●	20	10	2	3	8	10	120	18	9.15	1.7	2.0	3.0	SE-40120TR	LTW-15S
	1212JX-2	●	●	25	12		4	10	12		19	11.15					
	1616JX-2	●	●	32	16	-		9	16		24.5	15.15				SE-50125TR	LTW-20
KGMR/L	1010JX-2.5	●	●	20	10	2	3	8	10	120	18	9	2.0	2.4	3.0	SE-40120TR	LTW-15S
	1212JX-2.5	●	●	25	12		4	10	12		20.5	11					
	1616JX-2.5	●	●	32	16	-		9	16		25.5	15				SE-50125TR	LTW-20
KGMR/L	1616JX-3	●	●	32	16	-	4	9	16	120	25.5	14.8	2.4	3.0	4.0	SE-50125TR	LTW-20
KGMR	1212F-1.5-85	●		25	12	2	4	10	12	85	19	11.4	1.2	1.5	2.0	SE-40120TR	LTW-15S
KGMR/L	1212F-2-85	●	●	25	12	2	4	10	12	85	19	11.15	1.7	2.0	3.0	SE-40120TR	LTW-15S
KGMR/L	1212F-2.5-85	●	●	25	12	2	4	10	12	85	19	11	2.0	2.4	3.0	SE-40120TR	LTW-15S

KGM

Edge Width:3.0~8.0mm



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T		Edge Width W(mm) MIN.	Edge Width W(mm) MAX.	Spare Parts Screw		Spare Parts Wrench	
KGMR/L	1212H-3	●	●	12	4	6	12	100	27	10.8	2.4	9		3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16		7	16			14.8				3.0	4.0	-	HH5X16	-	LW-4
	2020K-3	●	●	20	-	7	20	125		18.8									
	2525M-3	●	●	25			25	150		23.8							HH5X25		
KGMR/L	2020K-4	●	●	20	-	7	20	125	27	18.3	3.4	10		4.0	5.0	-	HH5X16	-	LW-4
	2525M-4	●	●	25			25	150		23.3							HH5X25		
KGMR/L	2020K-5	●	●	20	-	7	20	125	27	17.8	4.4	10		5.0	6.0	-	HH5X16	-	LW-4
	2525M-5	●	●	25			25	150		22.8							HH5X25		
	3232P-5	●	●	32			32	170		29.8									
KGMR/L	2525M-8	●	●	25	7.5	10.5	25	150	40	22.0	6.0	25		8.0	8.0	-	HH6X25	-	LW-5
	3232P-8	●	●	32	-		32	170		29.0									

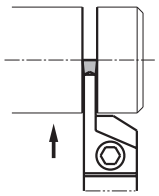
· Dimension T shows available grooving depth.

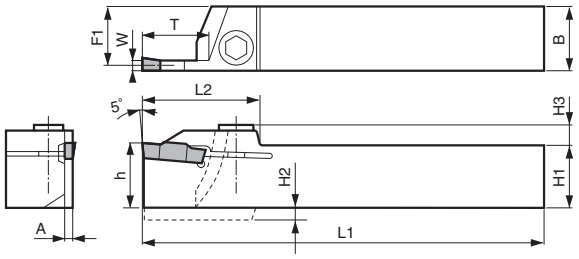
· 4mm width Insert can be installed in KGMR/L1212H-3, but is not recommended due to the toolholder's rigidity.

● : Std. Item

KGM-T

Edge Width:2.0~6.0mm





• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T		Edge Width W (mm) MIN.	MAX.	Spare Parts: Screw		Spare Parts: Wrench	
KGM$^{R/L}$	2012K-2T17	●	●	20	-	7	12	125	33	11.15	1.7	17		2.0	3.0	SB-5TR	-	LTW-20	-
	2020K-2T17	●	●	20			20	125		19.15						-	HH5X16	-	LW-4
	2525M-2T17	●	●	25			25	150		24.15							HH5X25		
KGM$^{R/L}$	1616H-3T20	●	●	16	4	7	16	100	36	14.8	2.4	20		3.0	4.0	-	HH5X16	-	LW-4
	2012K-3T20	●	●	20	-		12	125		10.8						SB-5TR	-	LTW-20	-
	2020K-3T20	●	●				20			18.8						-	HH5X16	-	LW-4
	2525M-3T20	●	●	25			25	150		23.8							HH5X25		
KGM$^{R/L}$	2020K-4T20	●	●	20	-	7.5	20	125	36	18.3	3.4	20		4.0	5.0	-	HH5X16	-	LW-4
	2525M-4T20	●	●	25			25	150		23.3							HH5X25		
	2525M-4T25	●	●						41			25							
KGM$^{R/L}$	2525M-5T25	●	●	25	-	8.5	25	150	42	22.8	4.4	25		5.0	6.0	-	HH5X25	-	LW-4
	3232P-5T25	●	●	32			32	170		29.8									
KGM$^{R/L}$	2525M-6T30	●	●	25	-	9.5	25	150	45	22.4	5.2	30		6.0	6.0	-	HH5X25	-	LW-4

· Dimension T shows the distance from the Toolholder to the cutting edge. Ref. to the Table **H24** for the relationship between the available Grooving Depth and the Cutting Dia.
· When using GMG / GMM type (2-edge) insert, set the groove depth under 15mm.

Applicable Inserts

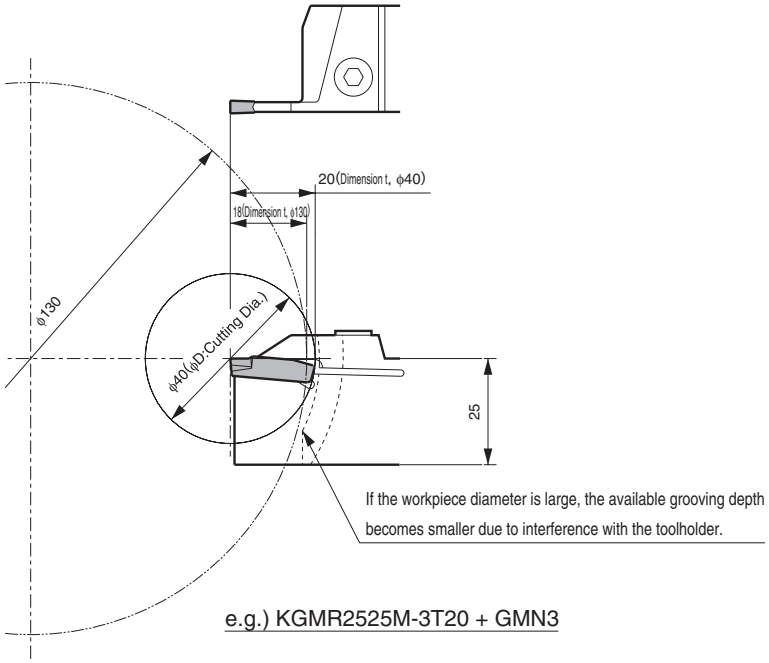
Applications	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Full-R / Copying	Cut Off / Deep Grooving	Cut Off / Deep Grooving	Cut Off / Deep Grooving	Cut Off / Deep Grooving	Cut Off / Deep Grooving
Ref. to Page	G30	G30	G30	G30	G31	H20	H20	H20	H20	H20
Insert / Toolholder Description	MW	MS	MG			MT	NB	TK / TMR	TK	
KGM$^{R/L}$···1.5	-	-	-	-	-	GMM1520..MT GMM2020..MT GMM1520$^{R/L}$..MT GMM2020$^{R/L}$..MT	GMM1520..NB GMM2020..NB	GMM2020..T. GMM2020$^{R/L}$..T.	GMN2..TK GM$^{R/L}$2..TK	-
KGM$^{R/L}$···2(T)	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2020..MT GMM2520..MT GMM3020..MT GMM2020$^{R/L}$..MT GMM2520$^{R/L}$..MT GMM3020$^{R/L}$..MT	GMM2020..NB GMM2520..NB GMM3020..NB	GMM2020..T. GMM2520..T. GMM3020..T. GMM2020$^{R/L}$..T. GMM2520$^{R/L}$..T. GMM3020$^{R/L}$..T.	GMN2..TK GMN3..TK GM$^{R/L}$2..TK GM$^{R/L}$3..TK	GMN2.2 GMN3 GM$^{R/L}$2.2 GM$^{R/L}$3
KGM$^{R/L}$···2.5	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2520..MT GMM3020..MT GMM2520$^{R/L}$..MT GMM3020$^{R/L}$..MT	GMM2520..NB GMM3020..NB	GMM2520..T. GMM3020..T. GMM2520$^{R/L}$..T. GMM3020$^{R/L}$..T.	GMN3..TK GM$^{R/L}$3..TK	GMN3 GM$^{R/L}$3
KGM$^{R/L}$···3(T)	GMM3020..MW GMM4020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS	GMG3020..MG GMG3520..MG GMG4020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R	-	GMM3020..MT GMM3020$^{R/L}$..MT	GMM3020..NB	GMM3020..T. GMM3020$^{R/L}$..T.	GMN3..TK GMN4..TK GM$^{R/L}$3..TK GM$^{R/L}$4..TK	GMN3 GMN4 GM$^{R/L}$3 GM$^{R/L}$4
KGM$^{R/L}$···4(T)	GMM4020..MW GMM5020..MW	GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG4020..MG GMG5020..MG	GMG4020..R GMM4020..R GMG5020..R GMM5020..R	-	-	-	-	GMN4..TK GM$^{R/L}$4..TK	GMN4 GMN5 GM$^{R/L}$4
KGM$^{R/L}$···5T	GMM5020..MW GMM6020..MW	GMG5020..MS GMM5020..MS GMG6020..MS GMM6020..MS	GMG5020..MG GMG6020..MG	GMG5020..R GMM5020..R GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN5 GMN6
KGM$^{R/L}$···6T	GMM6020..MW	GMG6020..MS GMM6020..MS	GMG6020..MG	GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN6
KGM$^{R/L}$···8	GMM8030..MW	-	GMG8030..MG	-	GMGA8030..R	-	-	-	-	-

Recommended Cutting Conditions ➡ **H29**

● : Std. Item

Possible cutting diameter of KGM / KGM-T type

There is a limit to available grooving depth depending on the workpiece diameter.



e.g.) KGMR2525M-3T20 + GMN3

KGM (for Automatic Lathe) Possible Cutting Dia. Table

Toolholder Description		ϕD(Cutting Dia.)																
KGM R/L	0810K-1.5-125	-	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	∞
	1010□-1.5···	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212□-1.5···	-	-	-	-	25	26	28	32	36	40	60	100					
	0810K-2-125	-	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	
	1010□-2···	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212□-2···	-	-	-	-	25	26	28	50	∞	∞	∞	∞					
	1616□-2···	32	40	50	60	80	100	∞	∞									
	1010□-2.5···	-	-	-	-	-	-	-	20	25	32	40	60					
	1212□-2.5···	-	-	-	-	25	26	28	32	36	40	60	100					
	1616□-2.5···	32	40	50	60	80	100	∞	∞	∞	∞	∞	∞					
	1616□-3···	32	40	50	60	80	100											
Available Grooving Depth t (mm)		16	15	14	13	12.5	12	11	10	9	8	7	6	5	4	3	2	1

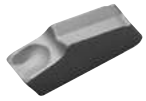
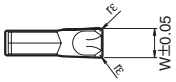
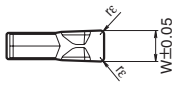
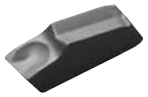
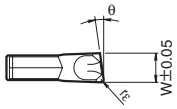
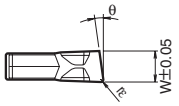
KGM-T Possible Cutting Dia. Table (GMN, GM R/L when using 1-edge insert)

Toolholder Description		ϕD(Cutting Dia.)												
KGM R/L	2012K-2T17	-	-	-	-	-	-	-	-	66	80	130	260	∞
	2020K-2T17	-	-	-	-	-	-	-	-	66	80	130	260	
	2525M-2T17	-	-	-	-	-	-	-	-	66	80	130	260	
	1616H-3T20	-	-	-	-	-	40	54	70	100	180	∞	∞	
	2012K-3T20	-	-	-	-	-	40	90	130	240	∞			
	2020K-3T20	-	-	-	-	-	40	90	130	240				
	2525M-3T20	-	-	-	-	-	40	90	130	240				
	2020K-4T20	-	-	-	-	-	40	90	130	240				
	2525M-4T20	-	-	-	-	-	40	90	130	240				
	2525M-4T25	-	-	50	140	240	∞	∞	∞	∞				
	2525M-5T25	-	-	50	140	240								
	3232P-5T25	-	-	50	280	600								
	2525M-6T30	100	300	∞	∞	∞								
Available Grooving Depth t (mm)		30	27	25	23	22	20	19	18	17	16	15	14	Under 13

Cut-Off Inserts

TKN / TK$^{R}/_{L}$

Classification of usage			P	Carbon steel / Alloy steel	○		●			○	
● :Continuous-Light Interruption / 1st Choice		M	Stainless Steel			◔	●		○	
◔ :Continuous-Light Interruption / 2nd Choice		K	Cast Iron							●
● :Continuous / 1st Choice		N	Non-ferrous Metals							●
○ :Continuous / 2nd Choice										

Insert (Handed Insert shows Right-hand)			Description		Dimension (mm) W	Dimension (mm) rε	Angle θ	Cermet TN620	Cermet TN90	CVD Coated Carbide CR9025	MEGACOAT NANO PR1535	PVD Coated Carbide PR660	PVD Coated Carbide PR930	Carbide KW10	Ref. to Page for Applicable Toolholders
Neutral			TKN	1.6	1.6	0.15	-		●	●	○	○	●	●	
				2	2.2	0.20		●	●	●	●	○	●	●	
				2.4	2.4	0.20		●	●	●	●	○	●	●	H26 H28
				3	3.1	0.25		●	●	●	●	○	●	●	
				4	4.1	0.30		●	●	●	●	○	●	●	
				4.8	4.8	0.30				●	○				
				5	5.1	0.30				●	●	○	●	●	
				6	6.4	0.35				●	○	○		●	
				8	8.0	0.40				●	○	○			H26
				9	9.6	0.45				●	○	○			
	Low Feed		TKN	1.6-P	1.6	0.20				●	○	○		●	
				2-P	2.2	0.20	-	○	●	●	●	○	●	●	H26 H28
				3-P	3.1	0.25		○		●	●	○	●	●	
								R L	R L	R L	R L	R L	R L	R L	
Lead Angle			TK$^{R}/_{L}$	1.6	1.6	0.15	8°			●	○ ○	○ ○	●	● ●	
				2	2.2	0.20		○	●	● ●	● ○	○ ○	●	● ●	
				2.4	2.4	0.20				● ●	● ○	○ ○	●	● ●	
				3	3.1	0.25		○	●	● ●	● ○	○ ○	● ●	● ●	
				4	4.1	0.30		○	●	● ●	● ○	○ ○		● ●	H26
				5	5.1	0.30				● ●	○ ○	○ ○		●	H28
	Low Feed		TK$^{R}/_{L}$	1.6-P	1.6	0.20	8°				○	○			
				2-P	2.2	0.20				●	● ○	○ ○	●	●	
				3-P	3.1	0.25		○	●	●	● ○	○ ○	●	●	

Recommended Cutting Conditions ➡ H29

◆ Cut-Off Tools

Cutting Range	Chipbreaker		Advantage
General Cut-Off	Standard (Without Indication)		General cut-off type for feed rates over 0.1mm/rev Superior chip evacuation
Low feed Cut-Off	P		Chipbreaker specially designed for low feed machining on automatic lathes, etc. Chips are controlled at feed rate 0.03~0.08mm/rev

◆ Inserts Edge Prep.

	Chamfer + Honed	Sharp Edge	R honed
Edge Prep.			
Std. Chipbreaker	TN90 CR9025 / PR660	PR1535 PR930 / KW10	-
P-Chipbreaker	-	-	TN620 / TN90 / CR9025 / PR1535 PR660 / PR930 / KW10

· Sharp Edge Spec. can reduce cutting force by 40% less than that of chamfer edge.

Set Up (TKN / TK$^{R}/_{L}$)

1. Tap the insert lightly with a plastic hammer to push it into the extent that it can not be removed by hand. (Fig.1)
   (Pull it to the point where it does not fall out when picked up lightly with fingers)
2. Remove the insert with the supplied wrench. (Fig.2)

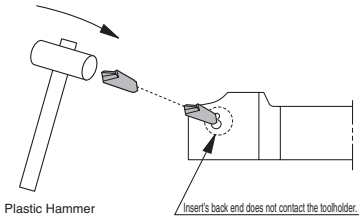


Fig.1 How to attach inserts

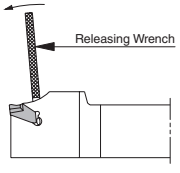
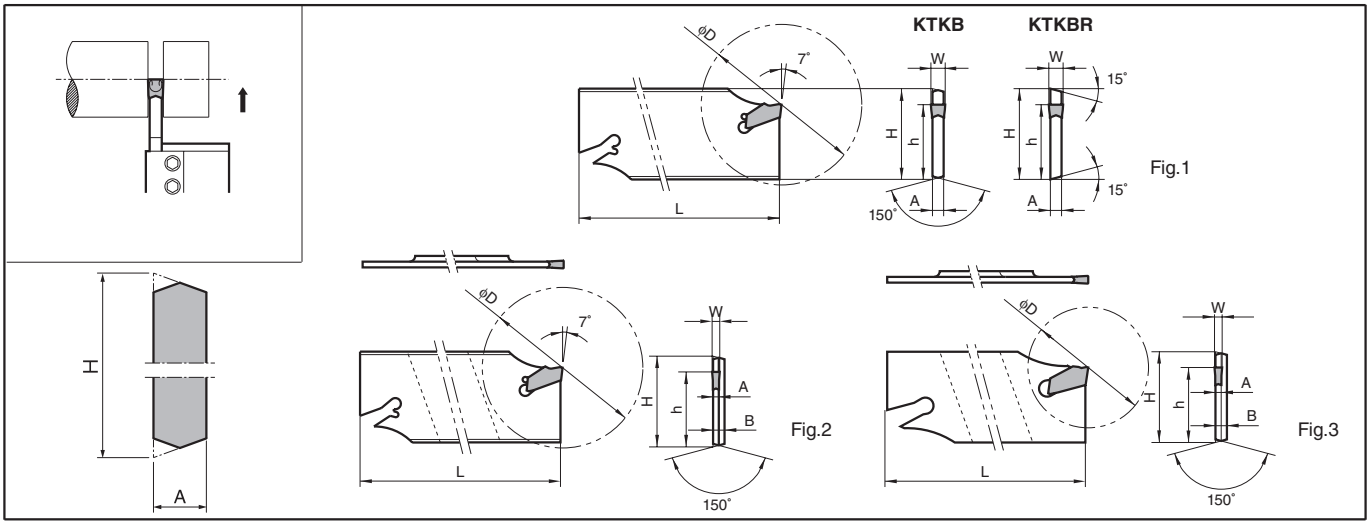


Fig.2 How to detach inserts

● : Std. Item
○ : Check Availability

Inserts are sold in 10 piece boxes.

KTKB-SS / KTKB-S



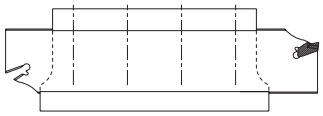
Blade Dimensions

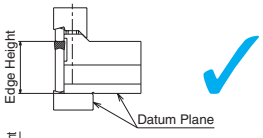
Description		Std.	Cut-off Dia.	Dimension (mm)					Edge Width(mm)	Drawing	Applicable Inserts ➡ H25				Applicable Blocks ➡ H27	
			ϕDmax	*H	h	B	L	A	W			Low Feed	Lead Angle	Low Feed / Lead Angle		
KTKB	19-1SS	●	32	19	15.7	2.4	86	1.2	1.6	Fig.3	TKN1.6	TKN1.6-P	TK$^{R}_{L}$1.6	TK$^{R}_{L}$1.6-P	KTKTB	16-19 20-19
KTKB	26-1SS	●	35	26	21.4	2.4	110	1.2	1.6	Fig.3	TKN1.6	TKN1.6-P	TK$^{R}_{L}$1.6	TK$^{R}_{L}$1.6-P	KTKTB	16-26 20-26
KTKB	32-1SS	●	35	32	25	2.4	150	1.2	1.6	Fig.3	TKN1.6	TKN1.6-P	TK$^{R}_{L}$1.6	TK$^{R}_{L}$1.6-P	KTKTB KTKTBF	20-32 25-32 32-32 25-32 32-32
KTKB	19-2S	●	40	19	15.7	-	86	1.8	2.2 2.4	Fig.1	TKN2 TKN2.4	TKN2-P	TK$^{R}_{L}$2 TK$^{R}_{L}$2.4	TK$^{R}_{L}$2-P	KTKTB	16-19 20-19
KTKB	26-2S	●	50	26	21.4	-	110	1.8	2.2 2.4	Fig.1	TKN2 TKN2.4	TKN2-P	TK$^{R}_{L}$2 TK$^{R}_{L}$2.4	TK$^{R}_{L}$2-P	KTKTB	16-26 20-26
	26-3S	●	75					2.6	3.1		TKN3	TKN3-P	TK$^{R}_{L}$3	TK$^{R}_{L}$3-P		
	26-4S	●	80					3.4	4.1		TKN4	-	TK$^{R}_{L}$4	-		
	26-5S	●	80					4.2	4.8 5.1		TKN4.8 TKN5	-	TK$^{R}_{L}$5	-		
KTKB	32-2S	●	50	32	25	2.6	150	1.8	2.2 2.4	Fig.2	TKN2 TKN2.4	TKN2-P	TK$^{R}_{L}$2 TK$^{R}_{L}$2.4	TK$^{R}_{L}$2-P	KTKTB KTKTBF	20-32 25-32 32-32 25-32 32-32
	32-3S	●	100			-		2.6	3.1	Fig.1	TKN3	TKN3-P	TK$^{R}_{L}$3	TK$^{R}_{L}$3-P		
	32-4S	●	100					3.4	4.1		TKN4	-	TK$^{R}_{L}$4	-		
	32-5S	●	120					4.2	4.8 5.1		TKN4.8 TKN5	-	TK$^{R}_{L}$5	-		
	32-6S	●	120					5.4	6.4		TKN6	-	-	-		
KTKB$^{R}_{L}$	32-8S	●	120	32	25	-	150	6.8	8.0	Fig.1	TKN8	-	-	-		
	32-9S	R	120					8.0	9.6		TKN9	-	-	-		

Note) 1. Suffix "-SS" means silver coating.
2. Releasing wrench is "LTK-5".
* Dimension H shows virtual apex distance.

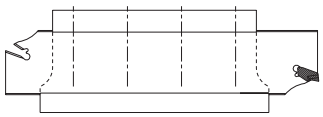
How to install toolblock and blade.

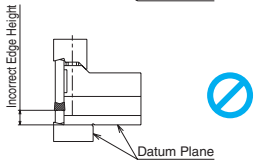
● Correct way



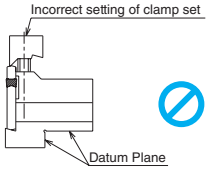


● Incorrect way





● Incorrect setting of clamp set

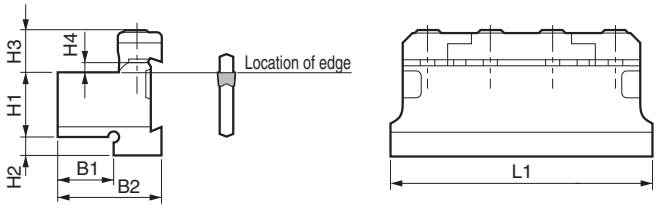


If the clamp set is mounted backward, a large gap will occur between the clamp and the toolblock, and the blade may come off during machining. Be careful when installing the clamp for safety.

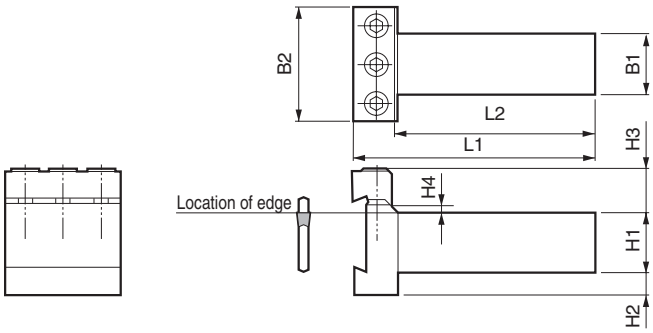
● : Std. Item
R : Std. Item (Right-hand Only)

Toolblocks (for Holding Blade)

KTKTB (Separate type)



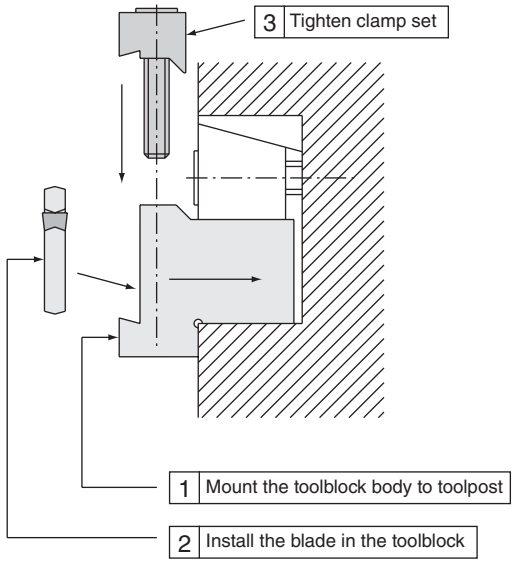
KTKTBF (Separate / Perpendicular type)

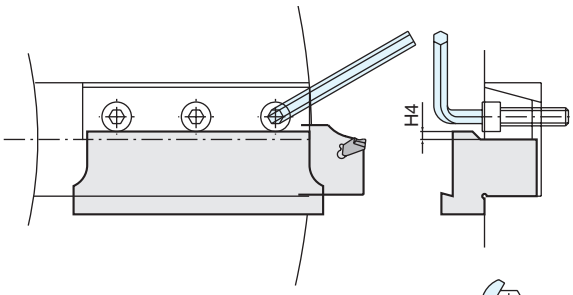


Toolblock Dimensions

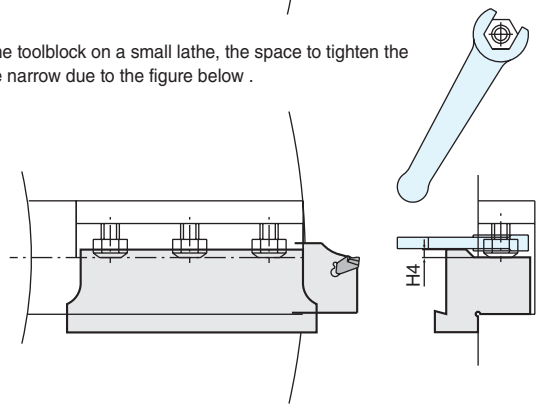
Description		Std.	Dimension (mm)								Spare Parts				Applicable Blade	
											Clamp Set		Screw	Wrench	Cut-Off	Face Grooving
			H1	H2	H3	H4	B1	B2	L1	L2	Separate Type	Integral Type			H26	G99
KTKTB	16-19	●	16	4	12	2	15.5	29.5	76	-	-	BCS-1	HH5X25	LW-4	KTKB19-○S KTKB19-1SS	-
	20-19	●	20				19	34								
	16-26	●	16	13	14	2.5	15.5	31.5	86	-	BCS-2	-	HH6X30	LW-5	KTKB26-○S KTKB26-1SS	-
	20-26	●	20	9			19	36								
	20-32	●	20	13	17	3.5	19	38	100	-	BCS-3	-	HH6X30	LW-5	KTKB32-○S KTKB32-1SS KTKB$^{R}_{L}$32-○S	KFTB$^{R}_{L}$○○○○-4S KFTB$^{R}_{L}$○○○○-5S
	25-32	●	25	8			23	42	110		BCS-4					
	32-32	●	32	5			29	48								
KTKTBF	25-32	●	25	9.5	17	3.5	25	48	102	84.5	-	BCS-5	HH6X30	LW-5	KTKB32-○S KTKB32-1SS KTKB$^{R}_{L}$32-○S	KFTB$^{R}_{L}$○○○○-4S KFTB$^{R}_{L}$○○○○-5S
	32-32	●	32	2.5			32		117	99.5						

How to mount the Toolblock





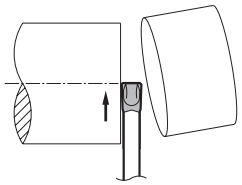
When mounting the toolblock on a small lathe, the space to tighten the clamp bolt may be narrow due to the figure below .



● : Std. Item

Cut-Off Toolholders (Integral Type)

KTKH-S



For General Cut-Off (Self Clamp)

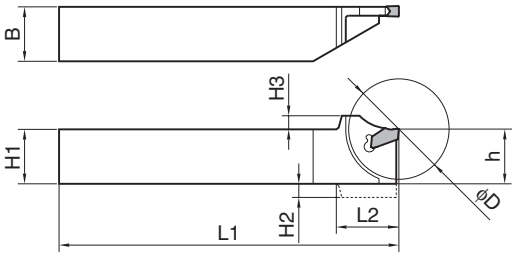
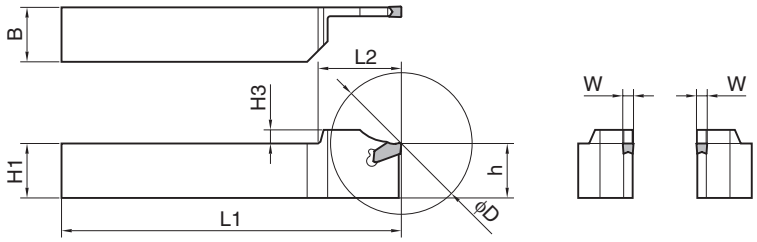


Fig.1



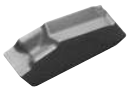
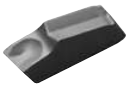
• Right-hand shown

Fig.2

Toolholder Dimensions

Description		Std. R	Std. L	Cut-off Dia. (mm) ϕDmax	Dimension (mm) H1=h	H2	H3	B	L1	L2	Edge Width(mm) W	Drawing	Spare Parts Releasing Wrench	Ref. to Page for Recommended Cutting Conditions
KTKH$^{R}_{L}$	1010F-2S	●	●	30	10	5	4	10	80	18.6				
	1212H-2S	●	●	33	12	4	5	12	100	19.8				
	1612H-2S	●	●	33	16	-	3	12	100	19.8	2.2	Fig.1		
	1616H-2S	●	●	33	16	-	3	16	100	19.8	2.4			
	2012K-2S	●	●	38	20	-	4	12	125	22.8				
	2020K-2S	●	●	38	20	-	4	20	125	22.8				
	1612H-3S	●	●	36	16	4	4	12	100	21.7				
	1616H-3S	●	●	36	16	4	4	16	100	21.7		Fig.1		
	2012K-3S	●	●	41	20	-	5	12	125	25.3	3.1			
	2020K-3S	●	●	52	20	-	5	20	125	31.0		Fig.2		
	2525M-3S	●	●	53	25	-	5	25	150	31.5				
	2012K-4S	●	●	44	20	-	5	12	125	26.3		Fig.1		
	2020K-4S	●	●	62	20	-	5	20	125	35.0	4.1	Fig.2		
	2525M-4S	●	●	68	25	-	5	25	150	38.0				
	2525M-5S	●	●	79	25	-	5	25	150	43.5	4.8,5.1	Fig.2		
KTKH$^{R}_{L}$	2020K-3T17S	●	●	35	20	-	5	20	125	21.8	3.1	Fig.1	LTK-5	H29
	2525M-3T22S	●	●	45	25	-	5	25	150	26.8				
	2020K-4T22S	●	●	45	20	-	5	20	125	26.8	4.1			
	2525M-4T22S	●	●	45	25	-	5	25	150	26.8				

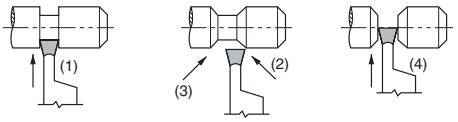
Applicable Inserts

Ref. to Page	H25			
Insert / Toolholder Description		 Low Feed	 Lead Angle	Low Feed / Lead Angle
KTKH$^{R}_{L}$ ...-2...	TKN2 TKN2.4	TKN2-P	TK$^{R}_{L}$2 TK$^{R}_{L}$2.4	TK$^{R}_{L}$2-P
KTKH$^{R}_{L}$ ...-3...	TKN3	TKN3-P	TK$^{R}_{L}$3	TK$^{R}_{L}$3-P
KTKH$^{R}_{L}$ ...-4...	TKN4	-	TK$^{R}_{L}$4	-
KTKH$^{R}_{L}$ ...-5...	TKN4.8 TKN5	-	TK$^{R}_{L}$5	-

Application Example of Cut-Off

1. Cut-Off after Chamfering

(1) Grooving (2)(3) Chamfering (4) Cut-Off

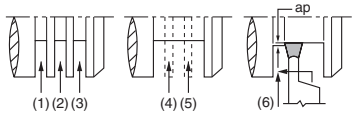


2. Wide Grooving

(1)~(5) Groove Widening

(6) Longitudinal Finishing

(Value of "ap" shall be under the value of Corner-R)



(In order to prevent both corners' unequal wear)

● : Std. Item

Recommended Cutting Conditions

Recommended Cutting Conditions (In case of using TKF12 / 16 type inserts)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						TKF12 Edge Width W (mm)						TKF16 Edge Width W (mm)		Remarks
	MEGACOAT NANO		MEGACOAT	PVD Coated Carbide	DLC Coated Carbide	Carbide	0.5	0.7	1.0	1.25	1.5	2.0	1.5	2.0	
	PR1425	PR1535	PR1225	PR1025	PDL025	KW10	f (mm/rev)						f (mm/rev)		
Carbon Steel	★ 70~170 (50~140)	☆ 70~150 (50~120)	☆ 70~150 (50~120)	☆ 60~130	-	-	0.01~0.02	0.01~0.03	0.01~0.04 (0.01 ~ 0.05)	0.01~0.04	0.01~0.04 (0.02 ~ 0.1)	0.01~0.04 (0.02 ~ 0.1)	0.02~0.07 (0.02~0.1)	0.02~0.07 (0.02~0.1)	Coolant
Alloy Steel	★ 70~170 (50~140)	☆ 70~150 (50~120)	☆ 70~150 (50~120)	☆ 60~130	-	-	0.01~0.02	0.01~0.03	0.01~0.04 (0.01 ~ 0.05)	0.01~0.04	0.01~0.04 (0.02 ~ 0.1)	0.01~0.04 (0.02 ~ 0.1)	0.02~0.07 (0.02~0.1)	0.02~0.07 (0.02~0.1)	
Stainless Steel	☆ 60~140 (40~120)	★ 60~120 (40~100)	☆ 60~120 (40~100)	☆ 50~100	-	-	0.005~0.015	0.01~0.02	0.01~0.02 (0.01 ~ 0.03)	0.01~0.02	0.01~0.02 (0.01 ~ 0.05)	0.01~0.02 (0.01 ~ 0.05)	0.01~0.04 (0.01~0.05)	0.01~0.04 (0.01~0.05)	
Cast Iron	-	-	-	-	-	★ 50~100	0.01~0.03	0.01~0.04	0.01~0.05	0.01~0.05	0.01~0.05	0.01~0.05	0.02~0.08	0.02~0.08	
Aluminum	-	-	-	-	★ 200~500	☆ 200~450	0.01~0.03	0.01~0.04	0.01~0.05	0.01~0.05	0.01~0.05	0.01~0.05	0.02~0.08	0.02~0.08	
Brass	-	-	-	-	-	★ 100~200	0.01~0.03	0.01~0.04	0.01~0.06	0.01~0.06	0.01~0.06	0.01~0.06	0.02~0.1	0.02~0.1	

*( ): Tough edge type (TKF..T..)

★ : 1st Recommendation ☆: 2nd Recommendation

Recommended Cutting Conditions (In case of using GMM-MT, GMM-TK, GMM-NB type inserts)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)					Edge Width W (mm)				Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide		Carbide	1.5	2.0 / 2.5	3.0	4.0	
	-	CR9025	PR915	PR930	KW10	f (mm/rev)				
Carbon Steel	-	☆ 80~180	★ 60~150	☆ 60~130	-	0.01~0.04	0.02~0.15	0.03~0.20	0.08~0.30	Coolant
Alloy Steel	-	☆ 70~150	★ 60~150	☆ 60~130	-	0.01~0.04	0.02~0.15	0.03~0.20	0.08~0.30	
Stainless Steel	-	☆ 60~140	★ 50~140	☆ 50~120	-	0.01~0.03	0.02~0.10	0.03~0.15	0.08~0.25	
Cast Iron	-	-	-	-	★ 50~100	0.01~0.05	0.05~0.12	0.10~0.25	0.10~0.30	
Aluminum	-	-	-	-	★ 200~450	0.01~0.05	0.05~0.10	0.05~0.20	0.05~0.25	
Brass	-	-	-	-	★ 100~200	0.01~0.05	0.05~0.10	0.05~0.15	0.05~0.20	

· When machining Steel and Stainless Steel by Insert of PR930, decrease the Feed Rate by 20%.

★ : 1st Recommendation ☆: 2nd Recommendation

Recommended Cutting Conditions (In case of using TKN, TKR/L type inserts)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)							Edge Width W (mm)					Remarks
	Cermet		CVD Coated Carbide	MEGACOAT NANO	PVD Coated Carbide		Carbide	1.6	2.2 / 2.4	3.1	4.1	4.8~9.6	
	TN620	TN90	CR9025	PR1535	PR660	PR930	KW10	f (mm/rev)					
Carbon Steel	☆ 60~200	☆ 120~200	★ 80~180	☆ 60~150	☆ 60~130	☆ 60~130	-	0.02~0.08	0.04~0.18	0.05~0.25	0.08~0.30	0.15~0.40	Coolant
Alloy Steel	☆ 60~160	☆ 100~160	★ 70~150	☆ 60~150	☆ 60~130	☆ 60~130	-	0.02~0.08	0.04~0.18	0.05~0.25	0.08~0.30	0.15~0.40	
Stainless Steel	☆ 60~150	☆ 80~150	☆ 60~140	★ 50~120	☆ 50~120	☆ 60~140	-	0.02~0.06	0.04~0.12	0.05~0.18	0.08~0.25	0.10~0.30	
Cast Iron	-	-	-	-	-	-	★ 50~100	0.02~0.08	0.05~0.12	0.10~0.25	0.10~0.30	0.15~0.35	
Aluminum	-	-	-	-	-	-	★ 100~450	0.02~0.10	0.05~0.10	0.05~0.20	0.05~0.25	0.10~0.25	
Brass	-	-	-	-	-	-	★ 100~200	0.02~0.10	0.05~0.10	0.05~0.15	0.05~0.20	0.10~0.25	

★ : 1st Recommendation ☆: 2nd Recommendation

Recommended Cutting Conditions (In case of using GMM-TMR type inserts)

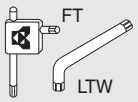
Workpiece Material	Vc (m/min)	f (mm/rev)	Remarks
Carbon Steel	60~200	0.08~0.18	Coolant
Alloy Steel	60~150		
Stainless Steel	50~140		

Alternative Toolholder Reference Table for Cut-off Toolholder (KTKF / KGM)

Conventional Toolholder						Alternative Toolholder			
Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts:	Ref. to Page	Description	Overall length (mm)	Remarks	Ref. to Page
KTKF R/L 1010K-12	125	SB-4590TRWN	LTW-10S			KTKF R/L 1010JX-12	120		
KTKF R/L 1212M-12	150					KTKF R/L 1212JX-12	120		
KTKF R/L 1616M-12	150					KTKF R/L 1616JX-12	120		
KTKF R/L 1010K-16	125					KTKF R/L 1010JX-16	120		H8
KTKF R/L 1212M-16	150					KTKF R/L 1212JX-16	120		
KTKF R/L 1616M-16	150					KTKF R/L 1616JX-16	120		
KGM R/L 0810K-1.5-125	125	SE-40120TR	LTW-15S			-	-	No replacement	
KGM R/L 1010K-1.5-125	125					KGM R/L 1010JX-1.5	120		
KGM R/L 1212M-1.5-150	150					KGM R/L 1212JX-1.5	120		
KGM R/L 0810K-2-125	125	SE-40120TR	LTW-15S			-	-	No replacement	
KGM R/L 1010K-2-125	125					KGM R/L 1010JX-2	120		
KGM R/L 1212M-2-150	150					KGM R/L 1212JX-2	120		H22
KGM R/L 1616M-2-150	150	SE-50125TR	LTW-20			KGM R/L 1616JX-2	120		
KGM R/L 1010K-2.5-125	125	SE-40120TR	LTW-15S			KGM R/L 1010JX-2.5	120		
KGM R/L 1212M-2.5-150	150					KGM R/L 1212JX-2.5	120		
KGM R/L 1616M-2.5-150	150	SE-50125TR	LTW-20			KGM R/L 1616JX-2.5	120		
KGM R/L 1616M-3-150	150	SE-50125TR	LTW-20			KGM R/L 1616JX-3	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Cut-off Toolholder (KTKH-B / KTKH-S)

Conventional Toolholder						Alternative Toolholder			
Description	Cut-off Dia.	Spare Parts: Releasing Wrench	Spare Parts: Clamp Screw	Spare Parts: Wrench	Ref. to Page	Description	Cut-off Dia.	Remarks	Ref. to Page
									
KTKH R/L 0808K-1.6-125B	ϕ10	-	SE-40120TR	FT-15		-	-	No replacement	
KTKH R/L 1010K-1.6-125B	ϕ20					KGM R/L 1010JX-1.5	ϕ20		
KTKH R/L 1212M-1.6-150B	ϕ25					KGM R/L 1212JX-1.5	ϕ25		
KTKH R/L 1414M-1.6-150B	ϕ26					-	-	No replacement	
KTKH R/L 1010K-2-125B	ϕ20	-	SE-40120TR	FT-15		KGM R/L 1010JX-2	ϕ20		
KTKH R/L 1212M-2-150B	ϕ25					KGM R/L 1212JX-2	ϕ25		
KTKH R/L 1616M-2-150B	ϕ32	-	SE-50125TR	LTW-20		KGM R/L 1616JX-2	ϕ32		H22
KTKH R/L 1616M-3-150B	ϕ32					KGM R/L 1616JX-3	ϕ32		
KTKHR 1010K-2-125S	ϕ30	LTK-5	-	-		KGMR 1010JX-2	ϕ20	Processing dia. is small.	
KTKH R/L 1212M-2-150S	ϕ30					KGM R/L 1212JX-2	ϕ25	Processing dia. is small.	
KTKH R/L 1616M-2-150S	ϕ36					KGM R/L 1616JX-2	ϕ32	Processing dia. is small.	
KTKH R/L 1616M-3-150S	ϕ45					KGM R/L 1616JX-3	ϕ32	Processing dia. is small.	

Note) The corresponding alternative toolholder may be different from the conventional toolholder in processing diameter or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Threading

J1~J48

J

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30° Trapezoidal (Tr)		J14
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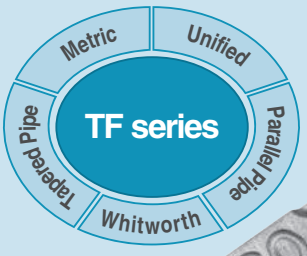
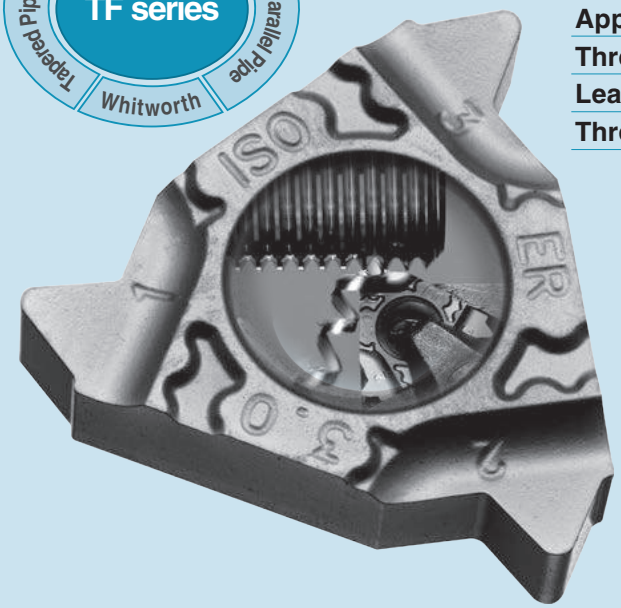
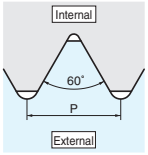
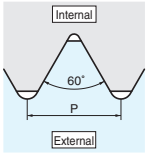
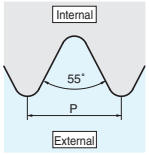
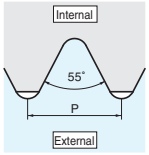
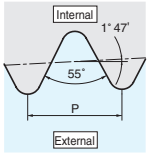
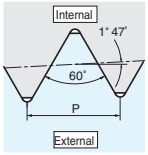
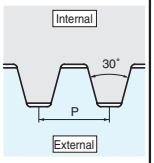
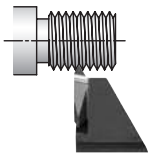
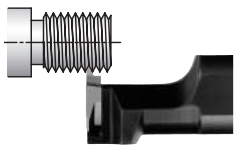
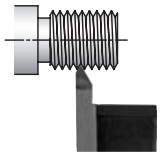
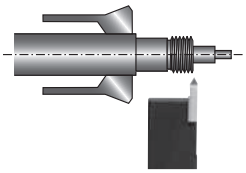




Summary of External Threading

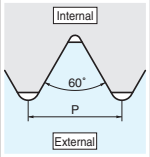
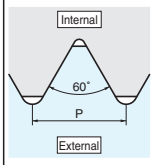
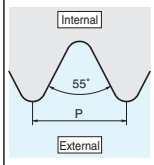
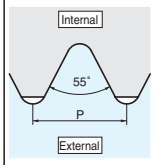
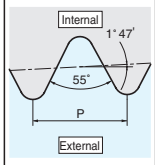
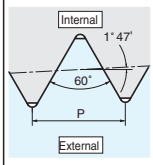
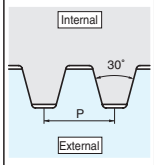
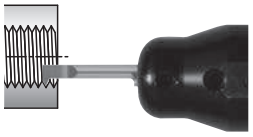
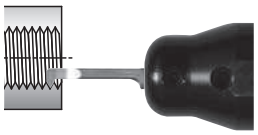
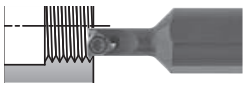
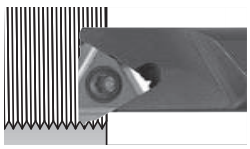
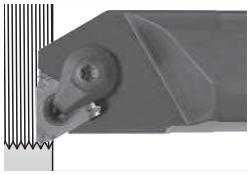
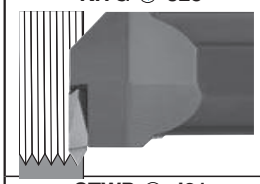
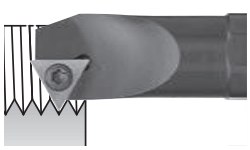
Tooling Application Table (External Thread)

Thread Types		Metric	Unified	Parallel Pipe	Whitworth	Tapered Pipe	American National Tapered Pipe	30° Trapezoidal
		M	UN,UNC UNF,UNEF	G(PF)	W	R(PT) (BSPT)	NPT	Tr
Thread shape								
Toolholder Shape \ Pitch		mm	TPI	TPI	TPI	TPI	TPI	mm
KTN ➡ J16	Full Profile	0.5 ~ 5.0 ➡ **J6**	24 ~ 8 ➡ **J8**	19 ~ 11 ➡ **J8**	16 ~ 11 ➡ **J8**	28 ~ 11 ➡ **J10**	18 ~ 11.5 ➡ **J10**	–
	Partial Profile	0.5 ~ 5.0 ➡ **J12**	48 ~ 5 ➡ **J12**	28 ~ 11 ➡ **J14**	40 ~ 5 ➡ **J14**	28 ~ 11 ➡ **J14**	–	2.0 ~ 5.0 ➡ **J14**
KTNS ➡ J16	Full Profile	0.5 ~ 3.0 ➡ **J6**	24 ~ 8 ➡ **J8**	19 ~ 11 ➡ **J8**	16 ~ 11 ➡ **J8**	28 ~ 11 ➡ **J10**	18 ~ 11.5 ➡ **J10**	–
	Partial Profile	0.5 ~ 3.0 ➡ **J12**	48 ~ 8 ➡ **J12**	28 ~ 11 ➡ **J14**	40 ~ 8 ➡ **J14**	28 ~ 11 ➡ **J14**	–	2.0 ~ 3.0 ➡ **J14**
KTT ➡ J22	Full Profile	1.0 ~ 2.0 ➡ **J22**	–	–	–	–	–	–
	Partial Profile	0.5 ~ 3.5 ➡ **J22**	56 ~ 8 ➡ **J22**	28 ~ 11 ➡ **J22**	24 ~ 7 ➡ **J22**	28 ~ 11 ➡ **J22**	–	–
KTTX ➡ J20 	Partial Profile	0.5 ~ 2.0 ➡ **J21**	56 ~ 14 ➡ **J21**	28 ~ 11 ➡ **J21**	24 ~ 11 ➡ **J21**	28 ~ 11 ➡ **J21**	–	–
S-KTTX ➡ J20 	Partial Profile	0.5 ~ 2.0 ➡ **J21**	56 ~ 14 ➡ **J21**	28 ~ 11 ➡ **J21**	24 ~ 11 ➡ **J21**	28 ~ 11 ➡ **J21**	–	–
KTKF ➡ J18 	Partial Profile	0.2 ~ 1.5 ➡ **J18**	64 ~ 18 ➡ **J18**	28 ~ 19 ➡ **J18**	40 ~ 16 ➡ **J18**	28 ~ 19 ➡ **J18**	–	–
KTKF ➡ J18 (Goose-neck Holder) 								

· Threading Inserts Identification System
Full Profile ➡ **J6**
Partial Profile ➡ **J12**

Summary of Internal Threading

Tooling Application Table (Internal Thread)

Thread Types		Metric	Unified	Parallel Pipe	Whitworth	Tapered Pipe	American National Tapered Pipe	30° Trapezoidal
		M	UN,UNC UNF,UNEF	G(PF) Rp(PS)	W	Rc(PT) (BSPT)	NPT	Tr
Thread shape								
Toolholder Shape \ Pitch		mm	TPI	TPI	TPI	TPI	TPI	mm
EZT ⇨ J24 	Partial Profile	0.5 ~ 1.75 ⇨ **J24**	36 ~ 16 ⇨ **J24**	28 ~ 19 ⇨ **J24**	24 ~ 18 ⇨ **J24**	28 ~ 19 ⇨ **J24**	18 ~ 14 ⇨ **J24**	–
VNT ⇨ J30	Partial Profile	0.75 ~ 1.5 ⇨ **J30**	28 ~ 18 ⇨ **J30**	–	–	–	–	–
HPT ⇨ J28 (PST ⇨ J30) 	Partial Profile	0.75 ~ 1.5 (0.75 ~ 1.5) ⇨ **J28** (⇨ **J30**)	28 ~ 16 (28 ~ 18) ⇨ **J28** (⇨ **J30**)	28 ~ 19 ⇨ **J28**	24 ~ 18 ⇨ **J28**	28 ~ 19 ⇨ **J28**	18 ~ 14 ⇨ **J28**	–
SIN ⇨ J17 	Full Profile	0.5 ~ 5.0 ⇨ **J7**	24 ~ 8 ⇨ **J9**	19 ~ 11 ⇨ **J9**	16 ~ 11 ⇨ **J9**	28 ~ 11 ⇨ **J11**	18 ~ 11.5 ⇨ **J11**	–
	Partial Profile	0.5 ~ 5.0 ⇨ **J13**	48 ~ 5 ⇨ **J13**	28 ~ 11 ⇨ **J15**	40 ~ 5 ⇨ **J15**	28 ~ 11 ⇨ **J15**	–	2.0 ~ 5.0 ⇨ **J15**
CIN ⇨ J17 	Full Profile	1.0 ~ 5.0 ⇨ **J7**	24 ~ 8 ⇨ **J9**	19 ~ 11 ⇨ **J9**	16 ~ 11 ⇨ **J9**	28 ~ 11 ⇨ **J11**	18 ~ 11.5 ⇨ **J11**	–
	Partial Profile	0.5 ~ 5.0 ⇨ **J13**	48 ~ 5 ⇨ **J13**	28 ~ 11 ⇨ **J15**	40 ~ 5 ⇨ **J15**	28 ~ 11 ⇨ **J15**	–	2.0 ~ 5.0 ⇨ **J15**
KITG ⇨ J23 	Partial Profile	0.5 ~ 3.0 ⇨ **J23**	48 ~ 8 ⇨ **J23**	28 ~ 11 ⇨ **J23**	24 ~ 8 ⇨ **J23**	28 ~ 11 ⇨ **J23**	–	–
STWP ⇨ J31 	Partial Profile	0.75 ~ 3.5 ⇨ **J31**	28 ~ 8 ⇨ **J31**	–	–	–	–	–

・For parallel pipe and tapered pipe the average values are only to be used if specifically recommendation.
・Pitch inside ( ) indicates PST.

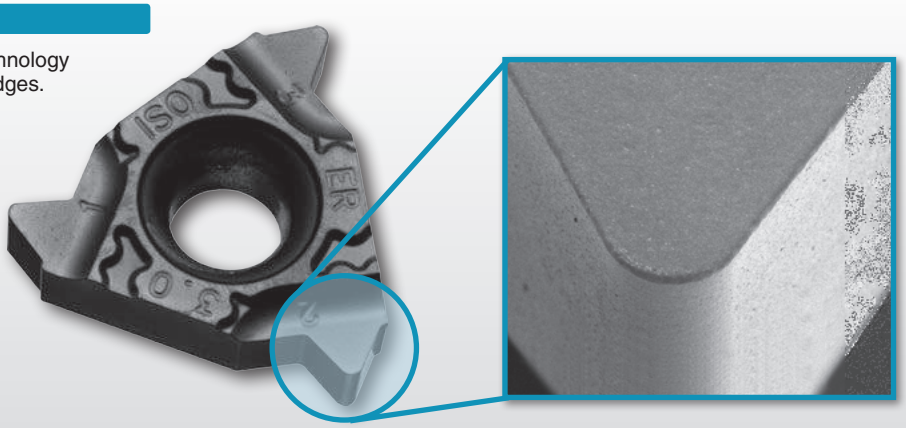
■ TF series Threading Inserts

High quality edge and new grade insert PR1115 achieve long tool life.
Economical, owing to new molding technology.

High Quality Cutting Edge

TF series

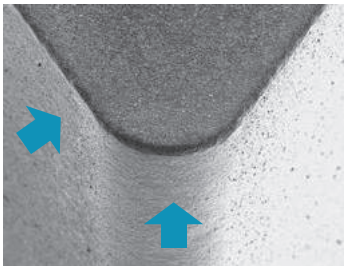
- High precision fine molding technology produces high quality cutting edges.



Cutting Edge close-up picture

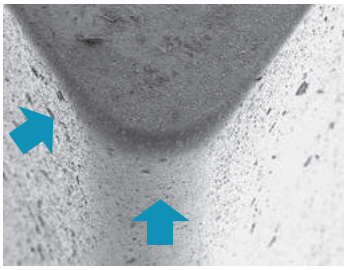
Consistent micro honing technology enables sharpness and high quality thread shape.

Sharp cutting



16ER150ISO-TF

Inconsistent edge honing condition.

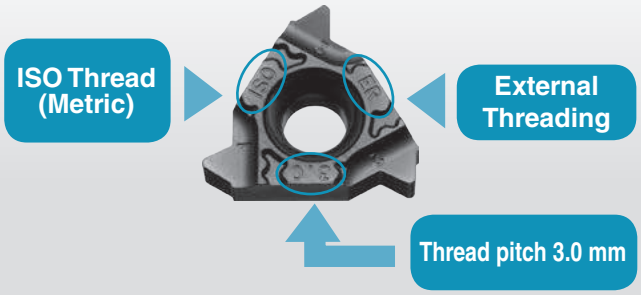


Competitor

Available for every standard screw thread

Metric (M)	Tapered Pipe (R,Rc(PT)(BSPT))
Unified (UN)	60° Type (Partial Profile)
Parallel Pipe [G (PF)]	55° Type (Partial Profile)
Whitworth (W)	

Clear makings provide user friendly insert identification

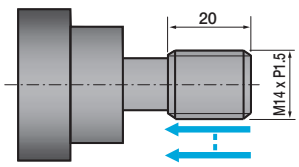


- **16···TF** has the mark on its top face side,
- **11···TF** has the mark on its seating face side (bottom side).

Case Studies

SCM415

- Machine parts
- Vc=65m/min
- Wet



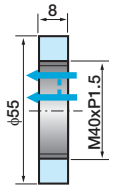
16ER150ISO-TF(PR1115)	1,800 pcs/edge
Competitor A	600 pcs/edge

TF Series extended the tool life 3 times compared to Competitor A.

(Evaluation by the user)

S25C

- Nut
- Vc=262m/min
- Wet



16IR150ISO-TF(PR1115)	500 pcs/edge
Competitor B	300 pcs/edge

TF Series extended the tool life 1.7 times compared to Competitor B.

(Evaluation by the user)

Summary of Threading Inserts

KTKF J18

"Threading" is added to Small Tools special tool series. Total toolholder length 120 mm series is now available (referred to as JX in the part number).

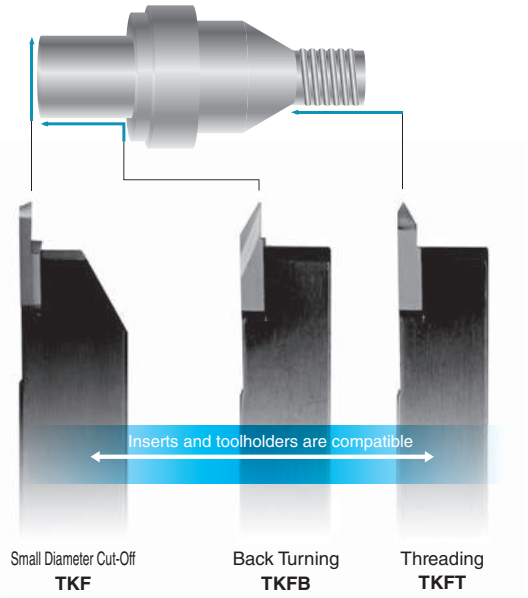
Threading

For Threading

TKFT

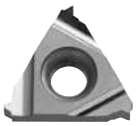
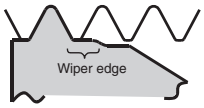
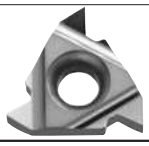
Applicable for various type of threading

Metric(M)	Parallel Pipe [G (PF)]
Unified (UN)	Tapered Pipe [R(PT)(BSPT)]



Threading Insert Features

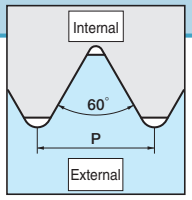
Full Profile and Partial Profile

	Insert shape	Function	Features
Full Profile			(1) Burr-free thread surface; high quality (Smooth feeling) (2) Leave the workpiece diameter slightly oversized for full topping (3) Every pitch size requires a specific insert
Partial Profile			(1) Thread's corner tends to be sharp edged (2) Thread's O.D. or I.D. needs to be finished to the size before threading (3) One insert can machine various pitch sizes

Thread Precision

Thread Types		Thread Precision Strict ← → Loose		
Metric	External	4h (1st Class)	6g (2nd Class)	8g (3rd Class)
	Internal	5H (1st Class)	6H (2nd Class)	7H (3rd Class)
Unified	External	3A	2A	1A
	Internal	3B	2B	1B
Applicable precision with		N/A	OK	OK

* Not recommended if strict thread precision is required.



External Threading Inserts

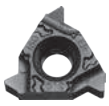
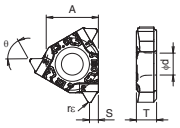
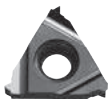
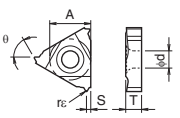
Metric (M)

Full Profile 60° (mm)

Description	A	T	ϕd
16E$^{R}_{L}$	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage ● :1st Choice

P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			●
N	Non-ferrous Metals			●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread M Pitch mm	Dimension (mm) rε	Dimension (mm) S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile			16ER	100ISO-TF	1.0	0.12	0.80	60°			●				J33
				125ISO-TF	1.25	0.15	0.90				●				
				150ISO-TF	1.5	0.19	1.00				●				
				175ISO-TF	1.75	0.22	1.60				●				
				200ISO-TF	2.0	0.25	1.50				●				
				250ISO-TF	2.5	0.33	1.60				●				
				300ISO-TF	3.0	0.41	1.60				●				
			16E$^{R}_{L}$	050ISO	0.5	0.06	0.40	60°	●		●	●	●		
				075ISO	0.75	0.09	0.53		●		●	●	●		
				100ISO	1.0	0.12	0.80		●		●	●	●		
				125ISO	1.25	0.15	0.90		●		●	●	●		
				150ISO	1.5	0.19	1.00		●		●	●	●		
				175ISO	1.75	0.22	1.50		●		●				
				200ISO	2.0	0.25	1.50		●		●	●	●		
				250ISO	2.5	0.32	1.60		●		●		●		
			22ER	300ISO	3.0	0.41	2.10	60°	●		●				
				350ISO	3.5	0.48	2.10		●		●				
				400ISO	4.0	0.55	2.80		●		●				
				450ISO	4.5	0.62	2.80		●		●				
				500ISO	5.0	0.70	2.80		●		●				

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER ···	KTNR···16 KTNSR···16	J16
16EL ···	KTNL···16	
22ER ···	KTNR···22	

Applicable Thread		
	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

Threading Inserts Identification System (Full Profile) ➡ J6~J11

16	E	R	100	ISO	-TF
(1)	(2)	(3)	(4)	(5)	(6)

(1)Insert Size	
11	6.35
16	9.525
22	12.70
Symbol	I.C. Size (mm)

(2)External / Internal	
E	External Threading
I	Internal Threading

(3)Insert Hand	
R	Right-hand
L	Left-hand

(4)Pitch	
Metric	
100	Pitch 1mm
150	Pitch 1.5mm
Inch Screw Thread	
24	24 TPI
20	20 TPI
Full Profile	

(5)Type of Applicable Thread	
ISO	Metric
M	Metric
UN	Unified
W	Whitworth
BSPT	Tapered Pipe
NPT	American National Tapered Pipe
Full Profile	

(6)Manufacture's Option	
-TF	TF Cutting Edge

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.

●: Std. Item

Internal Threading Inserts

Metric (M)

Full Profile 60° (mm)

Description	A	T	ϕd
11IR/L	6.35	3.18	3.0
16IR/L	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage ●:1st Choice

		Cermet	PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			●
N	Non-ferrous Metals			●

Insert (Handed Insert shows Right-hand)	Description		Applicable Thread M Pitch mm	Dimension (mm) rε	Dimension (mm) S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile	11IR	100ISO-TF	1.0	0.07	0.8	60°			●				J33
		125ISO-TF	1.25	0.08	1.1				●				
		150ISO-TF	1.5	0.11	1.1				●				
		175ISO-TF	1.75	0.12	1.1				●				
	16IR	100ISO-TF	1.0	0.07	0.8	60°			●				
		125ISO-TF	1.25	0.08	1.1				●				
		150ISO-TF	1.5	0.11	1.1				●				
		175ISO-TF	1.75	0.12	1.1				●				
		200ISO-TF	2.0	0.14	1.5				●				
		250ISO-TF	2.5	0.17	1.5				●				
		300ISO-TF	3.0	0.19	1.6				●				
	11IR/L	050ISO	0.5	0.03	0.55	60°	●		●		●		
		075ISO	0.75	0.05	0.68		●		●		●		
		100ISO	1.0	0.07	0.8		●		●	●	●		
		125ISO	1.25	0.08	1.1		●		●		●		
		150ISO	1.5	0.11	1.1		●		●	●	●		
		175ISO	1.75	0.12	1.1		●		●				
		200ISO	2.0	0.14	0.9				●				
	16IR/L	100ISO	1.0	0.07	0.8	60°	●		●	●	●		
		125ISO	1.25	0.08	1.1		●		●				
		150ISO	1.5	0.11	1.1		●		●	●	●		
		175ISO	1.75	0.12	1.1		●		●				
		200ISO	2.0	0.14	1.5		●		●	●	●		
		250ISO	2.5	0.16	1.5		●		●		●		
		300ISO	3.0	0.19	1.6				●		●		
	22IR	300ISO	3.0	0.19	1.8	60°	●						
		350ISO	3.5	0.23	2.1		●		●				
		400ISO	4.0	0.26	2.8		●		●				
		450ISO	4.5	0.30	2.8		●		●				
		500ISO	5.0	0.34	2.8		●		●				

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
11IR ···	SINR···11E SINR···11	J17
11IL ···	SINL···11E SINL···11	

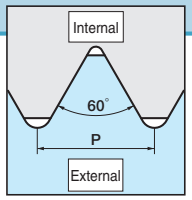
Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16IR ···	SINR···16 CINR···16	J17
16IL ···	SINL···16 CINL···16	
22IR ···	SINR···22 CINR···22	

Applicable Thread	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

●: Std. Item

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.



External Threading Inserts

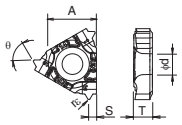
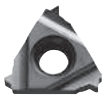
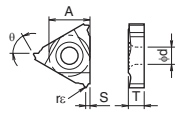
Unified (UN)

Full Profile 60° (mm)

Description	A	T	ϕd
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage ● :1st Choice

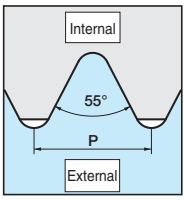
		Cermet	PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			
N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread UN,UNF Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile			16ER	24UN-TF	24	0.12	0.80	60°			●				J33
				20UN-TF	20	0.15	1.00				●				
				18UN-TF	18	0.18	1.00				●				
				16UN-TF	16	0.20	1.10				●				
				14UN-TF	14	0.23	1.50				●				
				13UN-TF	13	0.25	1.50				●				
				12UN-TF	12	0.27	1.50				●				
				10UN-TF	10	0.34	1.50				●				
				08UN-TF	8	0.43	1.75				●				
			16ER	24UN	24	0.13	0.8	60°	●		●				
				20UN	20	0.16	1.0		●		●				
				18UN	18	0.18	1.0		●		●				
				16UN	16	0.20	1.1		●		●				
				14UN	14	0.23	1.5		●		●				
				12UN	12	0.27	1.5		●		●				
			22ER	08UN	8	0.43	2.1		●		●				

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER ···	KTNR···-16 KTNSR···-16	J16
22ER ···	KTNR···-22	



External Threading Inserts

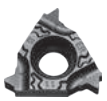
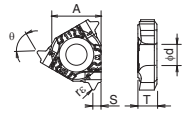
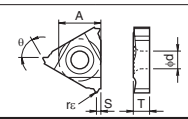
Parallel Pipe [G (PF)] Whitworth (W)

Full Profile 55° (mm)

Description	A	T	ϕd
16ER	9.525	3.68	4.0

Classification of usage ● :1st Choice

		Cermet	PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			
N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread G (PF) Pitch TPI	Applicable Thread W Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile			16ER	19W-TF	19	-	0.16	1.0	55°			●				J34
				16W-TF	-	16	0.19	1.1				●				
				14W-TF	14	14	0.23	1.5				●				
				11W-TF	11	11	0.30	1.5				●				
			16ER	19W	19	-	0.16	1.0	55°	●		●				
				14W	14	14	0.23	1.5		●		●				
				11W	11	11	0.30	1.5		●		●				

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER ···	KTNR···-16 KTNSR···-16	J16

Applicable Thread		
	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.

●: Std. Item

Internal Threading Inserts

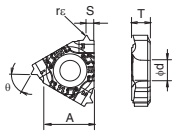
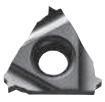
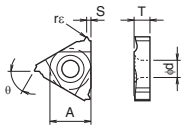
Unified (UN)

Full Profile 60° (mm)

Description	A	T	ϕd
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage ● :1st Choice

		Cermet	PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			
N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)		Description		Applicable Thread UN,UNF Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile			16IR 24UN-TF	24	0.06	0.8	60°			●				J33
			20UN-TF	20	0.08	1.0				●				
			18UN-TF	18	0.09	1.0				●				
			16UN-TF	16	0.10	1.1				●				
			14UN-TF	14	0.12	1.5				●				
			13UN-TF	13	0.13	1.5				●				
			12UN-TF	12	0.14	1.5				●				
			10UN-TF	10	0.17	1.5				●				
			08UN-TF	8	0.21	1.8				●				
			16IR 24UN	24	0.05	0.8	60°	●		●				
			20UN	20	0.07	1.0		●		●				
			18UN	18	0.09	1.0		●		●				
			16UN	16	0.10	1.1		●		●				
			14UN	14	0.12	1.5		●		●				
			12UN	12	0.14	1.5		●		●				
			22IR 08UN	8	0.20	1.8		●		●				

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16IR ···	SINR···16 CINR···16	J17
22IR ···	SINR···22 CINR···22	

Internal Threading Inserts

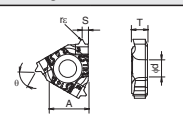
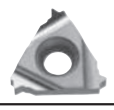
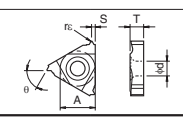
Parallel Pipe [G (PF)] Whitworth (W)

Full Profile 55° (mm)

Description	A	T	ϕd
16IR	9.525	3.68	4.0

Classification of usage ● :1st Choice

		Cermet	PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			
N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)		Description		Applicable Thread G (PF)	W	Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile			16IR 19W-TF	19	-		0.16	1.0	55°			●				J34
			16W-TF	-	16		0.19	1.1				●				
			14W-TF	14	14		0.23	1.5				●				
			11W-TF	11	11		0.30	1.5				●				
			16IR 14W	14	14		0.23	1.5	55°	●		●				
			11W	11	11		0.30	1.5		●		●				

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16IR ···	SINR···16 CINR···16	J17

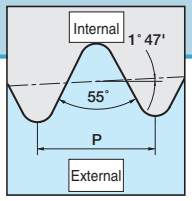
· No wiper effect is expected when threading the internal whitworth screw using 16IR ○○ W (TNN32IR ○○ W) insert.

Applicable Thread	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

●: Std. Item

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.



External Threading Inserts

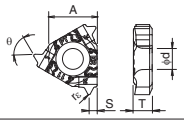
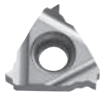
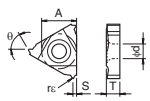
Tapered Pipe [R (PT) (BSPT)]

Full Profile 55° (mm)

Description	A	T	ϕd
16ER	9.525	3.68	4.0

Classification of usage ● :1st Choice

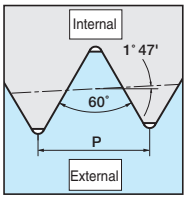
		Cermet	PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			●
N	Non-ferrous Metals			●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread R(PT) (BSPT) Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile			16ER	28BSPT-TF	28	0.10	0.8	55°			●				J34
				19BSPT-TF	19	0.16	1.0				●				
				14BSPT-TF	14	0.22	1.6				●				
				11BSPT-TF	11	0.29	1.6				●				
			16ER	28BSPT	28	0.10	0.8	55°	●		●		●		
				19BSPT	19	0.16	1.0		●		●		●		
				14BSPT	14	0.22	1.6		●		●		●		
				11BSPT	11	0.29	1.6		●		●		●		

Recommended Cutting Conditions J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER···	KTNR···16 KTNSR···16	J16



External Threading Inserts

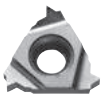
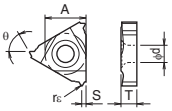
American National Tapered Pipe (NPT)

Full Profile 60° (mm)

Description	A	T	ϕd
16ER	9.525	3.68	4.0

Classification of usage ● :1st Choice

		Cermet	PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			●
N	Non-ferrous Metals			●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread NPT Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile			16ER	18NPT	18	0.04	0.9	60°	●		●		●		J34
				14NPT	14	0.05	1.5		●		●		●		
				11.5NPT	11.5	0.06	1.5		●		●		●		

Recommended Cutting Conditions J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER···	KTNR···16 KTNSR···16	J16

Applicable Thread		
	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

●: Std. Item

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.

Internal Threading Inserts

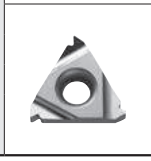
Tapered Pipe [Rc (PT) (BSPT)]

Full Profile 55° (mm)

Description	A	T	ϕd
11IR	6.35	3.18	3.0
16IR	9.525	3.68	4.0

Classification of usage ● :1st Choice

P	Carbon Steel / Alloy Steel	●
M	Stainless Steel	●
K	Cast Iron	●
N	Non-ferrous Metals	●

Insert (Handed Insert shows Right-hand)		Description		Applicable Thread Rc(PT) (BSPT) Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile		11IR	28BSPT-TF	28	0.10	0.6	55°			●				J34
			19BSPT-TF	19	0.16	0.78				●				
			14BSPT-TF	14	0.22	0.97				●				
		16IR	14BSPT-TF	14	0.22	0.97				●				
			11BSPT-TF	11	0.29	1.5				●				
		11IR	28BSPT	28	0.10	0.6	55°	●		●		●		
			19BSPT	19	0.16	0.78		●		●		●		
			14BSPT	14	0.22	0.97		●		●		●		
		16IR	14BSPT	14	0.22	0.97		●		●		●		
			11BSPT	11	0.29	1.5		●		●		●		

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
11IR··	SINR···11E SINR···11	J17
16IR··	SINR···16 CINR···16	

Internal Threading Inserts

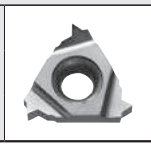
American National Tapered Pipe (NPT)

Full Profile 60° (mm)

Description	A	T	ϕd
16IR	9.525	3.68	4.0

Classification of usage ● :1st Choice

P	Carbon Steel / Alloy Steel	●
M	Stainless Steel	●
K	Cast Iron	●
N	Non-ferrous Metals	●

Insert (Handed Insert shows Right-hand)		Description		Applicable Thread NPT Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Full Profile		16IR	18NPT	18	0.04	0.9	60°	●		●		●		J34
			14NPT	14	0.05	1.5		●		●		●		
			11.5NPT	11.5	0.06	1.5		●		●		●		

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

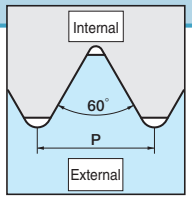
Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16IR···	SINR···16 CINR···16	J17

Applicable Thread		
	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

●: Std. Item

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.



External Threading Inserts

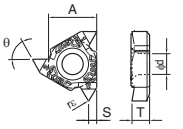
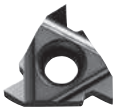
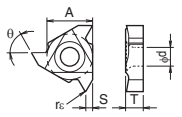
60° Type [Partial Profile / M, UN]

Partial Profile 60° (mm)

Description	A	T	ϕd
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage ● :1st Choice

P	Carbon Steel / Alloy Steel		●		
M	Stainless Steel		●		
K	Cast Iron				●
N	Non-ferrous Metals				●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread M Pitch mm	Applicable Thread UN UNF Pitch TPI	Dimension (mm) rε	Dimension (mm) S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile			16ER	A60-TF	0.5~1.5	48~16	0.06	1.00	60°			●				J34 J35
				G60-TF	1.75~3	14~8	0.22	1.60				●				
				AG60-TF	0.5~3	48~8	0.06	1.60				●				
			16ER	A60	0.5~1.5	48~16	0.06	1.00	60°					●		
				G60	1.75~3	14~8	0.22	1.70						●		
				AG60	0.5~3	48~8	0.06	1.70						●		
			22ER	N60	3.5~5	7~5	0.48	2.50				●		●		
			16ER	6001	1.0~2.5	24~11	0.10	1.50		●						J38
				6002	1.5~2.5	16~11	0.20	1.50		●						

Recommended Cutting Conditions J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER ···	KTNR···16 KTNSR···16	J16
22ER ···	KTNR···22	

Applicable Thread	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

Threading Inserts Identification System (Partial Profile) J12~J15

16 (1) **E** (2) **R** (3) **A60** (4) **-TF** (5)

(1)Insert Size	
06	3.97
08	4.76
11	6.35
16	9.525
22	12.70
Symbol	I.C. Size (mm)

(2)External / Internal	
E	External Threading
I	Internal Threading

(3)Insert Hand	
R	Right-hand
L	Left-hand

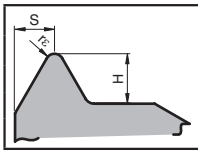
(4)Pitch		
60°	A60	60° Type (Partial Profile) 0.5~1.5mm
	G60	60° Type (Partial Profile) 1.75~3mm
	AG60	60° Type (Partial Profile) 0.5~3mm
55°	A55	55° Type (Partial Profile) 40~16 TPI
	G55	55° Type (Partial Profile) 14~8 TPI
	AG55	55° Type (Partial Profile) 40~8 TPI
Vertex angle	Partial Profile	

(5)Manufacture's Option	
-TF	TF Cutting Edge

(4)Pitch		
60°	6001	60° Type (Partial Profile) Corner-R(rε)=0.1mm 1.0~2.5mm
55°	5501	55° Type (Partial Profile) Corner-R(rε)=0.1mm 28~11 TPI
Vertex angle	Partial Profile	

Note) Pitch and threads per inch of an insert without wiper depend on the size of insert.

·Example of shape of A, G and AG



Description	Dimension (mm) rε	S	H
16ERA60-TF	0.06	1.00	1.5
16ERG60-TF	0.22	1.60	2.6
16ERAG60-TF	0.06	1.60	2.7

◆Corner-R(rε) Selection for Partial Profiling Insert

	External Threading	Internal Threading
Metric Unified	rε ≤ 0.1443P	rε ≤ 0.0720P
Parallel Pipe (Whitworth) Tapered Pipe	(For Both External and Internal Thread) rε ≤ 0.1373P	

rε: Corner-R P: Pitch (= $\frac{25.4}{n}$) n: TPI

● Metric, Unified Thread

Corner-R(rε) at Internal Threading is almost half of that of External.

● Parallel Pipe, Tapered Pipe, Whitworth Thread

Same Corner-R(rε) for both External and Internal Threading

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.

●: Std. Item

Internal Threading Inserts

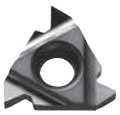
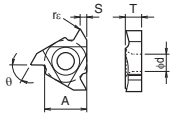
60° Type [Partial Profile / M, UN]

Partial Profile 60° (mm)

Description	A	T	ϕd
06IR	3.97	1.91	2.3
08IR	4.76	2.38	2.3
11IR	6.35	3.18	3.0
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage
● :1st Choice

P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			●
N	Non-ferrous Metals			●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread M	Applicable Thread UN UNF	Dimension (mm) rε	Dimension (mm) S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
					Pitch mm	Pitch TPI										
Partial Profile			**11IR**	**A60**	0.5~1.5	48~16	0.02	1.00	60°			●		●		**J35** **J36**
			16IR	**A60**	0.5~1.5	48~16	0.02	1.00				●		●		
				G60	1.75~3	14~8	0.11	1.70				●		●		
				AG60	0.5~3	48~8	0.02	1.70				●		●		
			22IR	**N60**	3.5~5	7~5	0.22	2.50				●		●		
			06IR	**60005**	0.75~1.25	28~20	0.05	0.60	60°			●				
			08IR	**60007**	1.0~1.75	20~16	0.07	0.80				●				
			11IR	**60005**	0.75~1.5	32~16	0.05	1.00		●						**J38**
			16IR	**6001**	1.5~2.5	16~10	0.10	1.50		●						
				60015	2.5	11~10	0.15	1.50		●						

Recommended Cutting Conditions ➡ **J32**

Applicable Toolholders

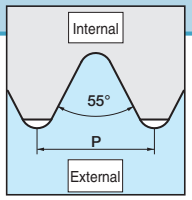
Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
06IR··	**SINR···06E**	**J17**
08IR··	**SINR···08E**	
11IR··	**SINR···11E** **SINR···11**	
16IR··	**SINR···16** **CINR···16**	
22IR··	**SINR···22** **CINR···22**	

Applicable Thread	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

●: Std. Item

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.



External Threading Inserts

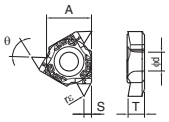
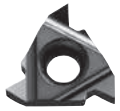
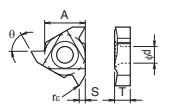
55° Type [Partial Profile / G (PF), R (PT, BSPT), (W)]

Partial Profile 55° (mm)

Description	A	T	ϕd
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage ●:1st Choice

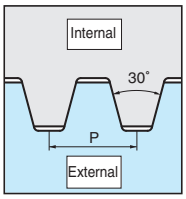
P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			●
N	Non-ferrous Metals			●

Insert (Handed Insert shows Right-hand)		Description		Applicable Thread G(PF) R(PT)	Applicable Thread W Pitch TPI	Dimension (mm) rε	Dimension (mm) S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile			16ER A55-TF	28,19	40~16	0.06	1.00	55°			●				
			G55-TF	14,11	14~8	0.22	1.60	55°			●				
			AG55-TF	28~11	40~8	0.06	1.60	55°			●				
			16ER A55	28,19	40~16	0.06	1.00	55°					●		J36 J37
			G55	14,11	14~8	0.22	1.70	55°					●		J36 J37
			AG55	28~11	40~8	0.06	1.65	55°					●		J36 J37
			22ER N55	-	7~5	0.47	2.50	55°			●		●		J36 J37
			16ER 5501	28~11	24~10	0.10	1.50	55°	●						J36 J37
			5502	14,11	16~9	0.20	1.50	55°	●						J36 J37

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER···	KTNR···16 KTNSR···16	J16
22ER···	KTNR···22	J16



External Threading Inserts

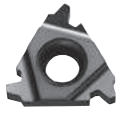
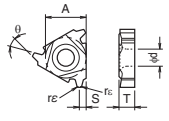
30° Trapezoidal (Tr)

Partial Profile 30° (mm)

Description	A	T	ϕd
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage ●:1st Choice

P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			
N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)		Description		Applicable Thread Tr Pitch mm	Dimension (mm) rε	Dimension (mm) S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile			16ER 200TR	2.0	0.20	1.6	30°	●		●				J37
			300TR	3.0	0.20	1.6	30°	●		●				J37
			22ER 400TR	4.0	0.20	2.5	30°	●		●				J37
			500TR	5.0	0.20	2.5	30°	●		●				J37

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16ER···	KTNR···16 KTNSR···16	J16
22ER···	KTNR···22	J16

Applicable Thread	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.

●: Std. Item

Internal Threading Inserts

55° Type [Partial Profile / G(PF), Rc(PT, BSPT), (W)]

Partial Profile 55° (mm)

Description	A	T	ϕd
06IR	3.97	1.91	2.3
08IR	4.76	2.38	2.3
11IR	6.35	3.18	3.0
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage ●:1st Choice

P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			●
N	Non-ferrous Metals			●

Insert (Handed Insert shows Right-hand)	Description		Applicable Thread G(PF) Rc(PT) Pitch TPI	W Pitch TPI	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile	11IR	A55	28,19	40～16	0.06	1.10	55°			●		●		J36 J37
	16IR	A55	28,19	40～16	0.06	1.00				●		●		
		G55	14,11	14～8	0.22	1.70				●		●		
		AG55	28～11	40～8	0.06	1.70				●		●		
	22IR	N55	-	7～5	0.47	2.50				●		●		
	06IR	5501	28	24	0.10	0.60				●				
	08IR	5501	28,19	24,20	0.10	0.80				●				
	11IR	55005	28～14	24～14	0.05	1.10	55°	●						
	16IR	5501	28～11	24～11	0.10	1.50		●						
		5502	14～11	16～11	0.20	1.50		●						

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
06IR･･･	SINR･･･06E	J17
08IR･･･	SINR･･･08E	
11IR･･･	SINR･･･11E SINR･･･11	

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16IR･･･	SINR･･･16 CINR･･･16	J17
22IR･･･	SINR･･･22 CINR･･･22	

Internal Threading Inserts

30° Trapezoidal (Tr)

Partial Profile 30° (mm)

Description	A	T	ϕd
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage ●:1st Choice

P	Carbon Steel / Alloy Steel		●	
M	Stainless Steel		●	
K	Cast Iron			
N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)	Description		Applicable Thread Tr Pitch mm	Dimension (mm) rε	S	Angle θ	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile	16IR	200TR	2.0	0.20	1.6	30°			●				J37
		300TR	3.0	0.20	1.6				●				
	22IR	400TR	4.0	0.20	2.5	30°			●				
		500TR	5.0	0.20	2.5				●				

Recommended Cutting Conditions ➡ J32

Applicable Toolholders

Insert Description	Applicable Toolholders	Ref. to Page for Applicable Toolholders
16IR･･･	SINR･･･16 CINR･･･16	J17
22IR･･･	SINR･･･22 CINR･･･22	

Applicable Thread	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

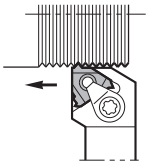
●: Std. Item

PR1115 / GW15 (Threading) are sold in 5 piece boxes.

TC60M (Threading) are sold in 10 piece boxes.

External Threading Toolholders

KTN



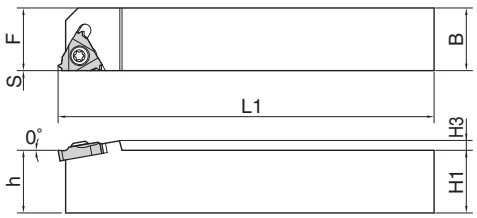


Fig.1

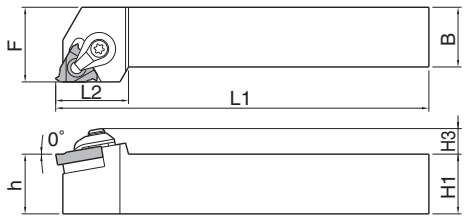
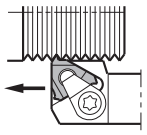


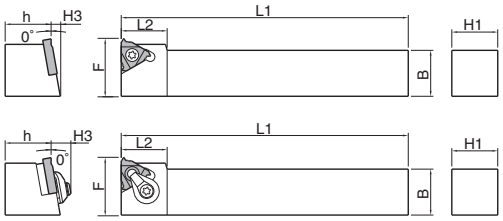
Fig.2

● Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

KTNS (For Gang Type NC Lathe)





KTNSR1010H-16
1212K-16
Fig.3

KTNSR1616K-16
2020K-16
Fig.4

● Right-hand shown

Right-hand Insert for Right-hand Toolholder.

External Threading Toolholders

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F	Drawing	Spare Parts: Clamp Set (5S / 6S)	Clamp Screw	Wrench	Shim	Shim Screw	Applicable Inserts
KTN R/L	1216JX-16F	●	●	12	3	16	120	-	16	Fig.1	-	SB-3.5TR	LTW-15S	-	-	16E R/L...
	1616H-16	●	●	16	8.5	16	100	25	20	Fig.2	CPS-5S	-	FT-15	TN-32	SP3X8	
	1616JX-16F	●	●		3		120	-	16	Fig.1	-	SB-3.5TR	LTW-15S	-	-	
	2020H-16*	●		20	8.5	20	100	25	25	Fig.2	CPS-5S	-	FT-15	TN-32	SP3X8	
	2020JX-16F	●	●		3		120	-	20	Fig.1	-	SB-3.5TR	LTW-15S	-	-	
	2020K-16	●	●		8.5		125	25	25	Fig.2	CPS-5S	-	FT-15	TN-32	SP3X8	
	2525M-16	●	●	25		25	150		30							
	2525M-22	●		25	10	25	150	29	32		CPS-6S	-	LW-3	TN-43	SP3X8	22ER...
	3225P-22	●		32			170	34								
KTNSR	1010H-16	●		10	8.5	10	100	16	16	Fig.3	-	SB-3.5TR	FT-15	-	-	16ER...
	1212K-16	●		12		12	125	18	18							
	1616K-16	●		16		16			22	Fig.4	CPS-5S	-		TN-32	SP3X8	
	2020K-16	●		20		20		20	27.4							

★ mark indicates short shank type.

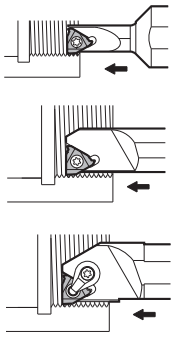
Refer to page for applicable inserts

Nominal Thread	Full Profile	Partial Profile	Nominal Thread	Full Profile	Partial Profile
M:Metric	**J6**	**J12**	R(PT)(BSPT) Tapered Pipe	**J10**	**J14**
UN: Unified UNF: Unified Fine Thread	**J8**	**J12**	W: Whitworth	**J8**	**J14**
			NPT American National Tapered Pipe	**J10**	**-**
G (PF): Parallel Pipe	**J8**	**J14**	Tr: 30° Trapezoidal	**-**	**J14**

●: Std. Item

Internal Threading Toolholders

SIN / CIN



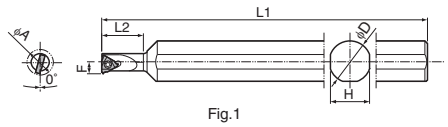


Fig.1

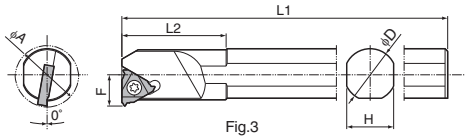


Fig.3

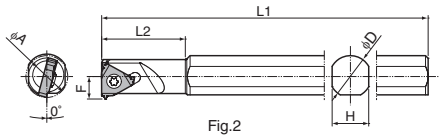


Fig.2

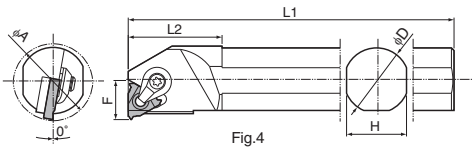
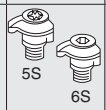
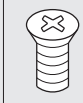


Fig.4

• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Internal Threading Toolholders

Description		Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	F	Drawing	Spare Parts: Clamp Screw	Clamp Set	Wrench	Shim	Shim Screw	Applicable Inserts
																
SINR/L	**0612S-06E**	●		6.4	12	11	100	10	3.8	Fig.1	SB-2040TR	-	FT-6	-	-	**06IR…**
	0816S-08E	●		7.8	16	15	125	16	4.0		SB-2050TR	-	FT-6	-	-	**08IR…**
	1216S-11E	●	●	12	16	14	150	25	6.3		SB-2TR	-	FT-8	-	-	**11IR/L…**
	1516S-11	●	●	15				30	7.5							
	1616S-16	●	●	16	16	14	150	32	8.6	Fig.2	SB-3.5TR	-	FT-15	-	-	**16IR/L…**
	2016S-16	●	●	20				37	10.0	Fig.3						
	2420S-16	●	●	24	20	18	180	40	12.0							
	2420S-22	●		24	20	18	180	40	13.5		SB-4085TR	-	FT-15	-	-	**22IR…**
CINR/L	**3025S-16**	●	●	30	25	23	200	36	15.0	Fig.4	-	CPS-5S	FT-15	TN-32	SP3X8	**16IR/L…**
	3732S-16	●		37	32	30	250	45	18.5							
	3025S-22	●		30	25	23	200	40	16.5		-	CPS-6S	LW-3	TN-43	SP3X8	**22IR…**
	3732S-22	●		37	32	30	250	45	20							

Refer to page for applicable inserts

Nominal Thread	Full Profile	Partial Profile	Nominal Thread	Full Profile	Partial Profile
M: Metric	**J7**	**J13**	Rc(PT)(BSPT) Tapered Pipe	**J11**	**J15**
UN: Unified UNF: Unified Fine Thread	**J9**	**J13**	W: Whitworth	**J9**	**J15**
			NPT American National Tapered Pipe	**J11**	**-**
G (PF): Parallel Pipe	**J9**	**J15**	Tr: 30° Trapezoidal	**-**	**J15**

Guide for Internal Threading

For the internal threading, pay extra attention to “Stabilizing Bore Dia.” and “chip evacuation”.

1 “Stabilizing Bore Dia.”

Because small pitch internal threading has small corner-R(r_ε), there is variation in the Bore Dia. which may greatly influence the tool life of an insert.
In order to eliminate the variation in the Bore Dia., “0” cutting (zero cutting) should be performed as the zero pass, before the first pass in threading.
The Bore Dia. is cut with the specified dimension, and the first pass of threading becomes stable.

2 “Chip evacuation”

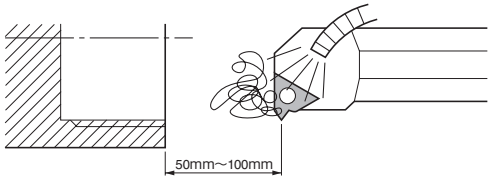
If machining process is continued when chips are tangled with a toolholder and other parts of the machine, it may cause damages to the insert.
Therefore, please ensure that there are no tangled chips in the machine by the following method.

<When processing the first workpiece>

Set the program with the “single block”
Keep the threading starting point 50mm~100mm away from the side of workpiece, and confirm that coolant is flushing down the chips for each pass.

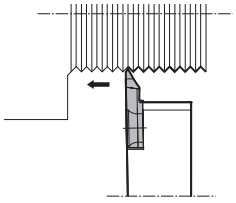
<When processing the second workpiece and later>

Ensure that chips are not tangled; then, start the continuous run.



●: Std. Item

KTKF / KTKF Goose-neck Holder



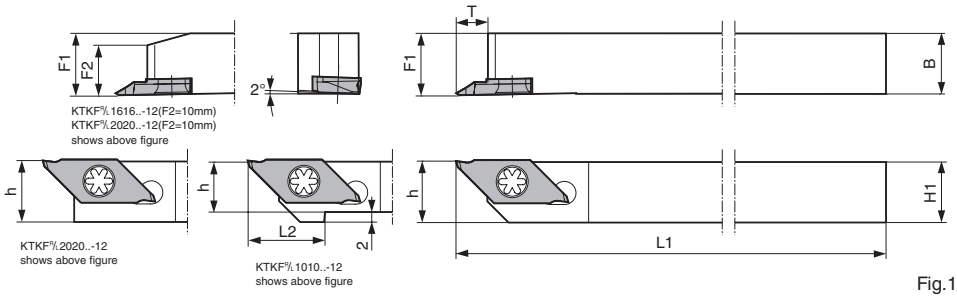
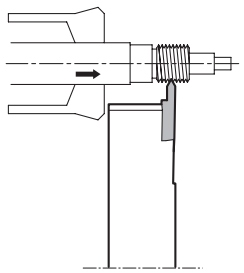


Fig.1

● Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.



<Goose-neck Holder>

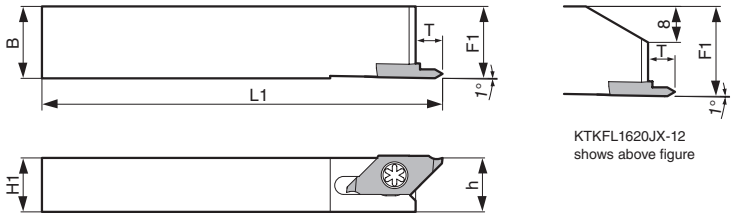


Fig.2

● Left-hand shown

Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

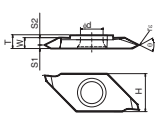
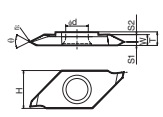
Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	T	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts
KTKF R/L	1010JX-12	●	●	10	10	120	15	10	6	Fig.1	SB-4590TRWN	LTW-10S	TKFT12 R/L…
	1212JX-12	●	●	12	12		-	12					
	1616JX-12	●	●	16	16			16					
NEW	2020JX-12	●	●	20	20			20					
KTKF R/L	1212F-12	●	●	12	12	85	-	12	6		SB-4590TRWN	LTW-10S	TKFT12 R/L…
KTKFL	1216JX-12		●	12	16	120	-	16	6	Fig.2	SB-4590TRWN	LTW-10S	TKFT12L..
	1620JX-12		●	16	20			20					

· Dimension T shows the distance from the Toolholder to the cutting edge.

Applicable Inserts

Classification of usage
● : 1st Choice
○ : 2nd Choice

		NEW				
P	Carbon Steel / Alloy Steel	●	○	○	○	
M	Stainless Steel	○	●	○	○	
K	Cast Iron					●
N	Non-ferrous Metals					●

Insert (Photo shows Right-hand.)			Description	Applicable Thread	Pitch mm	Pitch TPI	T	W	H	ϕd	rε	S1	S2	Angle θ	MEGACOAT NANO PR1425	MEGACOAT NANO PR1535	MEGACOAT PR1225	PVD Coated Carbide PR1025	Carbide KW10	Applicable Toolholders
Partial Profile		 Right-hand shown	TKFT 12RA6000	M UN	0.2~0.6	64~48	3.0	2.5	8.7	5.2	Max. 0.05 Flat	0.4	2.1	60°	●	●	●	●	●	KTKFR ...12
			12RB6000									2.1	0.4		●	●	●	●	●	
			12RA60005		0.5~1.25	48~24					0.05	0.8	1.7		●	●	●	●	●	
			12RB60005									1.7	0.8		●	●	●	●	●	
			12RN6001		1~1.5	24~18					0.1	1.25	1.25		●	●	●	●	●	
			12RA55005	G,R W	-	40~16					0.05	0.8	1.7	55°	●	●	●	●	●	
			12RB55005									1.7	0.8		●	●	●	●	●	
		 Left-hand shown	TKFT 12LA6000	M UN	0.2~0.6	64~48	3.0	2.5	8.7	5.2	Max. 0.05 Flat	2.1	0.4	60°	●	●	●	●	●	KTKFL ...12
			12LB6000									0.4	2.1		●	●	●	●	●	
			12LA60005		0.5~1.25	48~24					0.05	1.7	0.8		●	●	●	●	●	
			12LB60005									0.8	1.7		●	●	●	●	●	
			12LN6001		1~1.5	24~18					0.1	1.25	1.25		●	●	●	●	●	
			12LA55005	G,R W	-	40~16					0.05	1.7	0.8	55°	●	●	●	□	●	
			12LB55005									0.8	1.7		●	●	●	□	●	

● : Std. Item
□ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

Inserts Identification System (Ref. to Table-1)

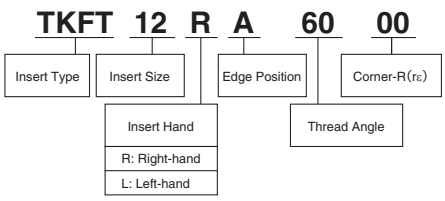
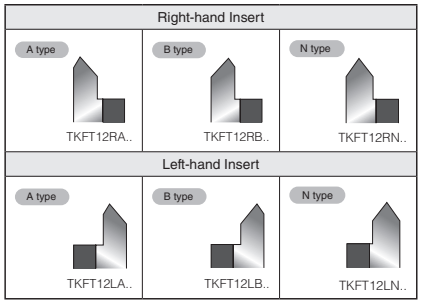


Table-1



Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades			
	MEGACOAT NANO	MEGACOAT	PVD Coated Carbide	Carbide
	PR1425/PR1535	**PR1225**	**PR1025**	**KW10**
Carbon Steel	Vc=70 ~ 170m/mim First ap (Radial):0.2mm and under		Vc=60 ~ 150m/mim First ap (Radial):0.2mm and under	–
Alloy Steel	Vc=70 ~ 170m/mim First ap (Radial):0.2mm and under		Vc=60 ~ 150m/mim First ap (Radial):0.2mm and under	–
Stainless Steel	Vc=60 ~ 100m/mim First ap (Radial):0.15mm and under		Vc=50 ~ 80m/mim First ap (Radial):0.15mm and under	–
Cast Iron	–		–	Vc=100m/mim First ap (Radial):0.2mm and under
Aluminum Alloys	–		–	Vc=150 ~ 400m/mim First ap (Radial):0.2mm and under
Brass	–		–	Vc=150 ~ 300m/mim First ap (Radial):0.15mm and under

· Coolant is recommended.
· In case of threading stainless steel, please set two to three passes more than <ap - passes> listed below.

Depth of Cut & Number of Passes

TKFT 60° / 55° Partial Profile

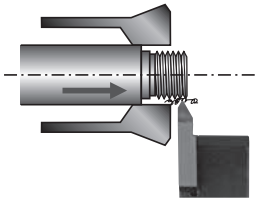
(ap shows the value of radial ap)

Type		Pitch mm / TPI	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12
Metric	External Thread	0.20mm	TKFT 12R/LA/B6000	Max. 0.05 Flat	0.15	4	0.06	0.04	0.03	0.02								
		0.25mm			0.19	4	0.07	0.06	0.04	0.02								
		0.30mm			0.23	4	0.08	0.07	0.06	0.02								
		0.35mm			0.27	5	0.08	0.07	0.06	0.04	0.02							
		0.40mm			0.30	5	0.10	0.08	0.06	0.04	0.02							
		0.45mm			0.34	6	0.10	0.08	0.06	0.04	0.04	0.02						
		0.50mm	TKFT 12R/LA/B6000		0.38	6	0.10	0.10	0.07	0.05	0.04	0.02						
			12R/LA/B60005	0.05	0.33	5	0.10	0.10	0.07	0.04	0.02							
		0.60mm	TKFT 12R/LA/B6000	Max. 0.05 Flat	0.45	7	0.10	0.10	0.08	0.06	0.05	0.04	0.02					
			12R/LA/B60005	0.05	0.40	6	0.10	0.10	0.08	0.06	0.04	0.02						
		0.70mm	TKFT 12R/LA/B60005	0.05	0.48	6	0.10	0.10	0.10	0.10	0.06	0.02						
		0.75mm		0.05	0.52	7	0.10	0.10	0.10	0.08	0.07	0.05	0.02					
		0.80mm		0.05	0.56	7	0.10	0.10	0.10	0.10	0.08	0.06	0.02					
		1.00mm	TKFT 12R/LA/B60005 12R/LN6001	0.05	0.71	8	0.15	0.15	0.12	0.10	0.08	0.06	0.03	0.02				
				0.10	0.66	7	0.18	0.15	0.12	0.10	0.06	0.03	0.02					
		1.25mm		0.05	0.90	9	0.20	0.18	0.13	0.10	0.10	0.07	0.05	0.05	0.02			
				0.10	0.85	8	0.20	0.18	0.13	0.10	0.10	0.07	0.05	0.02				
		1.50mm	TKFT 12R/LN6001	0.10	1.04	10	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02		
Parallel Pipe	External Thread	28 TPI	TKFT 12R/LA/B55005	0.05	0.67	7	0.18	0.15	0.12	0.10	0.06	0.04	0.02					
		19 TPI		0.05	1.01	9	0.20	0.18	0.14	0.12	0.12	0.10	0.08	0.05	0.02			
Whitworth	External Thread	24 TPI	TKFT 12R/LA/B55005	0.05	0.79	8	0.18	0.18	0.12	0.10	0.08	0.07	0.04	0.02				
		20 TPI		0.05	0.96	9	0.20	0.20	0.15	0.10	0.10	0.08	0.06	0.05	0.02			
		18 TPI		0.05	1.07	10	0.20	0.18	0.15	0.12	0.10	0.10	0.08	0.07	0.05	0.02		
		16 TPI		0.05	1.21	11	0.20	0.18	0.15	0.15	0.12	0.10	0.10	0.08	0.07	0.04	0.02	

Swiss Tool Automatic Lathe (Guide Bush System)

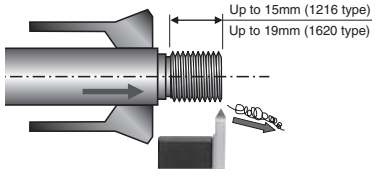
Goose-neck holder is applicable to automatic lathes whose toolholder does not move to longitudinal direction (Z-axis direction).

Conventional Tool



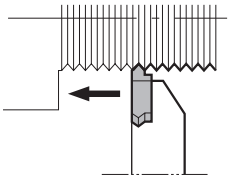
Chips may come into the guide bush and scratch the thread surface.

Goose-neck Holder

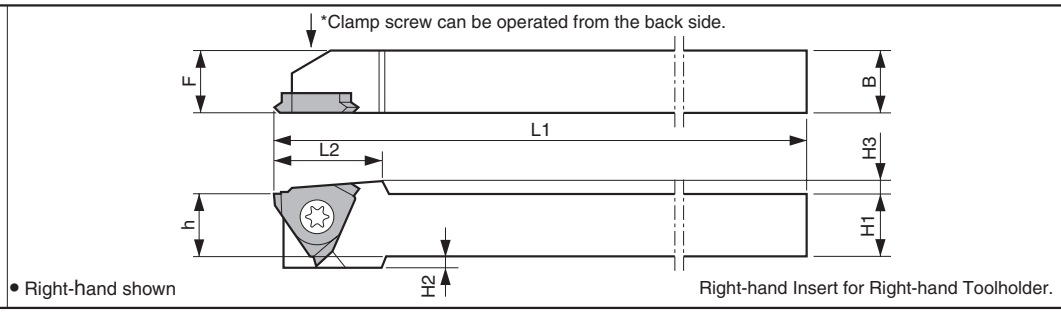


Goose-neck holder is capable of threading without returning the thread part into the guide bush (thread length up to 15 mm or 19 mm).

KTTX



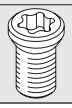
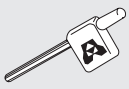
Thread to shoulder



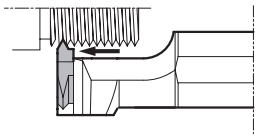
• Right-hand shown

Right-hand Insert for Right-hand Toolholder.

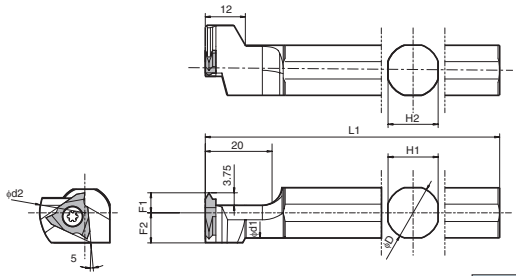
Toolholder Dimensions

Description		Std.	Dimension (mm)							Spare Parts				
										Clamp Screw	Wrench			
			H1=h	H2	H3	B	L1	L2	F					
KTTXR	1010JX-16F	●	10	2	2.5	10	120	17.6	10	SB-4070TRW	FT-8			
	1212JX-16F	●	12	-		12			12					
	1616JX-16F	●	16			16			16					
KTTXR	1212F -16F	●	12	-	2.5	12	85	17.6	12	SB-4070TRW	FT-8			
	2020K -16F	●	20			20	125		20					

S···KTTX (External Sleeve Holder)



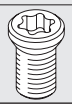
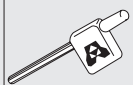
Thread to shoulder



• Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std.	Dimension (mm)							Spare Parts				
									Clamp Screw	Wrench			
		φD	L1	F1	F2	φd1	φd2	H1=H2					
S12F-KTTXL16	●	12	80	6.0	9.0	11.0	27	11	SB-4070TRW	FT-8			
S14H-KTTXL16	●	14	100			13.0		13					
S15F-KTTXL16	●	15.875	85			14.6		15					
S16F-KTTXL16	●	16											
S19G-KTTXL16	●	19.05	90		10.5	17.6		17					
S19K-KTTXL16	●		120										
S20G-KTTXL16	●	20	90		11.0	18.6		18					
S20K-KTTXL16	●		120										
S25.0H-KTTXL16	●	25	100	10.0	14.0	23.6	32	23					
S25K-KTTXL16	●	25.4	120										

●: Std. Item

Applicable Inserts

(mm)

Description	A	T	ϕd
TTX32R	9.525	3.18	4.4

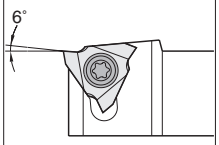
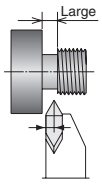
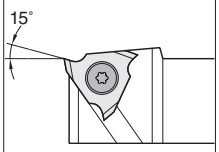
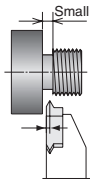
					Classification of usage
P	Carbon Steel / Alloy Steel	○	○	●	● : 1st Choice
M	Stainless Steel		○	●	○ : 2nd Choice
K	Cast Iron				●
N	Non-ferrous Metals				●

Insert (Handed Insert shows Right-hand)	Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) rε	S1	S2	Angle θ	Cermet TC60M	PVD Coated Carbide PR930	PVD Coated Carbide PR1115	Carbide KW10	Applicable Toolholders	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile	**TTX32R**	**6000**	M UN	0.5~1.0 -	- 56~32	0.00	0.6	1.12	60°				●	**KTTXR····16 S···KTTXL16**	**J40**
		60005	M UN	0.5~1.0 -	- 48~32	0.05	0.6	1.12		●	●	●	●		
		6001	M UN	1.0~2.0 -	- 28~14	0.10	1.1	1.62		●	●	●	●		
	TTX32R	**6000S**	M UN	0.5 -	- 56~48	0.00	0.3	1.12	60°		●	●	●		
		60005S	M UN	0.5 -	- 48	0.05	0.3	1.12			●	●	●		
	TTX32R	**5501**	G,R W	-	28~19 24~20	0.10	0.75	1.01	55°	●	●	●	●		
		55015	G,R W	-	19~11 20~11	0.15	1.20	1.46		●			●		

Applicable Thread		
	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

Recommended Cutting Conditions J32

TT and TTX

Type	Shape	Features: Rake Angle after Installation	Features: Condition	Features: Dead Space
TT			· One insert can machine various pitch sizes	
TTX			· The Least Cutting Force · Thread to shoulder (Less dead space) · One Insert can machine various pitch sizes. (less than TT)	

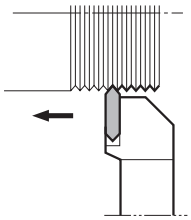
●: Std. Item

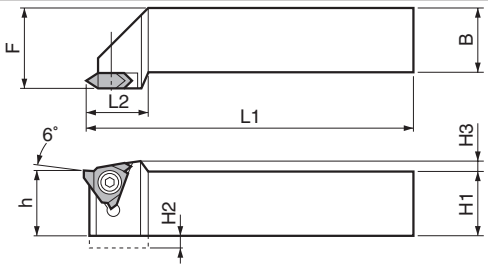
PR930 / PR1115 (Threading) are sold in 5 piece boxes.

TC60M / KW10 (Threading) are sold in 10 piece boxes.

External Threading Toolholders [TT Insert]

KTT





• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

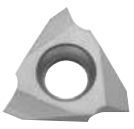
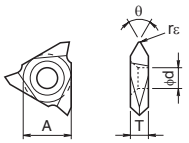
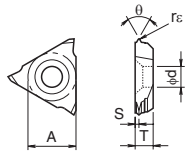
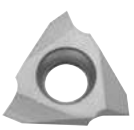
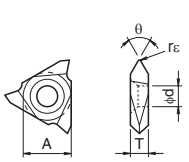
Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F	Spare Parts: Clamp Screw		Spare Parts: Wrench		
KTT$^{R}_{L}$	1010F-16	●	●	10	4	2.5	10	80	18	12	SB-4070TRS	-	FT-10	-	
	1212H-16	●	●	12	2		12	100		16					
	1616H-16	●	●	16	-		16	100		20					
	2020K-16	●	●	20			20	125		25	SB-4TR	-	FT-15	-	
	2525M-16	●	●	25			25	150		30					
	2020K-22	●	●	20	-	3.0	20	125	25	25	-	GS-50	-	LW-3	
	2525M-22	●	●	25			25	150		30					

Applicable Inserts

(mm)

Description	A	T	ϕd
TT32$^{R}_{L}$	9.525	3.18	4.4
TT43$^{R}_{L}$	12.70	4.76	5.5

		Classification of usage
P	Carbon Steel / Alloy Steel	● : 1st Choice
M	Stainless Steel	○ : 2nd Choice
K	Cast Iron	
N	Non-ferrous Metals	

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) rε	Dimension (mm) S		Angle θ	Cermet TC60M	PVD Coated Carbide PR930	PVD Coated Carbide PR1115	Carbide KW10	Applicable Toolholders	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile			TT32$^{R}_{L}$	6000	M UN	0.5~2.5 -	- 56~10	0.0	-		60°	●	●	●		KTT$^{R}_{L}$····-16	J39
				6001	M UN	1.0~2.5 -	- 24~10	0.1				●	●	●	●		
				6002	M UN	1.5~2.5 -	- 16~10	0.2				●	●	●	●		
				6003	M UN	2.5 -	- 11~10	0.3				●	R	R			
			TT32$^{R}_{L}$	5501	G, PT W	-	28~11 24~10	0.1	-		55°	●	●	R	●		
				5502	G, PT W	-	14~11 14~10	0.2				●	●	R	●		
Full Profile			TT43ER	100M	M	1.00	-	0.12	0.8		60°	R	R	R		KTT$^{R}_{L}$····-22	J40
				125M		1.25		0.15	0.9			R	R	R			
				150M		1.50		0.19	1.0			R	R	R			
				200M		2.00		0.25	1.7			R	R	R			
Partial Profile			TT43$^{R}_{L}$	6001	M UN	1.0~3.5 -	- 24~8	0.1	-		60°	●	●	●	●		J39
				6002	M UN	1.5~3.5 -	- 16~8	0.2				●	●	●	●		
				6003	M UN	2.5~3.5 -	- 11~8	0.3				●	●	R			
				6004	M UN	3.0~3.5 -	- 8	0.4				●	●	R			
			TT43$^{R}_{L}$	5501	G, PT W	-	28~11 24~7	0.1	-		55°	●	R	R	●		
				5502	G, PT W	-	14~11 16~7	0.2				●	R	R	●		
				5503	G, PT W	-	11 10~7	0.3				●	R	R			
				5504	G, PT W	-	- 8~7	0.4				●					

Applicable Thread		
	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

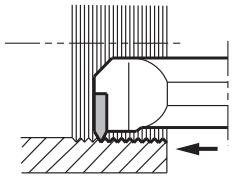
Recommended Cutting Conditions J32

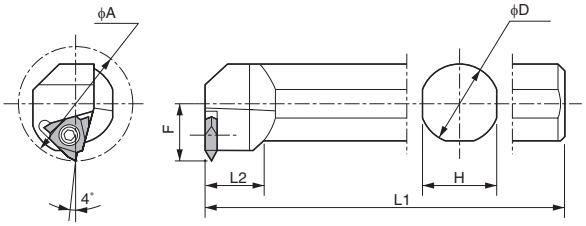
PR930 / PR1115 (Threading) are sold in 5 piece boxes.

TC60M / KW10 (Threading) are sold in 10 piece boxes.

● : Std. Item
R : Std. Item (Right-hand Only)

KITG

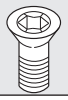
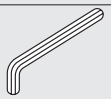




• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

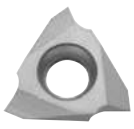
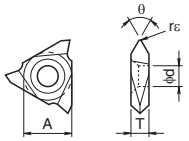
Description		Std. R	Std. L	Min. Bore Dia. ϕA	Dimension (mm) ϕD	H	L1	L2	F	Spare Parts: Clamp Screw		Wrench		
														
KITG R/L	3525T-16	●	●	35	25	23	220	18	17.5	SB-4TR	-	FT-15	-	
	4532T-22	●	●	45	32	30	250	20	22.5	-	GS-50	-	LW-3	

· Max. available Pitch: KITG R/L3525T-16···P2.5 or 10TPI, KITG R/L4532T-22···P3.0 or 8TPI.

Applicable Inserts

Description	A	T	ϕd
TT32 R/L	9.525	3.18	4.4
TT43 R/L	12.70	4.76	5.5

						Classification of usage
P	Carbon Steel / Alloy Steel	○	○	●		● : 1st Choice
M	Stainless Steel		○	●		○ : 2nd Choice
K	Cast Iron				●	
N	Non-ferrous Metals				●	

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) rε	Angle θ	Cermet TC60M	PVD Coated Carbide PR930	PVD Coated Carbide PR1115	Carbide KW10	Applicable Toolholders	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile			TT32 R/L	6000	M UN	0.5~2.5 -	- 48~10	0.0	60°	●	●	●		KITG R/L····16	J39 J40
				6001	M UN	1.5~2.5 -	- 16~10	0.1		●	●	●	●		
			TT32 R/L	5501	G,PT W	-	28~11 24~10	0.1	55°	●	●	R	●		
				5502	G,PT W		- 16~18	0.2		●	●	R	●		
			TT43 R/L	6001	M UN	1.5~3.0 -	14~11 16~10	0.1	60°	●	●	●	●	KITG R/L····22	
				6002	M UN	3.0 -	- 8	0.2		●	●	●	●		
			TT43 R/L	5501	G,PT W	-	28~11 24~8	0.1	55°	●	R	R	●		
				5502	G,PT W		14~11 16~8	0.2		●	R	R	●		
				5503	G,PT W		11 11~8	0.3		●	R	R			
				5504	G,PT W		- 8	0.4		●					

Recommended Cutting Conditions J32

Applicable Thread	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

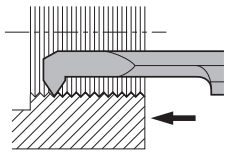
● : Std. Item
R : Std. Item (Right-hand Only)

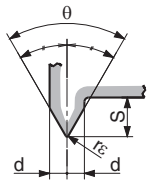
PR930 / PR1115 (Threading) are sold in 5 piece boxes.

TC60M / KW10 (Threading) are sold in 10 piece boxes.

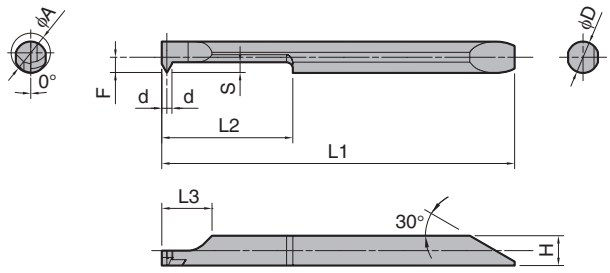
Micro Internal Threading EZ Bars

EZT





Detail of edge



• Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)										MEGA COAT	Applicable Thread					
														Metric		Unified		American National Tapered Pipe	
		φA	φD	H	L1	L2	L3	F	S	d	rε	θ	PR1225	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)	Nominal Thread	Pitch (TPI)
EZTR	030025-60-002	3.0	2.5	2.3	35.0	6.5	5.4	1.19	1.0	0.5	$0.02^{\pm0.01}$	60°	●	M4 and over (Fine Thread : M3.5 and over)	P0.5 ~ P0.8	No.8-32UNC No.8-36UNF and over	36 ~ 32	–	–
	035030-60-002	3.5	3.0	2.8	39.0	9.0	5.9	1.44	1.2	0.6			●	M4.5 and over (Fine Thread : M4.5 and over)	P0.5 ~ P1.0	No.10-24UNC No.8-36UNF and over	36 ~ 24	–	–
	040035-60-004	4.0	3.5	3.3	42.0	11.0	5.9	1.69	1.2	0.6	$0.04^{\pm0.01}$		●	M5 and over (Fine Thread : M5 and over)	P0.75 ~ P1.25	No.12-24UNC No.12-28UNF and over	28 ~ 20	–	–
	050040-60-004	5.0	4.0	3.8	45.0	16.0	6.4	1.94	1.3	0.65			●	M7 and over (Fine Thread : M6 and over)	P0.75 ~ P1.5	1/4-20UNC 1/4-28UNF and over	28 ~ 18	–	–
	060050-60-004	6.0	5.0	4.8	53.2	20.0	7.4	2.44	1.6	0.8			●	M8 and over (Fine Thread : M7 and over)	P0.75 ~ P1.5	5/16-18UNC 5/16-24UNF and over	24 ~ 16	1/4NPT 3/8NPT	18
	070060-60-004	7.0	6.0	5.8	61.2	25.0	8.4	2.94	2.0	1.0			●	M9 and over (Fine Thread : M8 and over)	P0.75 ~ P1.75	3/8-16UNC 3/8-24UNF and over	24 ~ 16	1/4NPT and over	18,14
														Whitworth		Parallel Pipe Tapered Pipe			
EZTR	060050-55-008	6.0	5.0	4.8	53.2	20.0	7.4	2.44	1.6	0.8	$0.085^{\pm0.015}$	55°	●	W10 TPI 24 and over	24 ~ 20	G1/16 and over R1/16 and over	28	–	–
	080070-55-008	8.0	7.0	6.8	64.2	25.0	8.9	3.44	2.0	1.0			●	W11 TPI 20 and over	20 ~ 18	G1/8 and over R1/8 and over	28,19	–	–

· For American National Tapered Pipe (NPT), use EZTR..-60-004 J27
Applicable Sleeves J25

EZ Bars are sold in 1 piece boxes.

●: Std. Item

Applicable Sleeves

Sleeve Description			Sleeve Shank Dia.	Applicable Inserts			Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length / with coolant hole) ➡ F22	EZH-HP (Adjustable overhang length) ➡ F24	EZH-ST ➡ F26	ϕD1(mm)	EZT	HPT	Shank Dia. ϕD(mm)	
–	–	EZH 02512ST-80	12	EZTR...025-...	–	2.5	(General purpose)
		03012ST-80		EZTR...030-...	–	3	
		03512ST-80		EZTR...035-...	–	3.5	
		04012ST-80		EZTR...040-...	HPTR..04-...	4	
		05012ST-80		EZTR...050-...	HPTR..05-...	5	
		06012ST-80		EZTR...060-...	–	6	
		07012ST-80		EZTR...070-...	HPTR..07-...	7	
–	EZH 02516HP-100	EZH 02516ST-100	16	EZTR...025-...	–	2.5	(General purpose)
	03016HP-100	03016ST-100		EZTR...030-...	–	3	
	03516HP-100	03516ST-100		EZTR...035-...	–	3.5	
	04016HP-100	04016ST-100		EZTR...040-...	HPTR..04-...	4	
	05016HP-100	05016ST-100		EZTR...050-...	HPTR..05-...	5	
	06016HP-100	06016ST-100		EZTR...060-...	–	6	
	07016HP-100	07016ST-100		EZTR...070-...	HPTR..07-...	7	
EZH 02519CT-120	EZH 02519HP-120	EZH 02519ST-120	19.05	EZTR...025-...	–	2.5	Citizen Machinery
03019CT-120	03019HP-120	03019ST-120		EZTR...030-...	–	3	
03519CT-120	03519HP-120	03519ST-120		EZTR...035-...	–	3.5	
04019CT-120	04019HP-120	04019ST-120		EZTR...040-...	HPTR..04-...	4	
05019CT-120	05019HP-120	05019ST-120		EZTR...050-...	HPTR..05-...	5	
06019CT-120	06019HP-120	06019ST-120		EZTR...060-...	–	6	
07019CT-120	07019HP-120	07019ST-120		EZTR...070-...	HPTR..07-...	7	
EZH 02520CT-120	EZH 02520HP-120	EZH 02520ST-120	20	EZTR...025-...	–	2.5	Eguro Tsugami Citizen Machinery (General purpose)
03020CT-120	03020HP-120	03020ST-120		EZTR...030-...	–	3	
03520CT-120	03520HP-120	03520ST-120		EZTR...035-...	–	3.5	
04020CT-120	04020HP-120	04020ST-120		EZTR...040-...	HPTR..04-...	4	
05020CT-120	05020HP-120	05020ST-120		EZTR...050-...	HPTR..05-...	5	
06020CT-120	06020HP-120	06020ST-120		EZTR...060-...	–	6	
07020CT-120	07020HP-120	07020ST-120		EZTR...070-...	HPTR..07-...	7	
EZH 02522CT-135	EZH 02522HP-135	EZH 02522ST-135	22	EZTR...025-...	–	2.5	Star Micronics Nomura DS Tsugami
03022CT-135	03022HP-135	03022ST-135		EZTR...030-...	–	3	
03522CT-135	03522HP-135	03522ST-135		EZTR...035-...	–	3.5	
04022CT-135	04022HP-135	04022ST-135		EZTR...040-...	HPTR..04-...	4	
05022CT-135	05022HP-135	05022ST-135		EZTR...050-...	HPTR..05-...	5	
06022CT-135	06022HP-135	06022ST-135		EZTR...060-...	–	6	
07022CT-135	07022HP-135	07022ST-135		EZTR...070-...	HPTR..07-...	7	
EZH 02525.0CT-135	EZH 02525.0HP-135	EZH 02525.0ST-135	25	EZTR...025-...	–	2.5	Eguro Tsugami Citizen Machinery (General purpose)
03025.0CT-135	03025.0HP-135	03025.0ST-135		EZTR...030-...	–	3	
03525.0CT-135	03525.0HP-135	03525.0ST-135		EZTR...035-...	–	3.5	
04025.0CT-135	04025.0HP-135	04025.0ST-135		EZTR...040-...	HPTR..04-...	4	
05025.0CT-135	05025.0HP-135	05025.0ST-135		EZTR...050-...	HPTR..05-...	5	
06025.0CT-135	06025.0HP-135	06025.0ST-135		EZTR...060-...	–	6	
07025.0CT-135	07025.0HP-135	07025.0ST-135		EZTR...070-...	HPTR..07-...	7	
EZH 02525.4CT-120	EZH 02525.4HP-120	EZH 02525.4ST-120	25.4	EZTR...025-...	–	2.5	Citizen Machinery
03025.4CT-120	03025.4HP-120	03025.4ST-120		EZTR...030-...	–	3	
03525.4CT-120	03525.4HP-120	03525.4ST-120		EZTR...035-...	–	3.5	
04025.4CT-120	04025.4HP-120	04025.4ST-120		EZTR...040-...	HPTR..04-...	4	
05025.4CT-120	05025.4HP-120	05025.4ST-120		EZTR...050-...	HPTR..05-...	5	
06025.4CT-120	06025.4HP-120	06025.4ST-120		EZTR...060-...	–	6	
07025.4CT-120	07025.4HP-120	07025.4ST-120		EZTR...070-...	HPTR..07-...	7	

· Choose sleeves (ϕd1) to meet with ϕD dimension of Bars.
· Adjustment Pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT/HP sleeves.
· Machine manufacturers in random order.

Recommended Cutting Conditions (EZT)

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)
	MEGACOAT
	PR1225
Carbon Steel / Alloy Steel	★ 30 ~ 100
Stainless Steel	★ 30 ~ 80
Non-ferrous Metals	–

★: 1st Recommendation

<Note>
1) The standard cutting speed is Vc=30~50m/min.
The table feed may not follow the expected conditions when machining small diameter workpieces at high speeds.
2) Coolant is recommended.

Depth of Cut & Number of Passes (Metric : M)

Pitch (mm)	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass	18Pass	19Pass	20Pass
0.5	0.3	9	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02											
0.7	0.42	10	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02										
0.75	0.45	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03										
0.8	0.48	11	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03									
1.00	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03								
1.25	0.77	14	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03						
1.50	0.93	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03			
1.75	1.1	20	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03

Depth of Cut & Number of Passes (Whitworth : W)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass
24	0.65	13	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03				
20	0.81	15	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03		
18	0.91	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03

Depth of Cut & Number of Passes (Unified : UN, UNC, UNF, UNEF)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass	18Pass
36	0.44	10	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.02	0.02								
32	0.5	11	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03							
28	0.55	12	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03						
24	0.65	12	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.03						
20	0.78	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.03				
18	0.88	17	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	
16	0.99	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03

Application of Parallel Pipe / Tapered Pipe Thread

Parallel Pipe : G(PF), Rp(PS)

Nominal Thread Symbol (Previous Symbol)	TPI	Internal Thread (G,Rp) Insert	Bore Dia.	Same Root's Radius
G1/16 (-)	28	**EZTR 060050-55-008**	6.56	0.12
G1/8 (PF1/8)		**080070-55-008**	8.57	
G1/4 (PF1/4)	19	**EZTR 080070-55-008**	11.45	0.18
G3/8 (PF3/8)			14.95	

Tapered Pipe : R, Rc(PT)(BSPT)

Nominal Thread Symbol (Previous Symbol)	TPI	Internal Thread (Rc) Insert	Bore Dia.	Same Root's Radius
R1/16,Rc1/16 (-)	28	**EZTR 060050-55-008**	-	0.12
R1/8,Rc1/8 (PT1/8)		**080070-55-008**	-	
R1/4,Rc1/4 (PT1/4)	19	**EZTR 080070-55-008**	-	0.18
R3/8,Rc3/8 (PT3/8)			-	

· When using "EZT type" for Parallel Pipe / Tapered Pipe threading, thread's corners become sharp edged due to its partial profile, and the shape will not be the same as the standard shape for Parallel Pipe / Tapered Pipe.

Depth of Cut & Number of Passes (Parallel Pipe / Tapered Pipe)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass	18Pass
28	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03						
19	0.95	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03

Application of American National Tapered Pipe Thread (NPT)

Nominal Thread	TPI	Internal Thread Toolholder	Insert Partial Profile	Insert Full Profile
1/16 NPT 1/8 NPT	27	No Tools Available		
1/4 NPT 3/8 NPT	18	**EZH** sleeve	**EZTR060050-60-004** **EZTR070060-60-004**	-
1/2 NPT 3/4 NPT	14	**EZH** sleeve	**EZTR070060-60-004**	-
1/2 NPT	14	**SINR1616S-16**	-	**16IR14NPT**
3/4 NPT		**SINR2016S-16**		

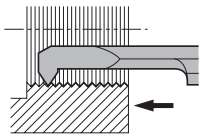
• Application of NPTF Thread
NPTF is the thread for sealing pipes without using any sealing material.
Thread symbol is similar to NPT but the Tolerance is different from that of NPT, therefore the above Inserts are not available for NPTF.

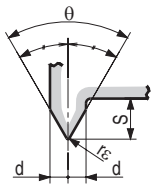
Depth of Cut & Number of Passes (American National Tapered Pipe)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass	18Pass	19Pass
18	1.23	16	0.18	0.14	0.12	0.12	0.10	0.09	0.08	0.08	0.07	0.06	0.05	0.04	0.03	0.03	0.02	0.02			
14	1.56	19	0.18	0.16	0.14	0.14	0.12	0.10	0.09	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.02

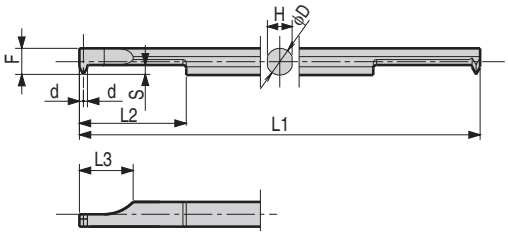
2-Edge Tip-Bars for Micro Internal Threading

HPT (Micro Internal Threading)





Detail of edge



• Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)									Insert Grades		Applicable Thread			
												PVD Coated Carbide	Carbide	Metric		Unified	
		φA	φD	H	L1	L2	L3	F	S	d	rε	θ	PR930	KW10	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)
HPTR	04504-60-005	4.5	4	3.7	60	16	8	3.9	1.3	0.6	$0.05^{+0}_{-0.02}$	60°	●	●	M6 and over	P0.75 ~ P1.25	1/4-20UNC 1/4-28UNF and over	28 ~ 20
	06005-60-005	6	5	4.6	70	21		4.9	1.6	0.8			●	●	M8 and over	P0.75 ~ P1.50	5/16-18UNC 5/16-24UNF and over	24 ~ 18
	07507-60-005	7.5	7	6.4	80	26	10	6.9	2.0	1.0			●	●	M10 and over	P0.75 ~ P1.50	3/8-16UNC 3/8-24UNF and over	24 ~ 16
															Whitworth		Parallel Pipe Tapered Pipe	
HPTR	06005-55-010	6	5	4.6	70	21	8	4.9	1.6	0.8	$0.1^{+0}_{-0.02}$	55°	●	●	W10 TPI24 and over	24 ~ 20	G1/16 and over R1/16 and over	28
	08007-55-010	8	7	6.4	80	26	10	6.9	2.0	1.0			●	●	W11 TPI20 and over	20 ~ 18	G1/8 and over R1/8 and over	28,19

· For American National Pipe (NPT), use HPTR..-60-005. J29

Description Table for Tip-Bars and Applicable Sleeves

Tip-Bars Description		Ref. to Page for Applicable Sleeves J25	
HPTR	04504-60-005	EZH	04·····
	06005-60-005		05·····
	07507-60-005		07·····
HPTR	06005-55-010	EZH	05·····
	08007-55-010		07·····

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)	
	PVD Coated Carbide	Carbide
	PR930	KW10
Carbon Steel / Alloy Steel	★ 30 ~ 100	—
Stainless Steel	★ 30 ~ 80	—
Non-ferrous Metals	—	★ ~ 300

★: 1st Recommendation

<Note>
1) The standard cutting speed is Vc=30~50m/min. The table feed may not follow the expected conditions when machining small diameter workpieces at high speeds.
2) Coolant is recommended.

Depth of Cut & Number of Passes (Metric : M)

Pitch (mm)	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass
0.75	0.44	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03							
1.00	0.60	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03					
1.25	0.76	14	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03			
1.50	0.92	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03

Depth of Cut & Number of Passes (Whitworth : W)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass
24	0.65	13	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03				
20	0.81	15	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03		
18	0.91	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03

Depth of Cut & Number of Passes (Unified : UN, UNC, UNF, UNEF)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass	18Pass
28	0.54	12	0.07	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03						
24	0.64	12	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.03						
20	0.77	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03				
18	0.87	17	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03	
16	0.98	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03

Tip-Bars are sold in 1 piece boxes.

●: Std. Item

Application of Parallel Pipe / Tapered Pipe Thread

Parallel Pipe : G(PF), Rp(PS)

Nominal Thread Symbol (Previous Symbol)	TPI	Internal Thread (G,Rp) Insert		Bore Dia.	Same Root's Radius
G1/16 (-)	28	**HPTR**	**06005-55-010**	6.56	0.12
G1/8 (PF1/8)			**08007-55-010**	8.57	
G1/4 (PF1/4)	19	**HPTR**	**08007-55-010**	11.45	0.18
G3/8 (PF3/8)				14.95	

Tapered Pipe : R, Rc(PT)(BSPT)

Nominal Thread Symbol (Previous Symbol)	TPI	Internal Thread (Rc) Insert		Bore Dia.	Same Root's Radius
R1/16,Rc1/16 (-)	28	**HPTR**	**06005-55-010**	-	0.12
R1/8,Rc1/8 (PT1/8)			**08007-55-010**	-	
R1/4,Rc1/4 (PT1/4)	19	**HPTR**	**08007-55-010**	-	0.18
R3/8,Rc3/8 (PT3/8)				-	

· When using "HPT type" for Parallel Pipe / Tapered Pipe threading, thread's corners become sharp edged due to its partial profile, and the shape will not be the same as the standard shape for Parallel Pipe / Tapered Pipe.

Depth of Cut & Number of Passes (Parallel Pipe / Tapered Pipe)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass	18Pass
28	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03						
19	0.95	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03

Application of American National Tapered Pipe Thread (NPT)

Nominal Thread	TPI	Internal Thread Toolholder	Insert Partial Profile	Insert Full Profile
1/16 NPT 1/8 NPT	27	No Tools Available		
1/4 NPT 3/8 NPT	18	**EZH** sleeve (Ref. to Page **J25**)	**HPTR06005-60-005** **HPTR07507-60-005**	-
1/2 NPT 3/4 NPT	14	**EZH** sleeve (Ref. to Page **J25**)	**HPTR07507-60-005**	-
1/2 NPT	14	**SINR1616S-16**	-	**16IR14NPT**
3/4 NPT		**SINR2016S-16**		

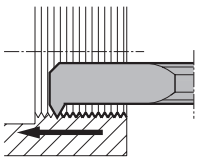
· Application of NPTF Thread
NPTF is the thread for sealing pipes without using any sealing material.
Thread symbol is similar to NPT but the Tolerance is different from that of NPT, therefore the above Inserts are not available for NPTF.

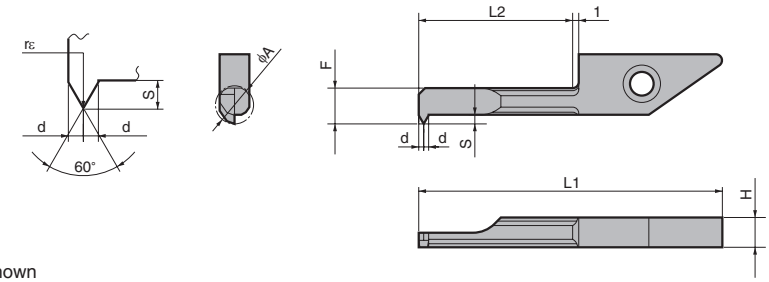
Depth of Cut & Number of Passes (American National Tapered Pipe)

TPI	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass	18Pass	19Pass
18	1.23	16	0.18	0.14	0.12	0.12	0.10	0.09	0.08	0.08	0.07	0.06	0.05	0.04	0.03	0.03	0.02	0.02			
14	1.56	19	0.18	0.16	0.14	0.14	0.12	0.10	0.09	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.02

Tip-Bars for Micro Threading

VNT (System Tip-Bars)





• Right-hand shown

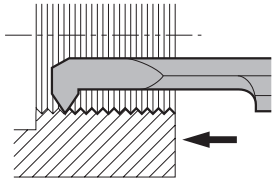
Dimensions

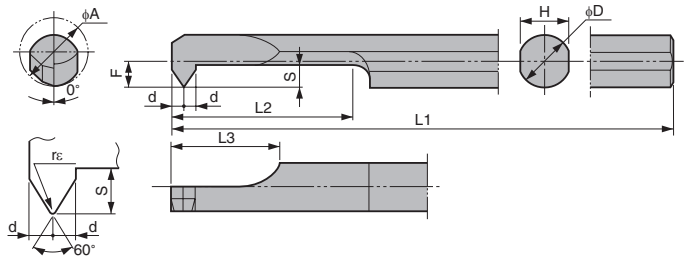
Description		Min. Bore Dia.	Dimension(mm)								Insert Grades			Applicable Thread			
											MEGA COAT	PVD Coated Carbide	Carbide	Metric		Unified	
		φA	H	L1	L2	F	S	d	rε		PR1225	PR930	KW10	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)
VNTR	045-11	4.5	3.9	30.8	11	3.6	1.3	0.6	+0 -0.02 0.05		●	●	●	M6 and over	P0.75 ~P1.25	1/4-20UNC, 1/4-28UNF and over	28~20
	060-11	6.0				4.6	1.6	0.8			●	●	●	M8 and over	P0.75 ~P1.50	5/16-18UNC, 5/16-24UNF and over	24~18

● For applicable Toolholder, Ref. to Page **F30** ~ **F31**.

PST-S (Tip-Bars)

This insert will be switched to EZT ➡ J24





• Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)									Insert Grades			Applicable Thread			
												Cermet	PVD Coated Carbide	Carbide	Metric		Unified	
		φA	φD	H	L1	L2	L3	F	S	d	rε	TC60M	PR930	KW10	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)
PSTR	0604-60S	4.5	3.8	3.6	60	15	8	1.7	1.6	0.8	+0.01 -0.02 0.05			○	M6 and over	P0.75 ~P1.25	1/4-20UNC, 1/4-28UNF and over	28~20
	0805-70S	6.0	4.8	4.4	70	20		2.2	2.1	1.0				○	M8 and over	P0.75 ~P1.50	5/16-18UNC, 5/16-24UNF and over	24~18

● For Applicable Sleeves, Ref. to Page **F84**.

◆ Depth of Cut & Number of Passes (Metric : M)

Pitch (mm)	Total ap (mm)	No. of Passes	1Pass	2Pass	3Pass	4Pass	5Pass	6Pass	7Pass	8Pass	9Pass	10Pass	11Pass	12Pass	13Pass	14Pass	15Pass	16Pass	17Pass
0.75	0.44	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03							
1.00	0.60	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03					
1.25	0.76	14	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03			
1.50	0.92	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03

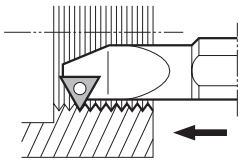
<Note>1) The standard cutting speed is Vc=30~50m/min. The table feed may not follow the expected conditions when machining small diameter workpieces at high speeds.
2) Coolant is recommended.

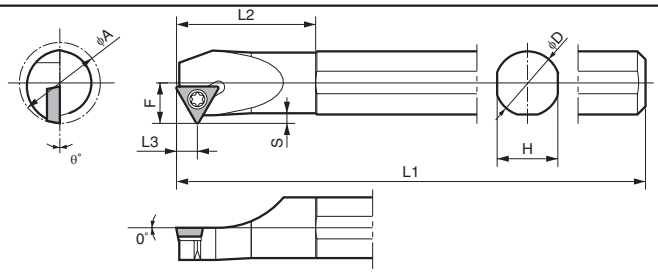
Tip-Bars are sold in 1 piece boxes.

System Tip-Bars are sold in 5 piece boxes.

● : Std. Item ○ : Check Availability

S···STWP

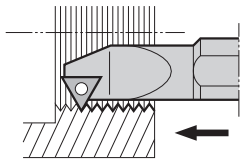


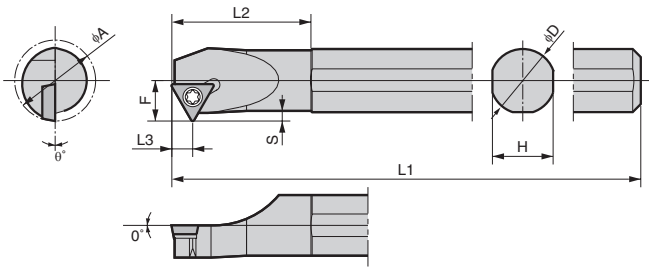


• Right-hand shown

This Tool can also be used as a boring bar.

S···STWP-E Excellent Bar





• Right-hand shown

This Tool can also be used as a boring bar.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. φA	Dimension (mm) φD	H	L1	L2	L3	F	S	Available Pitch (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10M-STWPR11-12	●		12	10	9.2	150	23	5.5	6	1.0	1.5 and under	SB-3STR	FT-10
S12M-STWPR11-16	●		16	12	11	150	30		8	1.5	2.0 and under		
S16Q-STWPR11-20	●		20	16	15	180	35		10	2.0	3.0 and under	SB-3TR	
S20R-STWPR11-25	●		25	20	19	200	40		12.5	2.5	3.5 and under		
S10M-STWP R/L11-12E	●	●	12	10	9.2	150	23	5.5	6	1.0	1.5 and under	SB-3STR	FT-10
S12M-STWP R/L11-16E	●	●	16	12	11	150	30		8	1.5	2.0 and under		
S16R-STWP R/L11-20E	●	●	20	16	15	200	35		10	2.0	3.0 and under	SB-3TR	
S20X-STWP R/L11-25E	●	●	25	20	19	220	40		12.5	2.5	3.5 and under		

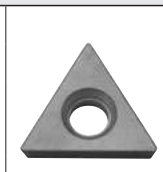
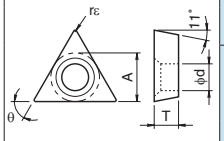
・Dimension S: shows the Max. available ap.

Applicable Inserts

(mm)

Description	A	T	φd
TPGB1102···	6.35	2.38	3.5
TPGB1103···	6.35	3.18	3.3

					Classification of usage
P	Carbon Steel / Alloy Steel		●		●: 1st Choice
M	Stainless Steel				○: 2nd Choice
K	Cast Iron			●	
N	Non-ferrous Metals			●	

Insert	Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) rε			Angle θ	Cermet TN6020	Cermet TN60	Cermet PV7020 (PVD)	Carbide KW10	Applicable Toolholders	Ref. to Page for Depth of Cut & Number of Passes
Partial Profile  	**TPGB**	**1102005**	M UN	0.75~1.5 -	- 28~16	0.05			60°		●		●	···STWP R/L11-12(E)	J41
		110201	M UN	1.5 -	- 16	0.10					●		●		
	TPGB	**1103005**	M UN	0.75~3.5 -	- 28~11	0.05					●		●	···STWP R/L11-16(E)	
		110301	M UN	1.5~3.5 -	- 16~8	0.10					●		●	···STWP R/L11-20(E)	
		110302	M UN	3.0~3.5 -	- 8	0.20				●	●	●	●	···STWP R/L11-25(E)	

Recommended Cutting Conditions ➡ J32

Applicable Thread		
	M: Metric	R,Rc(PT)(BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Tapered Pipe
	G (PF): Parallel Pipe	Tr: 30° Trapezoidal

●: Std. Item

Inserts are sold in 10 piece boxes

Recommended Cutting Conditions

KTN / KTNS

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		
	Cermet	PVD Coated Carbide	Carbide
	TC60M	**PR1115**	**GW15**
Carbon Steel	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	
Alloy Steel	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	
Stainless Steel	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm and under	0.25mm and under	
Cast Iron	-	-	★ 100
First ap (Radial)			0.3mm and under
Aluminum	-	-	★ 150~400
First ap (Radial)			0.3mm and under
Brass	-	-	★ 150~300
First ap (Radial)			0.3mm and under

SIN / CIN

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		
	Cermet	PVD Coated Carbide	Carbide
	TC60M	**PR1115**	**GW15**
Carbon Steel	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	
Alloy Steel	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	
Stainless Steel	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm and under	0.25mm and under	
Cast Iron	-	-	★ 100
First ap (Radial)			0.3mm and under
Aluminum	-	-	★ 150~400
First ap (Radial)			0.3mm and under
Brass	-	-	★ 150~300
First ap (Radial)			0.3mm and under

● For 06IR / 08IR, please lower it to a figure under 40% of above condition list

KTT

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60M	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	0.3mm and under	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	0.3mm and under	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm and under	0.25mm and under	0.25mm and under	
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.3mm and under
Aluminum	-	-	-	★ 150~400
First ap (Radial)				0.3mm and under
Brass	-	-	-	★ 150~300
First ap (Radial)				0.3mm and under

S···STWP (-E)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			
	Cermet		PVD Coated Cermet	Carbide
	TN6020	**TN60**	**PV7020**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.25mm and under	0.25mm and under	0.25mm and under	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.25mm and under	0.25mm and under	0.25mm and under	
Stainless Steel	-	-	-	-
First ap (Radial)				
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.25mm and under
Aluminum	-	-	-	★ 150~400
First ap (Radial)				0.25mm and under
Brass	-	-	-	★ 150~300
First ap (Radial)				0.25mm and under

KTTX / S-KTTX

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60M	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	0.3mm and under	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	0.3mm and under	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm and under	0.25mm and under	0.25mm and under	
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.3mm and under
Aluminum	-	-	-	★ 150~400
First ap (Radial)				0.3mm and under
Brass	-	-	-	★ 150~300
First ap (Radial)				0.3mm and under

KITG

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60M	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	0.3mm and under	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm and under	0.3mm and under	0.3mm and under	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm and under	0.25mm and under	0.25mm and under	
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.3mm and under
Aluminum	-	-	-	★ 150~400
First ap (Radial)				0.3mm and under
Brass	-	-	-	★ 150~300
First ap (Radial)				0.3mm and under

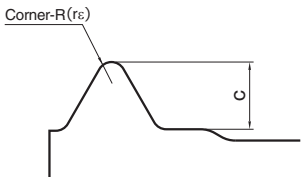
★ :1st Recommendation ☆ :2nd Recommendation

- Coolant is recommended.
- In case of using cermet insert, honing the edge with hand lapper enables higher stability.
- In case of threading stainless steel, please set two to three passes more than previous description of <Depth of Cut & Number of Passes>.

Depth of Cut & Number of Passes

Cautions for Usage of Full Profile Insert.

1) Max. ap is based on the value of 0.05~0.08mm
2) Finishing ap should be 0.02~0.05mm.
3) Prepare chamfering for C0.3~C0.5 to the workpiece to prevent the insert cracking during the 1st pass.
4) Coolant is recommended.



11 / 16 / 22 (Full Profile) type

(ap shows the value of radial ap)

Type		Pitch / TPI (mm / TPI)	Description	C (mm)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric	External Thread	1.00mm	16ER 100ISO-TF	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05														
		1.25mm	125ISO-TF	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05													
		1.50mm	150ISO-TF	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05													
		1.75mm	175ISO-TF	1.11	1.19	8	0.26	0.22	0.19	0.16	0.13	0.10	0.08	0.05											
		2.00mm	200ISO-TF	1.27	1.35	10	0.26	0.21	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05									
		2.50mm	250ISO-TF	1.57	1.65	12	0.26	0.23	0.21	0.18	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05							
		3.00mm	300ISO-TF	1.87	1.95	14	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.02					
		0.50mm	16E R/L 050ISO	0.33	0.38	4	0.14	0.12	0.08	0.04															
		0.75mm	075ISO	0.48	0.53	5	0.17	0.14	0.10	0.08	0.04														
		1.00mm	100ISO	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05														
		1.25mm	125ISO	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05													
		1.50mm	150ISO	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05													
		2.00mm	200ISO	1.27	1.35	10	0.26	0.21	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05									
		2.50mm	250ISO	1.57	1.65	12	0.26	0.23	0.21	0.18	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05							
		3.00mm	22ER 300ISO	1.87	1.95	14	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.02					
		3.50mm	350ISO	2.18	2.26	15	0.28	0.25	0.22	0.20	0.20	0.18	0.16	0.15	0.15	0.12	0.10	0.10	0.08	0.05	0.02				
		4.00mm	400ISO	2.48	2.56	17	0.28	0.25	0.24	0.22	0.20	0.18	0.16	0.15	0.15	0.14	0.12	0.12	0.10	0.10	0.08	0.05	0.02		
		4.50mm	450ISO	2.79	2.87	18	0.30	0.28	0.26	0.24	0.22	0.20	0.18	0.16	0.16	0.14	0.14	0.13	0.12	0.10	0.10	0.07	0.05	0.02	
		5.00mm	500ISO	3.10	3.18	19	0.30	0.28	0.27	0.26	0.23	0.20	0.18	0.18	0.17	0.16	0.16	0.15	0.15	0.13	0.12	0.10	0.07	0.05	0.02
	Internal Thread	1.00mm	11IR 100ISO-TF	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO-TF	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO-TF	0.88	0.96	8	0.24	0.18	0.14	0.10	0.10	0.08	0.07	0.05											
		1.75mm	175ISO-TF	1.02	1.10	9	0.24	0.18	0.16	0.14	0.10	0.10	0.08	0.05	0.05										
		0.50mm	11I R/L 050ISO	0.31	0.36	4	0.14	0.10	0.08	0.04															
		0.75mm	075ISO	0.45	0.50	5	0.15	0.14	0.10	0.07	0.04														
		1.00mm	100ISO	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO	0.88	0.96	8	0.24	0.18	0.14	0.10	0.10	0.08	0.07	0.05											
		1.75mm	175ISO	1.02	1.10	9	0.24	0.18	0.16	0.14	0.10	0.10	0.08	0.05	0.05										
		2.00mm	200ISO	1.18	1.26	10	0.24	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05									
		1.00mm	16IR 100ISO-TF	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO-TF	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO-TF	0.88	0.96	8	0.22	0.18	0.14	0.12	0.10	0.08	0.07	0.05											
		1.75mm	175ISO-TF	1.02	1.10	9	0.22	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05										
		2.00mm	200ISO-TF	1.18	1.26	10	0.24	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05									
		2.50mm	250ISO-TF	1.46	1.54	12	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.05							
		3.00mm	300ISO-TF	1.76	1.84	14	0.26	0.24	0.21	0.18	0.16	0.15	0.13	0.12	0.10	0.10	0.07	0.05	0.05	0.02					
		1.00mm	16I R/L 100ISO	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO	0.88	0.96	8	0.22	0.18	0.14	0.12	0.10	0.08	0.07	0.05											
		2.00mm	200ISO	1.18	1.26	10	0.24	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05									
		2.50mm	250ISO	1.46	1.54	12	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.05							
		3.00mm	300ISO	1.76	1.84	14	0.26	0.24	0.21	0.18	0.16	0.15	0.13	0.12	0.10	0.10	0.07	0.05	0.05	0.02					
		3.00mm	22IR 300ISO	1.76	1.84	14	0.26	0.24	0.21	0.18	0.16	0.15	0.13	0.12	0.10	0.10	0.07	0.05	0.05	0.02					
		3.50mm	350ISO	2.05	2.13	15	0.26	0.24	0.22	0.20	0.17	0.17	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.05	0.02				
		4.00mm	400ISO	2.34	2.42	17	0.26	0.24	0.22	0.20	0.18	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.10	0.10	0.05	0.05	0.02		
		4.50mm	450ISO	2.63	2.71	18	0.26	0.25	0.24	0.22	0.22	0.20	0.18	0.17	0.15	0.13	0.13	0.12	0.12	0.10	0.10	0.05	0.05	0.02	
		5.00mm	500ISO	2.92	3.00	19	0.28	0.26	0.24	0.22	0.20	0.20	0.18	0.18	0.16	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.10	0.05	0.02
Unified	External Thread	24 TPI	16ER 24UN-TF	0.67	0.75	5	0.24	0.20	0.16	0.10	0.05														
		20 TPI	20UN-TF	0.80	0.88	6	0.24	0.20	0.16	0.13	0.10	0.05													
		18 TPI	18UN-TF	0.89	0.97	6	0.26	0.22	0.18	0.15	0.11	0.05													
		16 TPI	16UN-TF	1.01	1.09	7	0.26	0.22	0.18	0.15	0.12	0.11	0.05												
		14 TPI	14UN-TF	1.15	1.23	8	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.05											
		13 TPI	13UN-TF	1.24	1.32	9	0.26	0.22	0.18	0.16	0.14	0.12	0.11	0.08	0.05										
		12 TPI	12UN-TF	1.34	1.42	11	0.26	0.22	0.18	0.16	0.13	0.12	0.10	0.08	0.07	0.05	0.05								
		10 TPI	10UN-TF	1.59	1.67	12	0.26	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.07	0.05	0.05							
		8 TPI	08UN-TF	1.98	2.06	14	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.08	0.05	0.05					
		24 TPI	16ER 24UN	0.67	0.75	5	0.24	0.20	0.16	0.10	0.05														
		20 TPI	20UN	0.80	0.88	6	0.24	0.20	0.16	0.13	0.10	0.05													
		18 TPI	18UN	0.89	0.97	6	0.26	0.22	0.18	0.15	0.11	0.05													
		16 TPI	16UN	1.01	1.09	7	0.26	0.22	0.18	0.15	0.12	0.11	0.05												
		14 TPI	14UN	1.15	1.23	8	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.05											
		12 TPI	12UN	1.34	1.42	11	0.26	0.22	0.18	0.16	0.13	0.12	0.10	0.08	0.07	0.05	0.05								
		8 TPI	22ER 08UN	1.98	2.06	15	0.30	0.26	0.22	0.20	0.16	0.15	0.14	0.13	0.10	0.10	0.10	0.07	0.06	0.05	0.02				
	Internal Thread	24 TPI	16IR 24UN-TF	0.62	0.70	5	0.22	0.19	0.15	0.10	0.04														
		20 TPI	20UN-TF	0.75	0.83	6	0.22	0.20	0.16	0.12	0.08	0.05													
		18 TPI	18UN-TF	0.83	0.91	6	0.24	0.20	0.18	0.14	0.10	0.05													
		16 TPI	16UN-TF	0.94	1.02	7	0.24	0.20	0.18	0.14	0.11	0.10	0.05												
		14 TPI	14UN-TF	1.07	1.15	8	0.24	0.22	0.18	0.14	0.12	0.10	0.10	0.05											
		13 TPI	13UN-TF	1.15	1.23	9	0.24	0.22	0.18	0.14	0.12	0.10	0.10	0.08	0.05										
		12 TPI	12UN-TF	1.24	1.32	11	0.24	0.22	0.16	0.15	0.12	0.10	0.10	0.07	0.07	0.05	0.04								
		10 TPI	10UN-TF	1.48	1.56	12	0.24	0.22	0.20	0.16	0.15	0.12	0.12	0.10	0.09	0.07	0.05	0.04							
		8 TPI	08UN-TF	1.86	1.94	14	0.24	0.22	0.20	0.18	0.16	0.16	0.14	0.14	0.12	0.12	0.10	0.07	0.05	0.04					
		24 TPI	16IR 24UN	0.62	0.70	5	0.22	0.19	0.15	0.10	0.04														
		20 TPI	20UN	0.75	0.83	6	0.22	0.20	0.16	0.12	0.08	0.05													
		18 TPI	18UN	0.83	0.91	6	0.24	0.21	0.17	0.14	0.10	0.05													
		16 TPI	16UN	0.94	1.02	7	0.24	0.20	0.18	0.14	0.11	0.10	0.05												
		14 TPI	14UN	1.07	1.15	8	0.24	0.22	0.18	0.14	0.12	0.10	0.10	0.05											
		12 TPI	12UN	1.24	1.32	11	0.24	0.22	0.16	0.15	0.12	0.10	0.10	0.07	0.07	0.05	0.04								
		8 TPI	22IR 08UN	1.84	1.92	15	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.10	0.10	0.09	0.05	0.05	0.02				

Depth of Cut & Number of Passes

11 / 16 (Full Profile) type

(ap shows the value of radial ap)

Type		Pitch / TPI (mm / TPI)	Description	C (mm)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Parallel Pipe	External Thread	19 TPI	16ER 19W-TF	0.89	0.97	6	0.27	0.22	0.18	0.15	0.10	0.05													
		14 TPI	14W-TF	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	19 TPI	16IR 19W-TF	0.88	0.96	6	0.25	0.21	0.20	0.15	0.10	0.05													
		14 TPI	14W-TF	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
Whitworth	External Thread	16 TPI	16ER 16W-TF	1.05	1.13	8	0.25	0.21	0.18	0.16	0.12	0.08	0.08	0.05											
		14 TPI	14W-TF	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	16 TPI	16IR 16W-TF	1.05	1.13	8	0.25	0.21	0.18	0.16	0.12	0.08	0.08	0.05											
		14 TPI	14W-TF	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
Tapered Pipe	External Thread	28 TPI	16ER 28BSPT-TF	0.58	0.63	5	0.20	0.15	0.13	0.11	0.04														
		19 TPI	19BSPT-TF	0.86	0.94	6	0.26	0.20	0.18	0.15	0.10	0.05													
		14 TPI	14BSPT-TF	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT-TF	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
		28 TPI	16ER 28BSPT	0.58	0.63	5	0.20	0.15	0.13	0.11	0.04														
		19 TPI	19BSPT	0.86	0.94	6	0.26	0.20	0.18	0.15	0.10	0.05													
		14 TPI	14BSPT	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	28 TPI	11IR 28BSPT-TF	0.58	0.63	5	0.20	0.16	0.13	0.10	0.04														
		19 TPI	19BSPT-TF	0.86	0.94	7	0.22	0.20	0.18	0.14	0.10	0.06	0.04												
		14 TPI	14BSPT-TF	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		28 TPI	11IR 28BSPT	0.58	0.63	5	0.20	0.16	0.13	0.10	0.04														
		19 TPI	19BSPT	0.86	0.94	7	0.22	0.20	0.18	0.14	0.10	0.06	0.04												
		14 TPI	14BSPT	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		14 TPI	16IR 14BSPT-TF	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT-TF	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
		14 TPI	16IR 14BSPT	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
American National Tapered Pipe	External Thread	18 TPI	16ER 18NPT	1.14	1.22	13	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.05	0.04	0.02						
		14 TPI	14NPT	1.46	1.54	15	0.20	0.18	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.04	0.02				
		11.5 TPI	11.5NPT	1.77	1.85	16	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.04	0.02			
	Internal Thread	18 TPI	16IR 18NPT	1.14	1.22	13	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.05	0.04	0.02						
		14 TPI	14NPT	1.46	1.54	15	0.20	0.18	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.04	0.02				
		11.5 TPI	11.5NPT	1.77	1.85	16	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.04	0.02			

60° / 55° (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI (mm / TPI)	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric	External Thread	0.5mm	16ER A60-TF	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
			AG60-TF	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
		0.75mm	16ER A60-TF	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
			AG60-TF	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
		1.00mm	16ER A60-TF	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
			AG60-TF	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
		1.25mm	16ER A60-TF	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
			AG60-TF	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
		1.50mm	16ER A60-TF	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG60-TF	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		1.75mm	16ER G60-TF	0.22	1.11	8	0.24	0.20	0.18	0.16	0.13	0.10	0.06	0.04											
			AG60-TF	0.06	1.27	11	0.22	0.20	0.18	0.13	0.11	0.09	0.09	0.08	0.07	0.06	0.04								
		2.00mm	16ER G60-TF	0.22	1.30	10	0.24	0.20	0.18	0.16	0.14	0.12	0.09	0.07	0.06	0.04										
			AG60-TF	0.06	1.46	11	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.04								
		2.50mm	16ER G60-TF	0.22	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.06	0.04							
			AG60-TF	0.06	1.84	13	0.25	0.22	0.20	0.19	0.17	0.16	0.14	0.11	0.10	0.09	0.09	0.07	0.05						
		3.00mm	16ER G60-TF	0.22	2.05	14	0.25	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
			AG60-TF	0.06	2.22	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				
		0.5mm	16ER A60	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
			AG60	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
		0.75mm	16ER A60	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
			AG60	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
		1.00mm	16ER A60	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
			AG60	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
		1.25mm	16ER A60	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
			AG60	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
		1.50mm	16ER A60	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG60	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		1.75mm	16ER G60	0.22	1.11	8	0.24	0.20	0.18	0.16	0.13	0.10	0.06	0.04											
			AG60	0.06	1.27	11	0.22	0.20	0.18	0.13	0.11	0.09	0.09	0.08	0.07	0.06	0.04								
		2.00mm	16ER G60	0.22	1.30	10	0.24	0.20	0.18	0.16	0.14	0.12	0.09	0.07	0.06	0.04										
			AG60	0.06	1.46	11	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.04								
		2.50mm	16ER G60	0.22	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.06	0.04							
			AG60	0.06	1.84	13	0.25	0.22	0.20	0.19	0.17	0.16	0.14	0.11	0.10	0.09	0.09	0.07	0.05						
		3.00mm	16ER G60	0.22	2.05	14	0.25	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
			AG60	0.06	2.22	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				

60° / 55° (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI (mm / TPI)	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric	External Thread	3.50mm	22ER N60	0.48	2.17	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.05				
		4.00mm			2.55	17	0.28	0.26	0.24	0.22	0.20	0.18	0.17	0.16	0.14	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05		
		4.50mm			2.93	18	0.30	0.28	0.26	0.25	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05	
		5.00mm			3.31	19	0.30	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.09	0.08	0.07	0.06	0.05
	Internal Thread	0.75mm	06IR 60005	0.05	0.44	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03									
		1.00mm	06IR 60005	0.05	0.60	12	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.04	0.03							
			08IR 60007	0.07	0.58	12	0.07	0.06	0.06	0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.03	0.03							
		1.25mm	06IR 60005	0.05	0.76	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03					
			08IR 60007	0.07	0.74	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03					
		1.5mm	08IR 60007	0.07	0.90	17	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03		
		1.75mm		0.07	1.07	19	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03
		0.50mm	11IR A60	0.02	0.30	5	0.08	0.07	0.06	0.05	0.04														
		1.00mm			0.63	6	0.16	0.14	0.12	0.10	0.07	0.04													
		1.50mm			0.95	9	0.18	0.16	0.13	0.12	0.10	0.08	0.08	0.06	0.04										
		0.5mm	16IR A60	0.02	0.30	5	0.08	0.07	0.06	0.05	0.04														
			AG60	0.02	0.30	5	0.08	0.07	0.06	0.05	0.04														
		0.75mm	16IR A60	0.02	0.47	6	0.12	0.10	0.08	0.07	0.06	0.04													
			AG60	0.02	0.47	6	0.12	0.10	0.08	0.07	0.06	0.04													
		1.00mm	16IR A60	0.02	0.63	6	0.16	0.14	0.12	0.10	0.07	0.04													
			AG60	0.02	0.63	6	0.16	0.14	0.12	0.10	0.07	0.04													
		1.25mm	16IR A60	0.02	0.79	7	0.16	0.15	0.14	0.13	0.10	0.07	0.04												
			AG60	0.02	0.79	7	0.16	0.15	0.14	0.13	0.10	0.07	0.04												
		1.50mm	16IR A60	0.02	0.95	9	0.18	0.16	0.13	0.12	0.10	0.08	0.08	0.06	0.04										
			AG60	0.02	0.95	9	0.18	0.16	0.13	0.12	0.10	0.08	0.08	0.06	0.04										
		1.75mm	16IR G60	0.11	1.03	9	0.20	0.17	0.15	0.13	0.11	0.10	0.08	0.05	0.04										
			AG60	0.02	1.12	10	0.20	0.18	0.16	0.13	0.12	0.10	0.08	0.06	0.05	0.04									
		2.00mm	16IR G60	0.11	1.19	10	0.20	0.18	0.17	0.15	0.13	0.11	0.08	0.07	0.06	0.04									
			AG60	0.02	1.28	12	0.20	0.17	0.15	0.13	0.12	0.11	0.10	0.09	0.07	0.06	0.04	0.04							
		2.50mm	16IR G60	0.11	1.51	14	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05	0.04	0.02					
			AG60	0.02	1.60	16	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05	0.05	0.04	0.04	0.02			
		3.00mm	16IR G60	0.11	1.84	16	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.10	0.10	0.08	0.07	0.06	0.04	0.02			
			AG60	0.02	1.93	18	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.13	0.12	0.10	0.10	0.08	0.07	0.06	0.05	0.04	0.03	0.02	
		3.50mm	22IR N60	0.22	2.05	14	0.26	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.08	0.06	0.05					
		4.00mm			2.38	16	0.26	0.24	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05			
		4.50mm			2.70	18	0.26	0.24	0.23	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05	
		5.00mm			3.03	19	0.30	0.27	0.25	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05
Unified	External Thread	48 TPI	16ER A60-TF	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
			AG60-TF	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
		24 TPI	16ER A60-TF	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
			AG60-TF	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
		20 TPI	16ER A60-TF	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
			AG60-TF	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
		18 TPI	16ER A60-TF	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			AG60-TF	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
		16 TPI	16ER A60-TF	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
			AG60-TF	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
		14 TPI	16ER G60-TF	0.22	1.15	9	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.07	0.05										
			AG60-TF	0.06	1.32	11	0.22	0.20	0.18	0.15	0.13	0.10	0.09	0.08	0.07	0.06	0.04								
		13 TPI	16ER G60-TF	0.22	1.26	9	0.24	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05										
			AG60-TF	0.06	1.43	11	0.25	0.23	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G60-TF	0.22	1.38	10	0.25	0.22	0.20	0.17	0.15	0.12	0.10	0.07	0.06	0.04									
			AG60-TF	0.06	1.55	12	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.09	0.07	0.06	0.04							
		10 TPI	16ER G60-TF	0.22	1.71	12	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.06	0.05							
			AG60-TF	0.06	1.87	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
		9 TPI	16ER G60-TF	0.22	1.92	13	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
			AG60-TF	0.06	2.08	14	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
		8 TPI	16ER G60-TF	0.22	2.19	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
			AG60-TF	0.06	2.35	16	0.30	0.25	0.23	0.20	0.18	0.17	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.05	0.05			
		48 TPI	16ER A60	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
			AG60	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
		24 TPI	16ER A60	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
			AG60	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
		20 TPI	16ER A60	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
			AG60	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
		18 TPI	16ER A60	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			AG60	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
		16 TPI	16ER A60	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
			AG60	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
		14 TPI	16ER G60	0.22	1.15	9	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.07	0.05										
			AG60	0.06	1.32	11	0.22	0.20	0.18	0.15	0.13	0.10	0.09	0.08	0.07	0.06	0.04								
		13 TPI	16ER G60	0.22	1.26	9	0.24	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05										
			AG60	0.06	1.43	11	0.25	0.23	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G60	0.22	1.38	10	0.25	0.22	0.20	0.17	0.15	0.12	0.10	0.07	0.06	0.04									
			AG60	0.06	1.55	12	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.09	0.07	0.06	0.04							
		10 TPI	16ER G60	0.22	1.71	12	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.06	0.05							
			AG60	0.06	1.87	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
		9 TPI	16ER G60	0.22	1.92	13	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
			AG60	0.06	2.08	14	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
		8 TPI	16ER G60	0.22	2.19	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
			AG60	0.06	2.35	16	0.30	0.25	0.23	0.20	0.18	0.17	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.05	0.05			
		7 TPI	22ER N60	0.48	2.27	15	0.27	0.25	0.24	0.23	0.20	0.18	0.15	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05				
		6 TPI			2.73	18	0.27	0.25	0.23	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.10	0.10	0.08	0.06	0.05	
		5 TPI			3.37	19	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.09	0.08	0.07	0.06	0.05
	Internal Thread	28 TPI	06IR 60005	0.05	0.54	12	0.07	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03							
		24 TPI		0.05	0.64	12	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.03							
		20 TPI	06IR 60005	0.05	0.77	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03					
			08IR 60007	0.07	0.75	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.03	0.03					

Depth of Cut & Number of Passes

60° / 55° (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI (mm / TPI)	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Unified	Internal Thread	18 TPI	08IR 60007	0.07	0.85	17	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03		
		16 TPI	08IR 60007	0.07	0.96	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	
		48 TPI	11IR A60	0.02	0.32	5	0.08	0.07	0.07	0.06	0.04														
		24 TPI			0.67	7	0.14	0.13	0.12	0.10	0.08	0.06	0.04												
		20 TPI			0.8	8	0.14	0.13	0.12	0.12	0.11	0.08	0.06	0.04											
		18 TPI			0.9	9	0.15	0.14	0.13	0.12	0.11	0.08	0.07	0.06	0.04										
		16 TPI			1.01	10	0.15	0.14	0.13	0.12	0.12	0.10	0.08	0.07	0.06	0.04									
		48 TPI	16IR A60	0.02	0.32	5	0.08	0.07	0.07	0.06	0.04														
			AG60	0.02	0.32	5	0.08	0.07	0.07	0.06	0.04														
		24 TPI	16IR A60	0.02	0.67	7	0.14	0.13	0.12	0.10	0.08	0.06	0.04												
			AG60	0.02	0.67	7	0.14	0.13	0.12	0.10	0.08	0.06	0.04												
		20 TPI	16IR A60	0.02	0.80	8	0.14	0.13	0.12	0.12	0.11	0.08	0.06	0.04											
			AG60	0.02	0.80	8	0.14	0.13	0.12	0.12	0.11	0.08	0.06	0.04											
		18 TPI	16IR A60	0.02	0.90	9	0.15	0.14	0.13	0.12	0.11	0.08	0.07	0.06	0.04										
			AG60	0.02	0.90	9	0.15	0.14	0.13	0.12	0.11	0.08	0.07	0.06	0.04										
		16 TPI	16IR A60	0.02	1.01	10	0.15	0.14	0.13	0.12	0.12	0.10	0.08	0.07	0.06	0.04									
			AG60	0.02	1.01	10	0.15	0.14	0.13	0.12	0.12	0.10	0.08	0.07	0.06	0.04									
		14 TPI	16IR G60	0.11	1.07	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.04										
			AG60	0.02	1.16	11	0.15	0.14	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.06	0.04								
		13 TPI	16IR G60	0.11	1.16	10	0.20	0.18	0.16	0.14	0.12	0.11	0.08	0.07	0.06	0.04									
			AG60	0.02	1.25	12	0.18	0.16	0.15	0.13	0.12	0.11	0.10	0.09	0.07	0.06	0.04	0.04							
		12 TPI	16IR G60	0.11	1.26	11	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.08	0.06	0.05	0.04								
			AG60	0.02	1.35	13	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.04	0.04						
		10 TPI	16IR G60	0.11	1.54	14	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.06	0.05	0.04	0.02					
			AG60	0.02	1.63	16	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.06	0.05	0.05	0.04	0.04	0.02			
		9 TPI	16IR G60	0.11	1.72	16	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.04	0.02			
			AG60	0.02	1.81	17	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.11	0.10	0.10	0.08	0.07	0.06	0.05	0.03	0.02		
		8 TPI	16IR G60	0.11	1.95	17	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.03	0.02		
			AG60	0.02	2.04	19	0.20	0.19	0.18	0.17	0.15	0.14	0.14	0.13	0.13	0.11	0.10	0.09	0.07	0.06	0.05	0.04	0.04	0.03	0.02
		7 TPI	22IR N60	0.22	2.14	14	0.26	0.24	0.23	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.07	0.06	0.05					
		6 TPI	22IR N60		2.53	17	0.28	0.26	0.23	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05		
		5 TPI	22IR N60		3.08	19	0.30	0.28	0.26	0.25	0.23	0.22	0.20	0.17	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.08	0.06	0.05
Parallel Pipe / Tapered Pipe	External Thread	28 TPI	16ER A55-TF	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
			AG55-TF	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	16ER A55-TF	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
			AG55-TF	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		14 TPI	16ER G55-TF	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55-TF	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		11 TPI	16ER G55-TF	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55-TF	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		28 TPI	16ER A55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
			AG55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	16ER A55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
			AG55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		14 TPI	16ER G55	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		11 TPI	16ER G55	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
	Internal Thread	28 TPI	06IR 5501	0.10	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03							
			08IR 5501																						
		19 TPI	08IR 5501	0.10	0.95	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	
		28 TPI	11IR A55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	11IR A55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		28 TPI	16IR A55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
			AG55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	16IR A55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
			AG55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		14 TPI	16IR G55	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		11 TPI	16IR G55	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
Whitworth	External Thread	48 TPI	16ER A55-TF	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
			AG55-TF	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
		24 TPI	16ER A55-TF	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
			AG55-TF	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
		20 TPI	16ER A55-TF	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
			AG55-TF	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
		18 TPI	16ER A55-TF	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG55-TF	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		16 TPI	16ER A55-TF	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
			AG55-TF	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
		14 TPI	16ER G55-TF	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55-TF	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G55-TF	0.22	1.44	10	0.24	0.22	0.20	0.18	0.15	0.12	0.12	0.09	0.07	0.05									
			AG55-TF	0.06	1.64	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.05							
		11 TPI	16ER G55-TF	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55-TF	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		10 TPI	16ER G55-TF	0.22	1.78	12	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.13	0.12	0.09	0.07	0.05							
			AG55-TF	0.06	1.98	14	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.05					
		9 TPI	16ER G55-TF	0.22	2.01	14	0.24	0.22	0.20	0.19	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.08	0.07	0.05					
			AG55-TF	0.06	2.20	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
		8 TPI	16ER G55-TF	0.22	2.29	15	0.28	0.26	0.24	0.22	0.19	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				
			AG55-TF	0.06	2.49	16	0.30	0.28	0.26	0.24	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.06	0.05			
		48 TPI	16ER A55	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
			AG55	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														

60° ·55° (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm / TPI	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Whitworth	External Thread	24 TPI	16ER A55	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
			AG55	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
		20 TPI	16ER A55	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
			AG55	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
		18 TPI	16ER A55	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG55	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		16 TPI	16ER A55	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
			AG55	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
		14 TPI	16ER G55	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G55	0.22	1.44	10	0.24	0.22	0.20	0.18	0.15	0.12	0.12	0.09	0.07	0.05									
			AG55	0.06	1.64	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.05							
		11 TPI	16ER G55	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		10 TPI	16ER G55	0.22	1.78	12	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.13	0.12	0.09	0.07	0.05							
			AG55	0.06	1.98	14	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.05					
		9 TPI	16ER G55	0.22	2.01	14	0.24	0.22	0.20	0.19	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.08	0.07	0.05					
			AG55	0.06	2.20	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
		8 TPI	16ER G55	0.22	2.29	15	0.28	0.26	0.24	0.22	0.19	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				
			AG55	0.06	2.49	16	0.30	0.28	0.26	0.24	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.06	0.05			
		7 TPI	22ER N55	0.47	2.43	16	0.30	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.10	0.09	0.08	0.06	0.05			
		6 TPI			2.92	18	0.30	0.27	0.25	0.23	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.06	0.05	
		5 TPI			3.60	21	0.30	0.28	0.27	0.26	0.25	0.24	0.22	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.11	0.10	0.09	0.07
							0.05	0.04																	
	Internal Thread	28 TPI	06IR 5501 08IR 5501	0.10	0.65	13	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03						
		19 TPI	08IR 5501	0.10	0.81	15	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03				
		24 TPI	11IR A55	0.06	0.72	7	0.16	0.14	0.12	0.10	0.08	0.07	0.05												
		20 TPI			0.87	8	0.16	0.15	0.14	0.13	0.11	0.08	0.06	0.04											
		18 TPI			0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
		16 TPI			1.10	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.05										
		24 TPI	16IR A55	0.06	0.72	7	0.16	0.14	0.12	0.10	0.08	0.07	0.05												
			AG55	0.06	0.72	7	0.16	0.14	0.12	0.10	0.08	0.07	0.05												
		20 TPI	16IR A55	0.06	0.87	8	0.16	0.15	0.14	0.13	0.11	0.08	0.06	0.04											
			AG55	0.06	0.87	8	0.16	0.15	0.14	0.13	0.11	0.08	0.06	0.04											
		18 TPI	16IR A55	0.06	0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
			AG55	0.06	0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
		16 TPI	16IR A55	0.06	1.10	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.05										
			AG55	0.06	1.10	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.05										
		14 TPI	16IR G55	0.22	1.06	8	0.21	0.19	0.17	0.15	0.12	0.10	0.07	0.05											
			AG55	0.06	1.27	11	0.20	0.18	0.17	0.15	0.13	0.10	0.09	0.08	0.07	0.06	0.04								
		12 TPI	16IR G55	0.22	1.28	9	0.22	0.20	0.19	0.17	0.15	0.13	0.10	0.08	0.04										
			AG55	0.06	1.48	11	0.24	0.22	0.20	0.18	0.16	0.13	0.11	0.09	0.06	0.05	0.04								
		11 TPI	16IR G55	0.22	1.42	10	0.24	0.22	0.20	0.18	0.15	0.12	0.10	0.09	0.07	0.05									
			AG55	0.06	1.62	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05							
		10 TPI	16IR G55	0.22	1.59	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		9 TPI	16IR G55	0.22	1.79	12	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.13	0.12	0.10	0.07	0.05							
			AG55	0.06	1.99	14	0.25	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.05					
		8 TPI	16IR G55	0.22	2.05	14	0.24	0.23	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.08	0.07	0.05					
			AG55	0.06	2.25	15	0.28	0.26	0.24	0.21	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
		7 TPI	22IR N55	0.47	2.09	14	0.24	0.23	0.22	0.20	0.19	0.17	0.15	0.14	0.13	0.12	0.10	0.08	0.07	0.05					
		6 TPI			2.53	16	0.30	0.28	0.25	0.23	0.21	0.20	0.18	0.16	0.13	0.11	0.10	0.10	0.09	0.08	0.06	0.05			
		5 TPI			3.14	19	0.30	0.28	0.27	0.26	0.24	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.12	0.11	0.10	0.10	0.08	0.06	0.05
30° Trapezoidal	External Thread	2.0mm	16ER 200TR	-	1.25	10	0.22	0.20	0.17	0.16	0.13	0.12	0.10	0.07	0.05	0.03									
		3.0mm	16ER 300TR	-	1.75	14	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.10	0.10	0.07	0.05	0.03					
		4.0mm	22ER 400TR	-	2.24	15	0.26	0.23	0.22	0.20	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03				
		5.0mm	22ER 500TR	-	2.73	17	0.28	0.26	0.24	0.22	0.21	0.20	0.19	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03		
	Internal Thread	2.0mm	16IR 200TR	-	1.25	10	0.22	0.20	0.17	0.16	0.13	0.12	0.10	0.07	0.05	0.03									
		3.0mm	16IR 300TR	-	1.75	14	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.10	0.10	0.07	0.05	0.03					
		4.0mm	22IR 400TR	-	2.24	15	0.26	0.23	0.22	0.20	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03				
		5.0mm	22IR 500TR	-	2.73	17	0.28	0.26	0.24	0.22	0.21	0.20	0.19	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03		

Corner-R(rε) Selection for Partial Profiling Insert

	External Threading	Internal Threading
Metric Unified	rε ≤ 0.1443P	rε ≤ 0.0720P
Parallel Pipe (Whitworth) Tapered Pipe	(For Both External and Internal Thread) rε ≤ 0.1373P	

rε : Corner-R P : Pitch(= $\frac{25.4}{n}$) n : TPI

- **Metric, Unified Thread**

  Corner-R(rε) at Internal Threading is almost half of that of External.

- **Parallel Pipe, Tapered Pipe, Whitworth Thread**

  Same Corner-R(rε) for both External and Internal Threading

Depth of Cut & Number of Passes

11 / 16 (60° / 55° Type, Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm / TPI	Description	Corner-R (r_ε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric (60°)	External Thread	1.00mm	16ER 6001	0.10	0.66	5	0.21	0.19	0.12	0.09	0.05														
		1.25mm	16ER 6001	0.10	0.85	6	0.25	0.21	0.15	0.12	0.07	0.05													
		1.50mm	16ER 6001	0.10	1.04	8	0.23	0.21	0.19	0.15	0.11	0.06	0.05	0.04											
			6002	0.20	0.94	7	0.23	0.20	0.18	0.14	0.10	0.05	0.04												
		1.75mm	16ER 6001	0.10	1.23	9	0.25	0.22	0.20	0.17	0.14	0.09	0.07	0.05	0.04										
			6002	0.20	1.13	8	0.25	0.22	0.20	0.16	0.14	0.07	0.05	0.04											
		2.00mm	16ER 6001	0.10	1.42	11	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
			6002	0.20	1.32	10	0.25	0.22	0.20	0.16	0.14	0.12	0.08	0.07	0.04	0.04									
		2.50mm	16ER 6001	0.10	1.79	13	0.25	0.22	0.20	0.18	0.16	0.16	0.14	0.12	0.10	0.09	0.08	0.05	0.04						
			6002	0.20	1.69	12	0.25	0.22	0.20	0.18	0.16	0.16	0.12	0.12	0.10	0.08	0.06	0.04							
	Internal Thread	0.75mm	11IR 60005	0.05	0.44	5	0.14	0.12	0.10	0.06	0.02														
		1.00mm	11IR 60005	0.05	0.60	6	0.18	0.15	0.10	0.08	0.05	0.04													
		1.25mm	11IR 60005	0.05	0.76	7	0.18	0.15	0.12	0.10	0.10	0.07	0.04												
		1.50mm	11IR 60005	0.05	0.92	9	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.06	0.04										
			16IR 6001	0.10	0.87	8	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.05											
		1.75mm	16IR 6001	0.10	1.04	9	0.20	0.18	0.15	0.12	0.12	0.10	0.08	0.05	0.04										
		2.00mm	16IR 6001	0.10	1.20	11	0.20	0.18	0.15	0.12	0.12	0.10	0.10	0.08	0.06	0.05	0.04								
		2.50mm	16IR 6001	0.10	1.52	14	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.06	0.04	0.02					
			60015	0.15	1.47	13	0.20	0.18	0.16	0.15	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.04	0.02						
Parallel Pipe / Tapered Pipe (55°)	External Thread	28 TPI	16ER 5501	0.10	0.61	5	0.20	0.16	0.12	0.08	0.05														
		19 TPI	16ER 5501	0.10	0.95	7	0.22	0.20	0.16	0.14	0.10	0.08	0.05												
		14 TPI	16ER 5501	0.10	1.34	10	0.24	0.20	0.18	0.16	0.13	0.10	0.10	0.10	0.08	0.05									
			5502	0.20	1.22	9	0.24	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	16ER 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02						
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02							
	Internal Thread	28 TPI	11IR 55005	0.05	0.67	7	0.18	0.15	0.12	0.08	0.06	0.05	0.03												
			16IR 5501	0.10	0.61	6	0.18	0.15	0.12	0.08	0.05	0.03													
		19 TPI	11IR 55005	0.05	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			16IR 5501	0.10	0.95	7	0.20	0.18	0.16	0.14	0.12	0.10	0.05												
		14 TPI	11IR 55005	0.05	1.39	11	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.05								
			16IR 5501	0.10	1.34	10	0.20	0.18	0.18	0.16	0.14	0.14	0.11	0.10	0.08	0.05									
			5502	0.20	1.22	9	0.20	0.18	0.18	0.16	0.15	0.12	0.10	0.08	0.05										
		11 TPI	16IR 5501	0.10	1.73	12	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.07	0.05							
			5502	0.20	1.62	11	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.11	0.07	0.05								
Whitworth (55°)	External Thread	24 TPI	16ER 5501	0.10	0.73	6	0.22	0.18	0.12	0.09	0.07	0.05													
		20 TPI	16ER 5501	0.10	0.90	6	0.22	0.18	0.17	0.16	0.12	0.05													
		18 TPI	16ER 5501	0.10	1.01	7	0.24	0.20	0.18	0.16	0.10	0.08	0.05												
		16 TPI	16ER 5501	0.10	1.15	9	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05										
			5502	0.20	1.04	8	0.24	0.20	0.16	0.14	0.10	0.08	0.07	0.05											
		14 TPI	16ER 5501	0.10	1.34	10	0.24	0.20	0.18	0.16	0.13	0.10	0.10	0.10	0.08	0.05									
			5502	0.20	1.22	9	0.24	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		12 TPI	16ER 5501	0.10	1.58	12	0.25	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.08	0.07	0.05							
			5502	0.20	1.46	11	0.25	0.20	0.18	0.16	0.15	0.14	0.10	0.08	0.08	0.07	0.05								
		11 TPI	16ER 5501	0.10	1.73	12	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.07	0.05							
			5502	0.20	1.62	11	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.10	0.08	0.05								
		10 TPI	16ER 5501	0.10	1.92	14	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.12	0.10	0.10	0.08	0.08	0.05	0.02					
			5502	0.20	1.80	13	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.05	0.02						
		9 TPI	16ER 5502	0.20	2.03	14	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.12	0.12	0.10	0.08	0.08	0.06	0.02					
	Internal Thread	24 TPI	11IR 55005	0.05	0.71	7	0.18	0.15	0.12	0.10	0.08	0.05	0.03												
			16IR 5501	0.10	0.65	6	0.18	0.15	0.12	0.10	0.07	0.03													
		20 TPI	11IR 55005	0.05	0.87	8	0.18	0.16	0.14	0.12	0.10	0.06	0.06	0.05											
			16IR 5501	0.10	0.81	7	0.18	0.16	0.14	0.12	0.10	0.06	0.05												
		18 TPI	11IR 55005	0.05	0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
			16IR 5501	0.10	0.91	7	0.20	0.18	0.16	0.14	0.10	0.08	0.05												
		16 TPI	11IR 55005	0.05	1.09	9	0.20	0.18	0.16	0.14	0.10	0.10	0.08	0.08	0.05										
			16IR 5501	0.10	1.04	8	0.20	0.18	0.16	0.15	0.12	0.10	0.08	0.05											
			5502	0.20	0.92	7	0.20	0.18	0.16	0.15	0.10	0.08	0.05												
		14 TPI	11IR 55005	0.05	1.26	10	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.10	0.08	0.05									
			16IR 5501	0.10	1.20	9	0.20	0.18	0.17	0.16	0.14	0.12	0.10	0.08	0.05										
			5502	0.20	1.08	8	0.20	0.18	0.18	0.16	0.13	0.10	0.08	0.05											
		12 TPI	16IR 5501	0.10	1.42	10	0.25	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.05									
			5502	0.20	1.30	9	0.25	0.22	0.18	0.16	0.14	0.12	0.10	0.08	0.05										
		11 TPI	16IR 5501	0.10	1.56	11	0.25	0.20	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.08	0.05								
			5502	0.20	1.44	10	0.25	0.20	0.18	0.16	0.16	0.14	0.12	0.10	0.08	0.05									

<Note> 1) Select the insert with suitable corner-R(r_ε) determined by the pitch.
2) Do not exceed 0.3mm for the 1st ap.
3) Finishing ap should be 0.02~0.05mm.
4) Prepare chamfering for C0.3~C0.5 to the workpiece to prevent the insert cracking during the 1st pass.
5) Coolant is recommended.

TT (60° / 55° Type, Partial Profile) Part 1

(ap shows the value of radial ap)

Type		Pitch / TPI mm / TPI	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric (60°)	External Thread	0.50mm	TT32R/L 6000	0.00	0.38	6	0.10	0.10	0.07	0.05	0.04	0.02											
		0.70mm	TT32R/L 6000	0.00	0.53	7	0.10	0.10	0.10	0.08	0.07	0.06	0.02										
		0.75mm	TT32R/L 6000	0.00	0.57	8	0.10	0.10	0.10	0.08	0.08	0.05	0.04	0.02									
		0.80mm	TT32R/L 6000	0.00	0.61	8	0.10	0.10	0.10	0.10	0.08	0.06	0.05	0.02									
		1.00mm	TT32R/L 6000	0.00	0.76	8	0.15	0.12	0.12	0.11	0.10	0.08	0.06	0.02									
			TT32/43R/L 6001	0.10	0.66	6	0.20	0.15	0.12	0.10	0.07	0.02											
		1.25mm	TT32R/L 6000	0.00	0.95	9	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.05	0.02								
			TT32/43R/L 6001	0.10	0.85	7	0.25	0.20	0.13	0.10	0.10	0.05	0.02										
		1.50mm	TT32R/L 6000	0.00	1.14	10	0.20	0.18	0.16	0.14	0.12	0.10	0.10	0.07	0.05	0.02							
			TT32/43R/L 6001	0.10	1.04	9	0.25	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.02								
			6002	0.20	0.94	8	0.25	0.18	0.14	0.12	0.10	0.08	0.05	0.02									
		1.75mm	TT32R/L 6000	0.00	1.33	11	0.25	0.23	0.20	0.13	0.10	0.10	0.10	0.08	0.07	0.05	0.02						
			TT32/43R/L 6001	0.10	1.23	10	0.25	0.23	0.20	0.13	0.10	0.10	0.08	0.07	0.05	0.02							
			6002	0.20	1.13	9	0.25	0.23	0.20	0.13	0.10	0.08	0.07	0.05	0.02								
		2.00mm	TT32R/L 6000	0.00	1.52	12	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.10	0.10	0.08	0.05	0.02					
			TT32/43R/L 6001	0.10	1.42	11	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.10	0.08	0.05	0.02						
			6002	0.20	1.32	10	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.08	0.05	0.02							
		2.50mm	TT32R/L 6000	0.00	1.89	13	0.27	0.25	0.20	0.18	0.17	0.15	0.14	0.14	0.13	0.10	0.08	0.06	0.02				
			TT32/43R/L 6001	0.10	1.79	12	0.27	0.25	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.10	0.06	0.02					
			6002	0.20	1.69	11	0.27	0.25	0.20	0.18	0.17	0.15	0.14	0.13	0.10	0.08	0.02						
			6003	0.30	1.59	11	0.27	0.25	0.20	0.18	0.17	0.15	0.12	0.10	0.08	0.05	0.02						
		3.00mm	TT43R/L 6001	0.10	2.17	14	0.30	0.25	0.23	0.20	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.05	0.02			
			6002	0.20	2.07	13	0.30	0.25	0.23	0.20	0.20	0.18	0.15	0.14	0.13	0.12	0.10	0.05	0.02				
			6003	0.30	1.97	12	0.30	0.25	0.23	0.20	0.20	0.18	0.15	0.14	0.12	0.10	0.08	0.02					
			6004	0.40	1.87	12	0.30	0.25	0.23	0.20	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.02					
		3.50mm	TT43R/L 6001	0.10	2.55	16	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.08	0.05	0.02	
			6002	0.20	2.45	15	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.10	0.10	0.05	0.02		
			6003	0.30	2.35	14	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.02			
			6004	0.40	2.25	14	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.02			
	Internal Thread	0.50mm	TT32R/L 6000	0.00	0.32	5	0.12	0.08	0.06	0.04	0.02												
		0.70mm	TT32R/L 6000	0.00	0.45	6	0.15	0.10	0.08	0.06	0.04	0.02											
		0.75mm	TT32R/L 6000	0.00	0.49	6	0.15	0.12	0.08	0.07	0.05	0.02											
		0.80mm	TT32R/L 6000	0.00	0.52	6	0.15	0.12	0.10	0.08	0.05	0.02											
		1.00mm	TT32R/L 6000	0.00	0.65	7	0.15	0.14	0.12	0.10	0.08	0.04	0.02										
		1.25mm	TT32R/L 6000	0.00	0.81	8	0.18	0.16	0.14	0.12	0.10	0.05	0.04	0.02									
		1.50mm	TT32R/L 6000	0.00	0.97	9	0.20	0.18	0.16	0.14	0.10	0.08	0.05	0.04	0.02								
			TT32/43R/L 6001	0.10	0.87	8	0.20	0.18	0.16	0.14	0.08	0.05	0.04	0.02									
		1.75mm	TT32R/L 6000	0.00	1.14	10	0.20	0.18	0.16	0.13	0.12	0.10	0.10	0.08	0.05	0.02							
			TT32/43R/L 6001	0.10	1.04	9	0.20	0.18	0.16	0.13	0.12	0.10	0.08	0.05	0.02								
		2.00mm	TT32R/L 6000	0.00	1.30	12	0.20	0.18	0.16	0.13	0.13	0.12	0.10	0.10	0.08	0.05	0.03	0.02					
			TT32/43R/L 6001	0.10	1.20	11	0.20	0.18	0.16	0.13	0.13	0.12	0.10	0.08	0.05	0.03	0.02						
		2.50mm	TT32R/L 6000	0.00	1.62	14	0.23	0.20	0.18	0.18	0.13	0.13	0.12	0.10	0.10	0.08	0.07	0.05	0.03	0.02			
			TT32/43R/L 6001	0.10	1.52	13	0.23	0.20	0.18	0.18	0.13	0.13	0.12	0.10	0.08	0.07	0.05	0.03	0.02				
		3.00mm	TT43R/L 6001	0.10	1.85	15	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.10	0.08	0.07	0.05	0.05	0.02		
			6002	0.20	1.75	14	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.08	0.07	0.05	0.05	0.02			
Parallel Pipe / Tapered Pipe (55°)	External Thread	28 TPI	TT32R/L 5501	0.10	0.61	5	0.20	0.18	0.15	0.06	0.02												
		19 TPI	TT32/43R/L 5501	0.10	0.95	8	0.20	0.18	0.15	0.13	0.12	0.10	0.05	0.02									
		14 TPI	TT32/43R/L 5501	0.10	1.34	10	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.08	0.05	0.02							
			5502	0.20	1.22	9	0.25	0.22	0.20	0.18	0.12	0.10	0.08	0.05	0.02								
		11 TPI	TT32/43R/L 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02				
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02					
			5503	0.30	1.50	11	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.04	0.02						
	Internal Thread	28 TPI	TT32/43R/L 5501	0.10	0.61	6	0.18	0.15	0.12	0.08	0.06	0.02											
		19 TPI	TT32/43R/L 5501	0.10	0.95	7	0.20	0.18	0.16	0.14	0.12	0.10	0.05										
		14 TPI	TT32/43R/L 5501	0.10	1.34	10	0.20	0.18	0.18	0.16	0.14	0.14	0.11	0.10	0.08	0.05							
			5502	0.20	1.22	9	0.20	0.18	0.18	0.16	0.15	0.12	0.10	0.08	0.05								
		11 TPI	TT32/43R/L 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02				
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02					
			5503	0.30	1.50	11	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.04	0.02						
Whitworth (55°)	External Thread	24 TPI	TT32/43R/L 5501	0.10	0.73	6	0.20	0.18	0.16	0.12	0.05	0.02											
		20 TPI	TT32/43R/L 5501	0.10	0.90	7	0.20	0.18	0.16	0.14	0.12	0.08	0.02										
		18 TPI	TT32/43R/L 5501	0.10	1.01	8	0.20	0.18	0.18	0.16	0.12	0.10	0.05	0.02									
		16 TPI	TT32/43R/L 5501	0.10	1.15	9	0.25	0.20	0.18	0.14	0.12	0.10	0.08	0.06	0.02								
			5502	0.20	1.04	8	0.25	0.20	0.18	0.14	0.10	0.08	0.07	0.02									
		14 TPI	TT32/43R/L 5501	0.10	1.34	10	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.08	0.05	0.02							
			5502	0.20	1.22	9	0.25	0.22	0.20	0.18	0.12	0.10	0.08	0.05	0.02								
		12 TPI	TT32/43R/L 5501	0.10	1.58	12	0.25	0.20	0.18	0.16	0.15	0.14	0.12	0.12	0.10	0.08	0.06	0.02					
			5502	0.20	1.46	11	0.25	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.06	0.02						
		11 TPI	TT32/43R/L 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02				
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02					
			TT43R/L 5503	0.30	1.50	11	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.04	0.02						
		10 TPI	TT32/43R/L 5501	0.10	1.92	14	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.12	0.10	0.10	0.08	0.08	0.05	0.02			
			5502	0.20	1.80	13	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.05	0.02				
			TT43R/L 5503	0.30	1.68	12	0.25	0.23	0.20	0.18	0.18	0.14	0.13	0.12	0.10	0.08	0.05	0.02					
		9 TPI	TT43R/L 5501	0.10	2.14	14	0.25	0.23	0.23	0.20	0.20	0.18	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.02			
			5502	0.20	2.03	13	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.02				
			5503	0.30	1.91	12	0.30	0.25	0.23	0.23	0.20	0.18	0.15	0.12	0.10	0.08	0.05	0.02					
		8 TPI	TT43R/L 5501	0.10	2.43	15	0.27	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.05	0.02		
			5502	0.20	2.31	14	0.27	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.16	0.14	0.12	0.10	0.05	0.02			
			5503	0.30	2.19	13	0.30	0.27	0.25	0.23	0.20	0.18	0.18	0.15	0.14	0.12	0.10	0.05	0.02				
			5504	0.40	2.08	12	0.30	0.27	0.25	0.23	0.23	0.20	0.18	0.15	0.12	0.08	0.05	0.02					

Depth of Cut & Number of Passes

TT (60° / 55° Type, Partial Profile) Part 2

(ap shows the value of radial ap)

Type		Pitch / TPI mm / TPI	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Whitworth (55°)	Internal Thread	24 TPI	TT32/43R/L 5501	0.10	0.65	6	0.20	0.16	0.12	0.10	0.05	0.02											
		20 TPI	TT32/43R/L 5501	0.10	0.81	7	0.20	0.18	0.16	0.12	0.08	0.05	0.02										
		18 TPI	TT32/43R/L 5501	0.10	0.91	8	0.20	0.18	0.16	0.15	0.10	0.05	0.05	0.02									
		16 TPI	TT32/43R/L 5501	0.10	1.04	9	0.20	0.18	0.15	0.14	0.12	0.10	0.08	0.05	0.02								
			5502	0.20	0.92	8	0.20	0.18	0.16	0.13	0.10	0.08	0.05	0.02									
		14 TPI	TT32/43R/L 5501	0.10	1.20	10	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.05	0.02							
			5502	0.20	1.08	9	0.20	0.18	0.16	0.15	0.14	0.10	0.08	0.05	0.02								
		12 TPI	TT32/43R/L 5501	0.10	1.42	10	0.23	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.05	0.02							
			5502	0.20	1.30	9	0.25	0.22	0.20	0.18	0.16	0.12	0.10	0.05	0.02								
		11 TPI	TT32/43R/L 5501	0.10	1.56	11	0.25	0.22	0.22	0.18	0.16	0.14	0.12	0.10	0.10	0.05	0.02						
			5502	0.20	1.44	10	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.05	0.02							
			TT43R/L 5503	0.30	1.33	9	0.25	0.22	0.20	0.18	0.16	0.14	0.10	0.06	0.02								
		10 TPI	TT32/43R/L 5501	0.10	1.73	12	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.14	0.12	0.10	0.05	0.02					
			5502	0.20	1.61	11	0.25	0.22	0.20	0.18	0.17	0.16	0.14	0.12	0.10	0.05	0.02						
			TT43R/L 5503	0.30	1.50	10	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.05	0.02							
		9 TPI	TT43R/L 5501	0.10	1.93	13	0.25	0.23	0.22	0.20	0.18	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.02				
			5502	0.20	1.82	12	0.25	0.23	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.05	0.02					
			5503	0.30	1.70	11	0.25	0.22	0.22	0.20	0.20	0.18	0.14	0.12	0.10	0.05	0.02						
		8 TPI	TT43R/L 5501	0.10	2.19	15	0.27	0.25	0.23	0.21	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.06	0.05	0.02		
			5502	0.20	2.07	14	0.27	0.25	0.23	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.02			
			5503	0.30	1.96	13	0.30	0.25	0.23	0.22	0.20	0.18	0.15	0.12	0.10	0.08	0.06	0.05	0.02				
			5504	0.40	1.84	12	0.30	0.25	0.23	0.21	0.20	0.18	0.14	0.12	0.08	0.06	0.05	0.02					

TT (60° Type, Full Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm / TPI	Description	C (mm)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric	External Thread	1.00mm	TT43ER/L 100M	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05												
		1.25mm	125M	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05											
		1.50mm	150M	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05											
		2.00mm	200M	1.27	1.35	10	0.26	0.21	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05							

TTX (60° / 55° Type, Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm / TPI	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric (60°)	External Thread	0.50mm	TTX32R 6000 6000S	0.00	0.38	6	0.10	0.10	0.07	0.05	0.04	0.02											
			60005 60005S	0.05	0.33	5	0.10	0.10	0.07	0.04	0.02												
		0.70mm	TTX32R 6000	0.00	0.53	7	0.10	0.10	0.10	0.08	0.07	0.06	0.02										
			60005	0.05	0.48	6	0.10	0.10	0.10	0.10	0.06	0.02											
		0.75mm	TTX32R 6000	0.00	0.57	8	0.10	0.10	0.10	0.08	0.08	0.05	0.04	0.02									
			60005	0.05	0.52	7	0.10	0.10	0.10	0.08	0.07	0.05	0.02										
		0.80mm	TTX32R 6000	0.00	0.61	8	0.10	0.10	0.10	0.10	0.08	0.06	0.05	0.02									
			60005	0.05	0.56	7	0.10	0.10	0.10	0.10	0.08	0.06	0.02										
		1.00mm	TTX32R 6000	0.00	0.76	8	0.15	0.13	0.12	0.12	0.10	0.08	0.04	0.02									
			60005	0.05	0.71	7	0.18	0.15	0.12	0.10	0.08	0.06	0.02										
			6001	0.10	0.66	6	0.20	0.15	0.12	0.10	0.07	0.02											
		1.25mm	TTX32R 6001	0.10	0.85	7	0.25	0.20	0.13	0.10	0.10	0.05	0.02										
		1.50mm		0.10	1.04	9	0.25	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.02								
		1.75mm		0.10	1.23	10	0.25	0.23	0.20	0.13	0.10	0.10	0.08	0.07	0.05	0.02							
		2.00mm		0.10	1.42	11	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.10	0.08	0.05	0.02						
Parallel Pipe (55°) Tapered Pipe (55°)	External Thread	28 TPI	TTX32R 5501	0.10	0.61	5	0.20	0.18	0.15	0.06	0.02												
		19 TPI	TTX32R 5501	0.10	0.95	8	0.20	0.18	0.15	0.13	0.12	0.10	0.05	0.02									
			55015	0.15	0.90	7	0.20	0.18	0.16	0.14	0.12	0.08	0.02										
		14 TPI	TTX32R 55015	0.15	1.28	10	0.25	0.20	0.18	0.16	0.12	0.12	0.10	0.08	0.05	0.02							
		11 TPI		0.15	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.06	0.02					
Whitworth (55°)	External Thread	24 TPI	TTX32R 5501	0.10	0.73	6	0.20	0.18	0.16	0.12	0.05	0.02											
		20 TPI	TTX32R 5501	0.10	0.90	7	0.20	0.18	0.16	0.14	0.12	0.08	0.02										
			TTX32R 55015	0.15	0.84	7	0.20	0.18	0.16	0.12	0.10	0.06	0.02										
		18 TPI	TTX32R 55015	0.15	0.95	8	0.20	0.18	0.15	0.14	0.12	0.10	0.04	0.02									
		16 TPI		0.15	1.10	9	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.06	0.02								
		14 TPI		0.15	1.28	10	0.25	0.20	0.18	0.16	0.12	0.12	0.10	0.08	0.05	0.02							
		12 TPI		0.15	1.52	11	0.25	0.20	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.05	0.02						
		11 TPI		0.15	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.06	0.02					

<Note>1) Select the insert with suitable corner-R(rε) determined by the pitch.
2) Do not exceed 0.3mm for the 1st ap.
3) Finishing ap should be 0.02~0.05mm.
4) Prepare chamfering for C0.3~C0.5 to the workpiece to prevent the insert cracking during the 1st pass.
5) Coolant is recommended.

TTX Type

Suitable for threading of smaller pitch sizes or more TPI than TT type. Suitable for threading to the shoulder.

Thread Types / Insert Description	Metric (mm)	Unified (TPI)	Parallel Pipe (TPI)	Whitworth (TPI)
TTX32R 6000	0.5 ~ 1.0	56 ~ 32	-	-
60005	0.5 ~ 1.0	48 ~ 32	-	-
6001	1.0 ~ 2.0	28 ~ 14	-	-
TTX32R 6000S	0.5	56 ~ 48	-	-
60005S	0.5	48	-	-
TTX32R 5501	-	-	28~19	24~20
55015	-	-	19~11	20~14

TPGB (60° Type, Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm / TPI	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric (60°)	Internal Thread	0.75mm	TPGB1102005 1103005	0.05	0.44	5	0.15	0.12	0.10	0.05	0.02												
		0.80mm	TPGB1102005 1103005	0.05	0.47	5	0.15	0.14	0.10	0.06	0.02												
		1.00mm	TPGB1102005 1103005	0.05	0.60	6	0.18	0.14	0.12	0.10	0.04	0.02											
		1.25mm	TPGB1102005 1103005	0.05	0.76	7	0.18	0.16	0.14	0.12	0.10	0.04	0.02										
		1.50mm	TPGB1102005 1103005	0.05	0.92	8	0.20	0.18	0.16	0.14	0.10	0.08	0.04	0.02									
			110201 110301	0.10	0.87	8	0.20	0.18	0.16	0.14	0.08	0.05	0.04	0.02									
		1.75mm	TPGB1102005 1103005	0.05	1.09	9	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.04	0.02								
			110301	0.10	1.04	9	0.20	0.18	0.16	0.13	0.12	0.10	0.08	0.05	0.02								
		2.00mm	TPGB1102005 1103005	0.05	1.25	11	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.10	0.06	0.04	0.02						
			110301	0.10	1.20	11	0.20	0.18	0.16	0.13	0.13	0.12	0.10	0.08	0.05	0.03	0.02						
		2.50mm	TPGB1102005 1103005	0.05	1.57	13	0.23	0.20	0.18	0.18	0.14	0.13	0.12	0.10	0.08	0.07	0.07	0.05	0.02				
			110301	0.10	1.52	13	0.23	0.20	0.18	0.18	0.13	0.13	0.12	0.10	0.08	0.07	0.05	0.03	0.02				
		3.00mm	TPGB1102005 1103005	0.05	1.90	15	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.12	0.10	0.08	0.08	0.07	0.05	0.02		
			110301	0.10	1.85	15	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.10	0.08	0.07	0.05	0.05	0.02		
			110302	0.20	1.75	14	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.08	0.07	0.05	0.05	0.02			
		3.50mm	TPGB1102005 1103005	0.05	2.22	16	0.25	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.05	0.02	
			110301	0.10	2.17	16	0.25	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.10	0.08	0.07	0.05	0.02	
			110302	0.20	2.07	15	0.25	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.08	0.07	0.05	0.02		

Guide for Internal Threading

For the internal threading, pay extra attention to “Stabilizing Bore Dia.” and “chip evacuation”.

1 “Stabilizing Bore Dia.”

Because small pitch internal threading has small corner-R(rε), there is variation in the Bore Dia. which may greatly influence the tool life of an insert.
In order to eliminate the variation in the Bore Dia., “0” cutting (zero cutting) should be performed as the zero pass, before the first pass in threading.
The Bore Dia. is cut with the specified dimension, and the first pass of threading becomes stable.

2 “Chip evacuation”

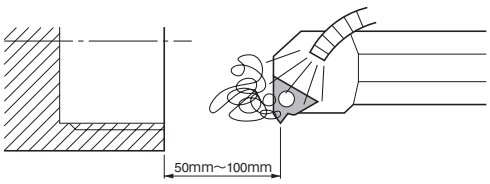
If machining process is continued when chips are tangled with a toolholder and other parts of the machine, it may cause damages to the insert.

<When processing the first workpiece>

Set the program with the “single block”
Keep the threading starting point 50mm~100mm away from the side of workpiece, and confirm that coolant is flushing down the chips for each pass.

<When processing the second workpiece and later>

Ensure that chips are not tangled; then, start the continuous run.



Applicable Toolholders & Inserts

In Applicable Toolholder / Insert Lists on **J42** ~ **J45**, Right-hand Insert / Right-hand Toolholder descriptions are listed based on the previous TNN type inserts.
For other applicable inserts / toolholders or stock availability of Left-hand, see each relevant page and **J48**.

Parallel Pipe: G(PF), Rp(PS)

Nominal Thread Symbol (Previous Symbol)	TPI	External Thread (G)			Internal Thread (G,Rp)				Same Root's Radius
		Toolholder	Insert		Toolholder	Insert		Bore Dia.	
			Partial Profile	Full Profile		Partial Profile	Full Profile		
G 1/16 (-)	28	**KTNR○○○○□-16** **KTNSR○○○○□-16**	16ERA55-TF 16ERAG55-TF 16ERA55 16ERAG55	-	**SINR0612S-06E** (EZT⇒**J24**) (HPT⇒**J28**)	06IR5501	-	6.56	0.12
G 1/8 (PF 1/8)								8.57	
G 1/4 (PF 1/4)	19	**KTNR○○○○□-16** **KTNSR○○○○□-16**	16ERA55-TF 16ERAG55-TF 16ERA55 16ERAG55	16ER19W-TF 16ER19W	**SINR0816S-08E** (EZT⇒**J24**) (HPT⇒**J28**)	08IR5501	-	11.45	0.18
G 3/8 (PF 3/8)					**SINR1216S-11E** (EZT⇒**J24**) (HPT⇒**J28**)	11IRA55 11IR55005	-	14.95	
G 1/2 (PF 1/2)	14	**KTNR○○○○□-16** **KTNSR○○○○□-16**	16ERAG55-TF 16ERG55-TF 16ERAG55 16ERG55	16ER14W-TF 16ER14W	**SINR1516S-11**	11IR55005	-	18.63	0.25
					SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	16IR14W-TF 16IR14W		
G 5/8 (PF 5/8)					**SINR2016S-16**			20.59	
G 3/4 (PF 3/4)								24.12	
G 7/8 (PF 7/8)					**SINR2420S-16**			27.88	
G 1 (PF 1)	11	**KTNR○○○○□-16** **KTNSR○○○○□-16**	16ERAG55-TF 16ERG55-TF 16ERAG55 16ERG55	16ER11W-TF 16ER11W	**SINR2420S-16**	16IRAG55 16IRG55 16IR5501 16IR5502	16IR11W-TF 16IR11W	30.29	0.32
G 1 1/8 (PF 1 1/8)					**CINR3025S-16**			34.94	
G 1 1/4 (PF 1 1/4)					**CINR3732S-16**			38.95	
		Hereafter, all the threads are 11 TPI and the root's radius 0.32. The same tool for G1 1/4 is recommended.							

Tapered Pipe: R, Rc (PT) (BSPT)

Nominal Thread Symbol (Previous Symbol)	TPI	External Thread (G)			Internal Thread (Rc)				Same Root's Radius
		Toolholder	Insert		Toolholder	Insert			
			Partial Profile	Full Profile		Partial Profile	Full Profile		
R 1/16,Rc 1/16 (-)	28	**KTNR○○○○□-16** **KTNSR○○○○□-16**	(16ERA55-TF) (16ERAG55-TF) (16ERA55) (16ERAG55)	16ER28BSPT-TF 16ER28BSPT	**SINR0612S-06E** (EZT⇒**J24**) (HPT⇒**J28**)	06IR5501	-		0.12
R 1/8,Rc 1/8 (PT 1/8)									
R 1/4,Rc 1/4 (PT 1/4)	19	**KTNR○○○○□-16** **KTNSR○○○○□-16**	(16ERA55-TF) (16ERAG55-TF) (16ERA55) (16ERAG55)	16ER19BSPT-TF 16ER19BSPT	**SINR0816S-08E** (EZT⇒**J24**) (HPT⇒**J28**)	08IR5501	-		0.18
R 3/8,Rc 3/8 (PT 3/8)					**SINR1216S-11E** (EZT⇒**J24**) (HPT⇒**J28**)	(11IRA55) (11IR55005)	11IR19BSPT-TF 11IR19BSPT		
R 1/2,Rc 1/2 (PT 1/2)	14	**KTNR○○○○□-16** **KTNSR○○○○□-16**	(16ERAG55-TF) (16ERG55-TF) (16ERAG55) (16ERG55)	16ER14BSPT-TF 16ER14BSPT	**SINR1516S-11**	(11IR55005)	11IR14BSPT-TF 11IR14BSPT		0.25
					SINR1616S-16	(16IRAG55) (16IRG55) (16IR5501) (16IR5502)	16IR14BSPT-TF 16IR14BSPT		
R 3/4,Rc 3/4 (PT 3/4)					**SINR2016S-16**				
R 1,Rc 1 (PT 1)	11	**KTNR○○○○□-16** **KTNSR○○○○□-16**	(16ERAG55-TF) (16ERG55-TF) (16ERAG55) (16ERG55)	16ER11BSPT-TF 16ER11BSPT	**SINR2420S-16**		16IR11BSPT-TF 16IR11BSPT		0.32
R 1 1/4,Rc 1 1/4 (PT 1 1/4)					**CINR3025S-16**				
R 1 1/2,Rc 1 1/2 (PT 1 1/2)					**CINR3732S-16**				
		Hereafter, all the threads are 11 TPI and the root's radius 0.32. The same tool for R1 1/2 is recommended.			Hereafter, all the threads are 11 TPI and the root's radius 0.32. The same tool for Rc1 1/2 is recommended.				

1) The largest size of minimum diameter toolholder is recommended for internal threading toolholders.
Therefore it is available if minimum diameter is smaller than recommended toolholders.
(e.g.) SINR2420S-16 (Min. Bore Dia.: ϕ24mm) is recommended for the Tool of G7/8 Internal Threading from the above Table, but SINR2016S-16 can also be used.
2) When using "Partial Profile" for Tapered Pipe threading, thread's corners become sharp edged, and the shape will not be the same as the standard shape for Tapered Pipe.

American National Tapered Pipe: NPT

Nominal Thread	TPI	External Thread			Internal Thread			
		Toolholder	Insert		Toolholder	Insert		
			Partial Profile	Full Profile		Partial Profile	Full Profile	
1/16 NPT 1/8 NPT	27	**KTTR○○○○□-16** **KTTXR○○○○□-16F**	TT32R6000 TTX32R6000	-	No Tools Available			
1/4 NPT 3/8 NPT	18	**KTNR○○○○□-16** **KTNSR○○○○□-16**	-	16ER18NPT	**EZH** sleeve (Ref. to Page **J25**)	**EZTR060050-60-004** **EZTR070060-60-004** **HPTR06005-60-005** **HPTR07507-60-005**	-	
1/2 NPT 3/4 NPT	14	**KTNR○○○○□-16** **KTNSR○○○○□-16**	-	16ER14NPT	**EZH** sleeve (Ref. to Page **J25**)	**EZTR070060-60-004** **HPTR07507-60-005**	-	
1/2 NPT	14	**KTNR○○○○□-16** **KTNSR○○○○□-16**	-	16ER14NPT	**SINR1616S-16**	-	16IR14NPT	
3/4 NPT					**SINR2016S-16**			
1 NPT	11.5	**KTNR○○○○□-16** **KTNSR○○○○□-16**	-	16ER11.5NPT	**SINR2420S-16**	-	16IR11.5NPT	
1 1/4 NPT					**CINR3025S-16**			
1 1/2 NPT 2 NPT					**CINR3732S-16**			

• Application of NPTF Thread
NPTF is the thread for sealing pipes without using any sealing material.
Thread symbol is similar to NPT but the Tolerance is different from that of NPT, therefore the above Inserts are not available for NPTF.

30° Trapezoidal: Tr

The JIS Standard Trapezoidal Size to be machined by TNN Insert are shown.

Nominal Thread	Pitch (mm)	External Thread			Internal Thread			Bore Dia.
		Toolholder	Insert		Toolholder	Insert		
			Partial Profile	Full Profile		Partial Profile	Full Profile	
Tr 16X2	2	No Tools Available			No Tools Available	-	-	14.00
Tr 18X2 Tr 20X2		**KTNR○○○○□-16** **KTNSR○○○○□-16**	16ER200TR	-	**SINR1616S-16**	16IR200TR	-	16.00 18.00
Tr 22X3	3	**KTNR○○○○□-16** **KTNSR○○○○□-16**	16ER300TR	-	**SINR1616S-16**	16IR300TR	-	19.00
Tr 24X3 Tr 26X3	3				**SINR2016S-16**	16IR300TR	-	21.00 23.00
Tr 28X3 Tr 30X3 Tr 32X3	3				**SINR2420S-16**	16IR300TR	-	25.00 27.00 29.00
Tr 34X3 Tr 36X3 Tr 38X3 Tr 40X3	3				**CINR3025S-16**	16IR300TR	-	31.00 33.00 35.00 37.00
Tr 42X3 Tr 44X3 Tr 46X3 Tr 48X3 Tr 50X3 Tr 52X3 Tr 55X3 Tr 60X3 Tr 65X3	3				**CINR3732S-16**	16IR300TR	-	39.00 41.00 43.00 45.00 47.00 49.00 52.00 57.00 62.00
Tr 70X4 Tr 75X4 Tr 80X4 Tr 90X4 Tr 95X4 Tr 100X4 Tr 105X4 Tr 110X4	4	**KTNR○○○○□-22**	22ER400TR	-	**CINR3732S-22**	22IR400TR	-	66.00 71.00 76.00 86.00 91.00 96.00 101.00 106.00

• TM Thread
TM Thread (old JIS 30° Trapezoidal Thread) has been discontinued. But if the "Nominal Dia. X Pitch" is the same, the above Tr Thread can be used.
• TW Thread
TW Thread is 29° Trapezoidal Thread, therefore the above Inserts are not available.

Metric Coarse Thread: M

Nominal Thread	Pitch (mm)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
M1 • • • M3	0.25 0.5	No Tools Available	–	–	0.73 • • • 2.46
M4	0.7		EZTR030025-60-002		3.24
M5	0.8		EZTR040035-60-004		4.13
M6	1.0	–	HPTR04504-60/VNTR045-11		4.92
M7	1.0		EZTR050040-60-004	–	5.92
			HPTR04504-60/VNTR045-11		
M8	1.25	–	EZTR060050-60-004	–	6.65
			HPTR06005-60/VNTR060-11		
		SINR0612S-06E	06IR60005	–	
M9	1.25	–	EZTR070060-60-004	–	7.65
		SINR0612S-06E	06IR60005	–	
M10	1.5	SINR0816S-08E	08IR60007	–	8.38
M11	1.5				9.38
M12	1.75	SINR0816S-08E	08IR60007	–	10.11
M16	2.0	SINR1216S-11E	–	11IR200ISO	13.84
M18	2.5	No Tools Available			15.29
M20	2.5	SINR1616S-16	Table 5	16IR250ISO-□□	17.29
M22	2.5				19.29
M24	3.0	SINR2016S-16	Table 4	16IR300ISO-□□	20.75
M27	3.0				23.75
M30	3.5	SINR2420S-22	22IRN60	22IR350ISO	26.21
M33	3.5				29.21
M36	4.0	CINR3025S-22		22IR400ISO	31.67
M39	4.0				34.67
M42	4.5	CINR3732S-22		22IR450ISO	37.13
M45	4.5				40.13
M48	5.0	CINR3732S-22		22IR500ISO	42.59
M52	5.0				46.59
M56 • • •	5.5	* Threading of M56 and over is not available due to too large pitch size.			50.05 • • •

Metric Fine Thread: M

Part 1

Nominal Thread	Pitch (mm)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
M1×0.2 • • • M3×0.35	0.2 0.35	No Tools Available	–	–	0.78 • • • 2.62
M3.5×0.35	0.35	–	EZTR030025-60-002		3.12
M4.5×0.5	0.5	–	EZTR035030-60-002		3.96
M5×0.5	0.5	–	EZTR040035-60-004		4.46
M6×0.75	0.75	–	HPTR04504-60/VNTR045-11		5.19
M7×0.75	0.75	–	EZTR050040-60-004	–	6.20
			HPTR06005-60/VNTR060-11		
M8×1.0	1.0	–	EZTR060050-60-004	–	6.92
			HPTR06005-60/VNTR060-11		
		SINR0612S-06E	06IR60005	–	
M8×0.75	0.75	–	EZTR060050-60-004	–	7.19
			HPTR06005-60/VNTR060-11		
		SINR0612S-06E	06IR60005	–	
M9×1.0	1.0	–	EZTR070060-60-004	–	7.92
			HPTR07507-60/VNTR060-11		
		SINR0612S-06E	06IR60005	–	
		SINR0816S-08E	08IR60007		
M9×0.75	0.75	–	EZTR070060-60-004	–	8.19
			HPTR07507-60/VNTR060-11		
		SINR0612S-06E	06IR60005	–	
M10×1.25	1.25	–	HPTR07507-60/VNTR060-11		8.65
		SINR0816S-08E	08IR60007	–	
M10×1.0	1.0	–	HPTR07507-60/VNTR060-11		8.92
		SINR0816S-08E	08IR60007	–	
M10×0.75	0.75	–	HPTR07507-60/VNTR060-11		9.19
		SINR0612S-06E	06IR600005	–	
M11×1.0	1.0	–	HPTR07507-60/VNTR060-11		9.92
		SINR0816S-08E	08IR60007	–	
M11×0.75	0.75	–	HPTR07507-60/VNTR060-11		10.19
		SINR0612S-06E	06IR60005	–	
M12×1.5	1.5	SINR0816S-08E	08IR60007	–	10.38
M12×1.25	1.25				10.65
M12×1.0	1.0				10.92

Metric Fine Thread: M

Part 2

Nominal Thread	Pitch (mm)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
M14×1.5	1.5	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-□□	12.38
M14×1.25	1.25			11IR125ISO-□□	12.65
M14×1.0	1.0			11IR100ISO-□□	12.92
M15×1.5	1.5	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-□□	13.38
M15×1.0	1.0			11IR100ISO-□□	13.92
M16×1.5	1.5	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-□□	14.38
M16×1.0	1.0			11IR100ISO-□□	14.92
M17×1.5	1.5	SINR1516S-11	11IRA60 11IR60005	11IR150ISO-□□	15.38
M17×1.0	1.0			11IR100ISO-□□	15.92
M18×2.0	2.0	SINR1516S-11	–	11IR200ISO	15.84
M18×1.5	1.5	SINR1616S-16	Table 2	16IR150ISO-□□	16.38
M18×1.0	1.0		Table 3	16IR100ISO-□□	16.92
M20×2.0	2.0	SINR1616S-16	Table 1	16IR200ISO-□□	17.84
M20×1.5	1.5		Table 2	16IR150ISO-□□	18.38
M20×1.0	1.0		Table 3	16IR100ISO-□□	18.92
M22×2.0	2.0	SINR1616S-16	Table 1	16IR200ISO-□□	19.84
M22×1.5	1.5	SINR2016S-16	Table 2	16IR150ISO-□□	20.38
M22×1.0	1.0		Table 3	16IR100ISO-□□	20.92
M24×2.0	2.0	SINR2016S-16	Table 1	16IR200ISO-□□	21.84
M24×1.5	1.5		Table 2	16IR150ISO-□□	22.38
M24×1.0	1.0		Table 3	16IR100ISO-□□	22.92
M25×2.0	2.0	SINR2016S-16	Table 1	16IR200ISO-□□	22.84
M25×1.5	1.5		Table 2	16IR150ISO-□□	23.38
M25×1.0	1.0		Table 3	16IR100ISO-□□	23.92
M26×1.5	1.5	SINR2420S-16	Table 2	16IR150ISO-□□	24.38
M27×2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	24.84
M27×1.5	1.5		Table 2	16IR150ISO-□□	25.38
M27×1.0	1.0		Table 3	16IR100ISO-□□	25.92
M28×2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	25.84
M28×1.5	1.5		Table 2	16IR150ISO-□□	26.38
M28×1.0	1.0		Table 3	16IR100ISO-□□	26.92
M30×3.0	3.0	SINR2420S-22	–	22IR300ISO	26.75
		SINR2420S-16	Table 4	16IR300ISO-□□	
M30×2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	27.84
M30×1.5	1.5		Table 2	16IR150ISO-□□	28.38
M30×1.0	1.0		Table 3	16IR100ISO-□□	28.92
M32×2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	29.84
M32×1.5	1.5	CINR3025S-16	Table 2	16IR150ISO-□□	30.38
M33×3.0	3.0	SINR2420S-22	–	22IR300ISO	29.75
		SINR2420S-16	Table 4	16IR300ISO-□□	
M33×2.0	2.0	CINR3025S-16	Table 1	16IR200ISO-□□	30.84
M33×1.5	1.5		Table 2	16IR150ISO-□□	31.38
M35×1.5	1.5	CINR3025S-16	Table 2	16IR150ISO-□□	33.38
M36×3.0	3.0	CINR3025S-22	–	22IR300ISO	32.75
		CINR3025S-16	Table 4	16IR300ISO-□□	
M36×2.0	2.0	CINR3025S-16	Table 1	16IR200ISO-□□	33.84
M36×1.5	1.5		Table 2	16IR150ISO-□□	34.38
M38×1.5	1.5	CINR3025S-16	Table 2	16IR150ISO-□□	36.38
M39×3.0	3.0	CINR3025S-22	–	22IR300ISO	35.75
		CINR3025S-16	Table 4	16IR300ISO-□□	
M39×2.0	2.0	CINR3025S-16	Table 1	16IR200ISO-□□	36.84
M39×1.5	1.5	CINR3732S-16	Table 2	16IR150ISO-□□	37.38
M40×3.0	3.0	CINR3025S-22	–	22IR300ISO	36.75
		CINR3025S-16	Table 4	16IR300ISO-□□	
M40×2.0	2.0	CINR3732S-16	Table 1	16IR200ISO-□□	37.84
M40×1.5	1.5		Table 2	16IR150ISO-□□	38.38
M42×4.0	4.0	CINR3732S-22	22IRN60	22IR400ISO	37.67
M42×3.0	3.0		–	22IR300ISO	38.75
		CINR3732S-16	Table 4	16IR300ISO-□□	
M42×2.0	2.0	CINR3732S-16	Table 1	16IR200ISO-□□	39.84
M42×1.5	1.5		Table 2	16IR150ISO-□□	40.38
M45×4.0 • • •	4.0	* Threading of M45 and over can be machined by the same tool for M42. (P=4.0,3.0,2.0,1.5)			40.67 • • •

Table 1 (P=2.0mm)

16IRG60
16IRAG60
16IR6001

Table 2 (P=1.5mm)

16IRA60
16IRAG60
16IR6001

Table 3 (P=1.0mm)

16IRA60
16IRAG60

Table 4 (P=3.0mm)

16IRG60
16IRAG60

Table 5 (P=2.5mm)

16IRG60
16IRAG60
16IR6001
16IR60015

• Above shows the usage example of applicable Toolholder / Insert.

Unified Coarse Thread: UNC

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
2-56 UNC • • • 6-32 UNC	56 32	No Tools Available	—	—	1.69 • • • 2.65
8-32 UNC	32	—	EZTR030025-60-002	—	3.31
10-24 UNC	24	—	EZTR035030-60-002	—	3.68
12-24 UNC	24	—	EZTR040035-60-004	—	4.34
1/4-20 UNC	20	—	EZTR050040-60-004	—	4.98
		—	HPTR04504-60/VNTR045-11		
5/16-18 UNC	18	—	EZTR060050-60-004	—	6.41
		—	HPTR06005-60/VNTR060-11		
3/8-16 UNC	16	—	EZTR070060-60-004	—	7.81
		—	HPTR07507-60-005	—	
7/16-14 UNC	14	No Tools Available			9.15
1/2-13 UNC	13				10.58
9/16-12 UNC	12				12.00
5/8-11 UNC	11				13.38
3/4-10 UNC	10	SINR1616S-16	16IRAG60 16IRG60	16IR10UN-TF	16.30
7/8- 9 UNC	9			—	19.17
1- 8 UNC	8	SINR2016S-16		16IR08UN-TF	21.96
1 1/8- 7 UNC 1 1/4- 7 UNC	7	SINR2420S-22	22IRN60	—	24.65 27.82
1 3/8- 6 UNC 1 1/2- 6 UNC	6	CINR3025S-22			30.34 33.52
1 3/4- 5 UNC	5	CINR3732S-22			38.95
2-4 1/2 UNC • • •	41/2	* 2-4 1/2 UNC and over cannot be machined, because no inserts are available for the TPI.			44.69 • • •

Unified Fine Thread: UNF

Nominal Thread	TPI (TPI)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
0-80 UNF • • • 6-40 UNF	80 40	No Tools Available	—	—	1.18 • • • 2.82
8-36 UNF	36	—	EZTR030025-60-002	—	3.40
10-32 UNF	32	—	EZTR035030-60-002	—	3.97
12-28 UNF	28	—	EZTR040035-60-004	—	4.50
1/4-28 UNF	28	—	EZTR050040-60-004	—	5.37
		—	HPTR04504-60/VNTR045-11		
5/16-24 UNF	24	—	EZTR060050-60-004	—	6.79
		—	HPTR06005-60/VNTR060-11		
		SINR0612S-06E	06IR60005	—	
3/8-24 UNF	24	—	EZTR070060-60-004	—	8.38
		—	HPTR07507-60-005	—	
		SINR0612S-06E	06IR60005	—	
7/16-20 UNF 1/2-20 UNF	20	SINR0816S-08E	08IR60007	—	9.74 11.33
9/16-18 UNF 5/8-18 UNF	18	SINR1216S-11E	11IRA60 11IR60005	—	12.76 14.35
3/4-16 UNF	16	SINR1516S-11	11IRA60 11IR60005	—	17.33
		SINR1616S-16	16IRAG60 16IRG60 16IR6001	16IR16UN(-TF)	
7/8-14 UNF	14	SINR2016S-16		16IR14UN(-TF)	20.26
1-12 UNF	12	SINR2016S-16		16IR12UN(-TF)	23.10
1 1/8-12 UNF 1 1/4-12 UNF	12	SINR2420S-16			26.28 29.46
1 3/8-12 UNF 1 1/2-12 UNF	12	CINR3025S-16			32.63 36.81

Whitworth Coarse Thread: W

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
W 1/4 W 5/16	20 18	No Tools Available	—	—	4.91 6.34
W 3/8	16	No Tools Available			7.73
W 7/16	14				9.06
W 1/2 W 9/16	12				10.30 11.89
W 5/8	11				13.26
W 3/4	10	SINR1616S-16	16IRAG55 16IRG55	—	16.17
W 7/8	9				19.03
W 1	8	SINR2016S-16		—	21.80
W 1 1/8 W 1 1/4	7	SINR2420S-22	22IRN55	—	24.47 27.64
W 1 3/8 W 1 1/2	6	CINR3025S-22	22IRN55	—	30.13 33.30
W 1 5/8	5				35.52
W 1 3/4	5	CINR3732S-22	22IRN55	—	38.69
W 1 7/8 W 2	41/2	No Tools Available			41.23 44.41
W 2 1/4	4				49.96

Whitworth Fine Thread: W

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
W9.5 TPI 24 W10 TPI 24 W10.5 TPI 24	24	SINR0816S-08E	08IR5501	—	8.30 8.80 9.30
		—	EZTR060050-55-008 HPTR06005-55		
W9.5 TPI 20 W10 TPI 20 W10.5 TPI 20 W11 TPI 20 W11.5 TPI 20 W12 TPI 20 W12.5 TPI 20 W13 TPI 20	20	SINR0816S-08E	08IR5501	—	8.06 8.56 9.06 9.56 10.06 10.56 11.06 11.56
		—	EZTR060050-55-008 EZTR080070-55-008 HPTR06005-55 HPTR08007-55		
W13.5 TPI 20	20	SINR1216S-11E	11IRA55 11IR55005	—	12.06
W11 TPI 18 W11.5 TPI 18 W12 TPI 18 W12.5 TPI 18	18	No Tools Available			9.40 9.90 10.40 10.90
W14 TPI 18 W14.5 TPI 18 W15 TPI 18 W16 TPI 18	18	SINR1216S-11E	11IRA55 11IR55005	—	12.40 12.90 13.40 14.40
W13 TPI 16 W13.5 TPI 16	16	No Tools Available			11.20 11.70
W14 TPI 16 W14.5 TPI 16 W15 TPI 16	16	SINR1216S-11E	11IRA55 11IR55005	—	12.20 12.70 13.20
W17 TPI 16	16	SINR1516S-11			15.20
W18 TPI 16 W19 TPI 16 W20 TPI 16	16	SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	(16IR16W-TF)	16.20 17.20 18.20
W16 TPI 14 W17 TPI 14	14	SINR1216S-11E	11IRA55 11IR55005	—	13.94 14.94
W18 TPI 14	14	SINR1516S-11			15.94
W21 TPI 14 W22 TPI 14	14	SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	(16IR14W-TF) (16IR14W)	18.94 19.94
W23 TPI 14 W24 TPI 14 W25 TPI 14 W26 TPI 14	14	SINR2016S-16			20.94 21.94 22.94 23.94
W19 TPI 12 W20 TPI 12 W21 TPI 12 W22 TPI 12	12	SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	—	16.60 17.60 18.60 19.60
W28 TPI 12 W30 TPI 12 W32 TPI 12	12	SINR2420S-16		—	25.60 27.60 29.60
W34 TPI 12 W35 TPI 12 W36 TPI 12 W38 TPI 12	12	CINR3025S-16		—	31.60 32.60 33.60 35.60
W40 TPI 12 W42 TPI 12 W44 TPI 12 W45 TPI 12 W46 TPI 12 W48 TPI 12 W50 TPI 12 • • •	12	CINR3732S-16		—	37.60 39.60 41.60 42.60 43.60 45.60 47.60 • • •
		* Hereafter, 12 TPI Whitworth Fine Thread can be machined by the same tool as above.			
W23 TPI 10 W24 TPI 10 W25 TPI 10 W26 TPI 10	10	SINR2016S-16	16IRAG55 16IRG55	—	20.12 21.12 22.12 23.12
W28 TPI 9 W30 TPI 9 W32 TPI 9	9	SINR2420S-16		—	24.80 26.80 28.80
W34 TPI 8 W35 TPI 8 W36 TPI 8 W38 TPI 8 W40 TPI 8 W42 TPI 8	8	CINR3025S-16		—	30.40 31.40 32.40 34.40 36.40 38.40
W44 TPI 7 W45 TPI 7 W46 TPI 7 W48 TPI 7 W50 TPI 7 W52 TPI 7	7	CINR3732S-22	22IRN55	—	39.89 40.89 41.89 43.89 45.89 47.89
W55 TPI 6 W58 TPI 6 W60 TPI 6 W62 TPI 6 • W72 TPI 6	6	CINR3732S-22	22IRN55	—	50.20 53.20 55.20 57.20 • 67.20
W75 TPI 5 • • W105 TPI 5	5	CINR3732S-22	22IRN55	—	69.24 • • 99.24
W110 TPI 4 • •	4	No Tools Available			102.8 • •

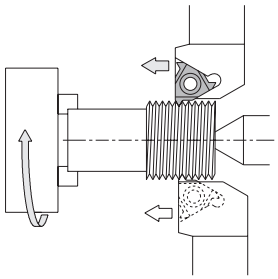
• Above shows the usage example of applicable Toolholder / Insert.

External Threading (Left-hand Thread / Right-hand Thread)

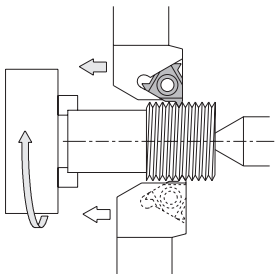
External Thread

Left-hand Thread

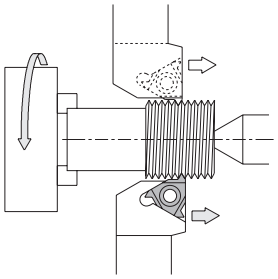
Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04



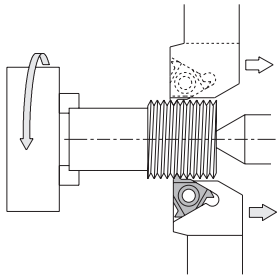
Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M04



Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M03

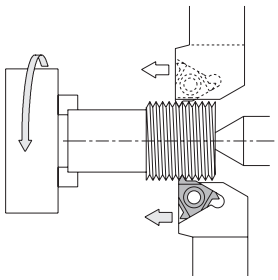


Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03

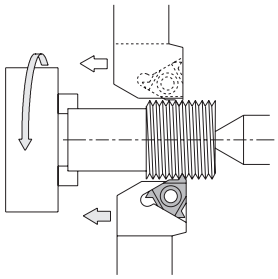


Right-hand Thread

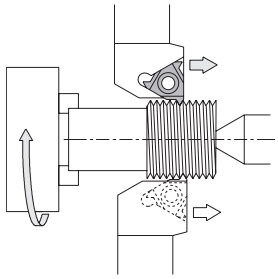
Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03



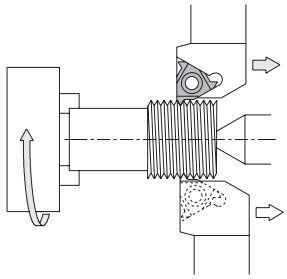
Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M03



Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M04



Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04

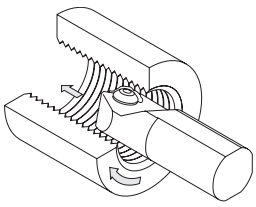


* These tables are based on KTN / KTNS / KTT / KTTX type Toolholder.

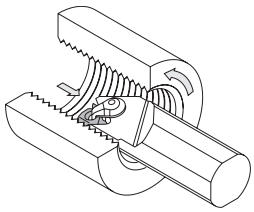
Internal Threading (Left-hand Thread / Right-hand Thread)

Internal Thread

Left-hand Thread

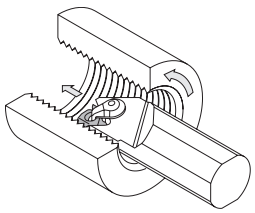


Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04

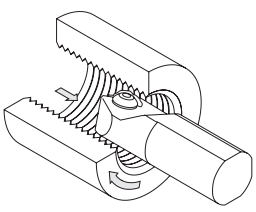


Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03

Right-hand Thread



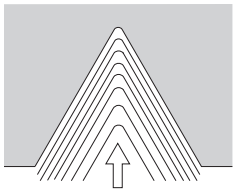
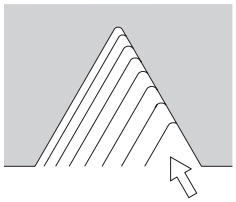
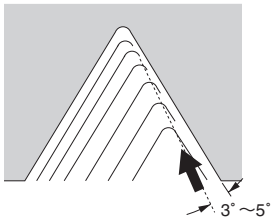
Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03



Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04

* These tables are based on SIN / CIN type Toolholder.
For KITG type (for large internal threading), Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Infeed Methods

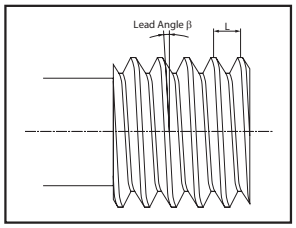
Infeed Methods	Features
 Radial Infeed	• The most common threading method. The cutting edge moves toward the center of the workpiece every pass. • Suitable for relatively small pitch size threading. • V-shape chips are generated and chip control may be difficult depending on workpiece material.
 Flank Infeed	• Suitable for large pitch size threading. • The wear on the right side edge of the figure (no ap) tends to become greater. • Chips flow to one side.
 Flank Compound Infeed	• Revised compound methods of the above flank infeed method. • No "No ap." condition. • Chips flow to one side.

Lead Angle of Thread

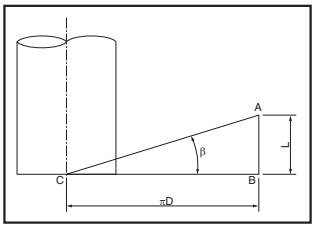
Thread's Lead Angle β as shown in Fig. 1 decides from the Workpiece Diameter (Pitch Dia.).
"D" and Lead "L" (in case of Single-start Thread, it is the same as Pitch "P").
By rolling a right-angled Triangle around a Cylinder and the Angle ACB in Fig. 2 becomes the Lead Angle β.
The calculation formula is shown as follows.

$$\tan\beta = \frac{L}{\pi D} = \frac{nP}{\pi D}$$

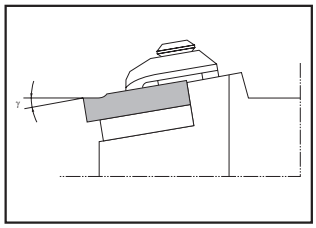
β : Lead Angle D: Pitch Dia. n: Number of Thread P: Pitch
L : Lead (In case of single-start thread, it is equal to P, In case of n-start thread, it is equal to n×P.)



(Fig.1)



(Fig.2)

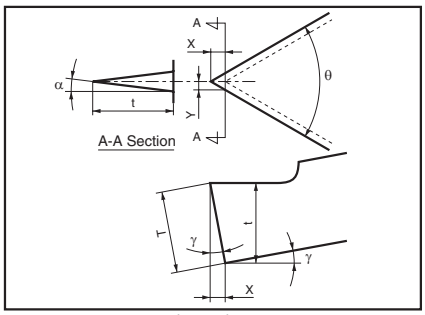


(Fig.3)

Relief Angle of Thread

Against this lead angle, the threading insert requires side relief angle α. TNN type threading insert is a negative insert and there is no relief angle. When installing the insert in the toolholder, the edge inclination angle γ (Fig. 3) is set, and at the same time front relief angle as well as side relief angle are generated to the insert. Side relief angle is described by the following formula. (Fig.4)

$$\tan\alpha = \tan\gamma \times \tan\left(\frac{\theta}{2}\right)$$



(Fig.4)

Symbol	e.g.)
α : Side Relief Angle	
γ : Inclination Angle after Installing Insert	External Insert:10° Internal Insert :15°
θ : Insert's Thread Angle	Metric:60° Tapered Pipe:55° 30° Trapezoidal:30°
T: Insert Thickness	

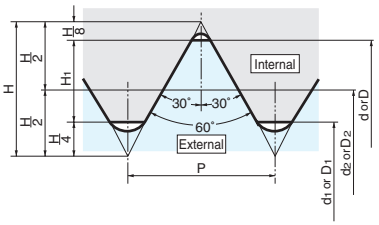
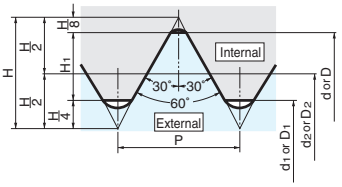
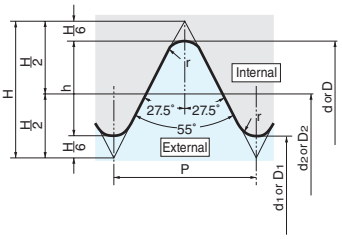
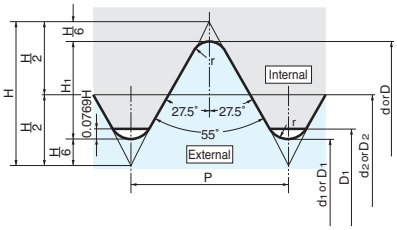
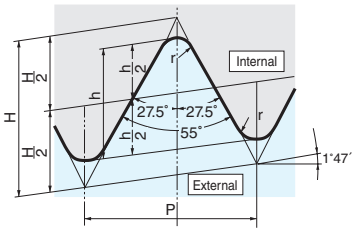
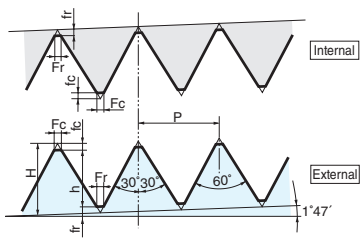
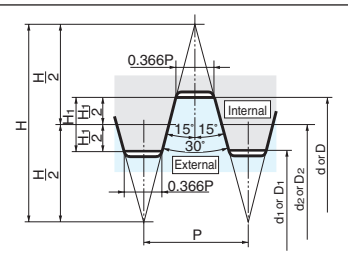
X=T·sin γ
Y=X·tan(θ/2)=t·tan α
t=T·cos γ

(Table 1)

Inserts	Side Relief Angle α	
	External	Internal
60° Thread (M, UN, NPT)	5°49'	8°47'
55° Thread (W, G, PT)	5°14'	7°56'
30° Trapezoidal (Tr)	2°43'	5°7'

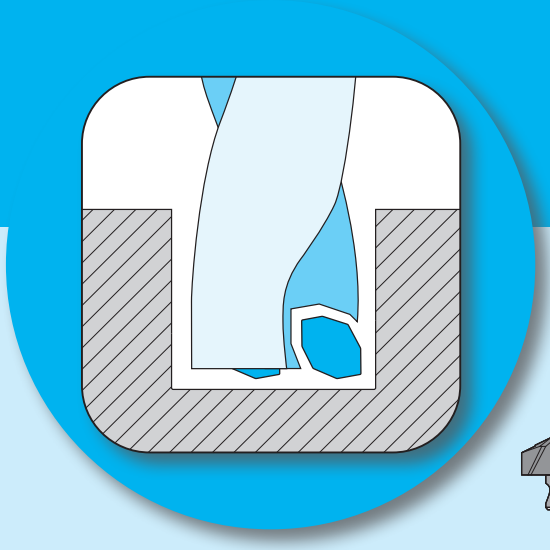
Ref. to Table 1 for the Side Relief Angle depending on the insert type.
However, the side relief angle is set for 1° in the traveling direction by the toolholder itself, so that the actual side relief angle becomes α+1°.

Thread Types & Basic Profile / Applicable Toolholders & Inserts

	Basic Profile	Symbol (Previous Symbol)	Type	Applicable Inserts	Applicable Toolholders
Metric		**M** e.g.) **M30**	External	○○ E$^{R}_{L}$○○○ ISO(-TF) ○○ ER □□60(-TF) 16ER60 ○○	KTN$^{R}_{L}$○○○○□-○○ KTNSR ○○○○□-16
				TT43E$^{R}_{L}$○○○ M TT ○○ $^{R}_{L}$60 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R60 ○○	KTTXR ○○○○□-16F,S ○○□-KTTXL16
			Internal	○○ I$^{R}_{L}$○○○ ISO(-TF) ○○ IR □□60 ○○ IR60 ○○ (○)	SIN$^{R}_{L}$○○○○ S- ○○ (E) CIN$^{R}_{L}$○○○○ S- ○○
				TT ○○$^{L}_{R}$ 60 ○○	KITG$^{R}_{L}$○○○○ T- ○○
				TPGB11 ○○○○ (○)	S ○○□-STWP$^{R}_{L}$11- ○○ (E)
Unified		**UN** **UNC** **UNF** **UNEF** e.g.) **¾-16 UNF**	External	○○ ER ○○ UN(-TF) ○○ ER □□60(-TF) 16ER60 ○○	KTNR ○○○○□-○○ KTNSR ○○○○□-16
				TT ○○ $^{R}_{L}$60 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R60 ○○	KTTXR ○○○○□-16F,S ○○□-KTTXL16
			Internal	○○ IR ○○ UN-(TF) ○○ IR □□60 ○○ IR60 ○○ (○)	SINR ○○○○ S- ○○ (E) CINR ○○○○ S- ○○
				TT ○○ $^{L}_{R}$60 ○○	KITG$^{R}_{L}$○○○○ T- ○○
				TPGB11 ○○○○ (○)	S ○○□ -STWP$^{R}_{L}$11- ○○ (E)
Parallel Pipe		External:**G(PF)** Internal:**G(PF)** **Rp(PS)** e.g.) **G¾ (PF¾)**	External	○○ ER ○○ W(-TF) ○○ ER □□55 16ER55 ○○	KTNR ○○○○□-○○ KTNSR ○○○○□-16
				TT ○○ $^{R}_{L}$55 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R55 ○○	KTTXR ○○○○□-16F,S ○○□-KTTXL16
			Internal	○○ IR ○○ W(-TF) ○○ IR □□55 ○○ IR55 ○○ (○)	SINR ○○○○ S- ○○ (E) CINR ○○○○ S- ○○
				TT ○○ $^{L}_{R}$55 ○○	KITG$^{R}_{L}$○○○○ T- ○○
Whitworth		**W** e.g.) **W$^{3}/_{8}$**	External	○○ ER ○○ W(-TF) ○○ ER □□ 55 16ER55 ○○	KTNR ○○○○□-○○ KTNSR ○○○○□-16
				TT ○○ $^{R}_{L}$55 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R55 ○○	KTTXR ○○○○□-16F,S ○○□-KTTXL16
			Internal	○○ IR ○○ W(-TF) ○○ IR □□55 ○○ IR55 ○○ (○)	SINR ○○○○ S- ○○ (E) CINR ○○○○ S- ○○
				TT ○○ $^{L}_{R}$55 ○○	KITG$^{R}_{L}$○○○○ T- ○○
Tapered Pipe		External:**R(PT)** **(BSPT)** Internal:**Rc(PT)** **(BSPT)** e.g.) **R½ (PT½)**	External	16ER ○○ BSPT(-TF)	KTNR ○○○○□-○○ KTNSR ○○○○□-16
				TT ○○ $^{R}_{L}$55 ○○ *	KTT$^{R}_{L}$○○○○□-○○
				TTX32R55 ○○ *	KTTXR ○○○○□-16F,S ○○□-KTTXL16
			Internal	○○ IR ○○ BSPT(-TF)	SINR ○○○○ S- ○○ (E) CINR ○○○○ S- ○○
				TT ○○ $^{L}_{R}$55 ○○ *	KITG$^{R}_{L}$○○○○ T- ○○
American National Tapered Pipe		**NPT** e.g.) **$^{3}/_{8}$-18 NPT**	External	16ER ○○ (.○)NPT	KTNR ○○○○□-○○ KTNSR ○○○○□-16
			Internal	16IR ○○ (.○)NPT	SINR ○○○○ S- ○○ CINR ○○○○ S- ○○
30° Trapezoidal		**Tr** e.g.) **Tr 26×3**	External	○○ ER ○○○ TR	KTNR ○○○○□-○○ KTNSR ○○○○□-16
			Internal	○○ IR ○○○ TR	SINR ○○○○ S- ○○ CINR ○○○○ S- ○○

* For the case when the thread root's corner-R(r_{ε}) can be smaller than the standard.

● Above shows the usage example of applicable Toolholder / Insert.



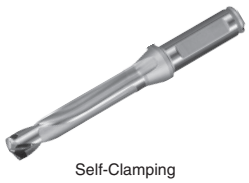
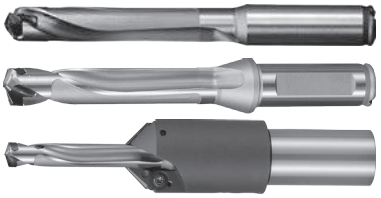
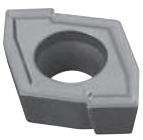
Drilling

K1~K71

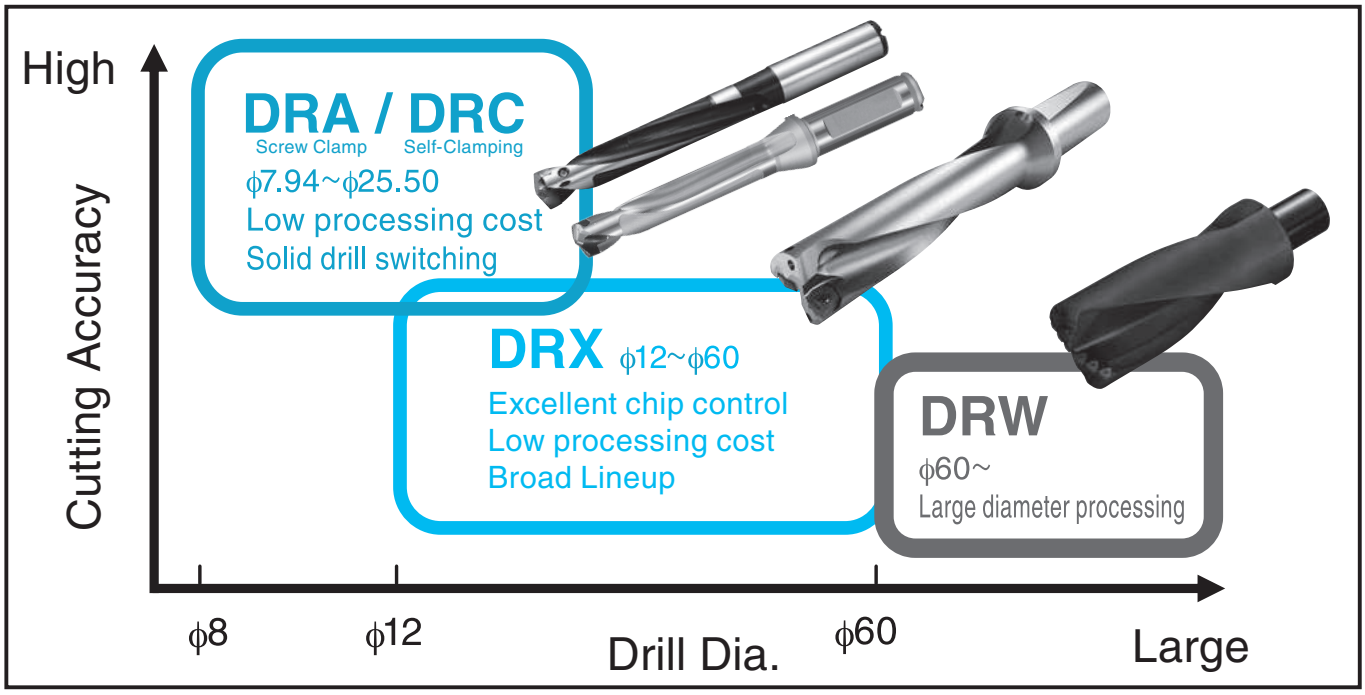
K

Product Lineup			**K2~K3**
MagicDrill DRA			**K4~K17**
SS-DRA	Drilling Depth: 3×D type	Straight Shank	**K9**
SS-DRA	Drilling Depth: 5×D type	Straight Shank	**K10**
SS-DRA	Drilling Depth: 8×D type	Straight Shank	**K11**
SF-DRA	Drilling Depth: 3×D type	Flanged Shank	**K12**
SF-DRA	Drilling Depth: 5×D type	Flanged Shank	**K13**
SF-DRA	Drilling Depth: 8×D type	Flanged Shank	**K14**
MagicDrill DRC			**K18~K33**
SS-DRC	Drilling Depth: 3×D type	Straight Shank	**K21**
SS-DRC	Drilling Depth: 5×D type	Straight Shank	**K22**
SS-DRC	Drilling Depth: 8×D type	Straight Shank	**K23**
Chamfering attachment	for Straight Shank SS-DRC		**K24**
SF-DRC	Drilling Depth: 3×D type	Flanged Shank	**K26**
SF-DRC	Drilling Depth: 5×D type	Flanged Shank	**K27**
SF-DRC	Drilling Depth: 8×D type	Flanged Shank	**K28**
MagicDrill DRX			**K34~K52**
DRX	Drilling Depth: 2×D type	φ12~φ60	**K40**
DRX	Drilling Depth: 3×D type	φ12~φ60	**K42**
DRX	Drilling Depth: 4×D type	φ12~φ60	**K44**
DRX	Drilling Depth: 5×D type	φ12~φ60	**K46**
MagicDrill DRS & DRZ			**K53~K66**
DRS (MagicDrill Mini)		φ10~φ12.5	**K54**
DRZ	Drilling Depth: 2×D type	φ13~φ59	**K56**
DRZ	Drilling Depth: 3×D type	φ13~φ59	**K58**
DRZ	Drilling Depth: 4×D type	φ13~φ50	**K60**
DRZ	Drilling Depth: 5×D type	φ27~φ50	**K62**
DRZ-CR	Cartridge type	φ60~	**K63**
MagicDrill DRW			**K67~K71**
DRW	Drilling Depth: 1×D Type	φ60~φ100	**K68**
DRW	Drilling Depth: 2×D type	φ60~φ100	**K68**
DRW	Drilling Depth: 3×D type	φ60~φ100	**K69**

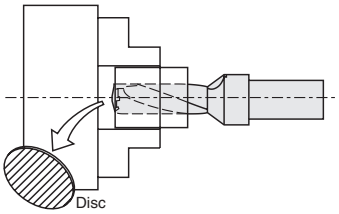
Product Lineup

Type	Shape	Drill Dia. (Drilling Depth)	Cutting Edge	Remarks
DRA K4	Screw Clamp	φ7.94~φ25.50 (3D/5D/8D)	Module type with double edges	Line up SS-DRA SF-DRA
DRC K18	 Self-Clamping	φ7.94~φ25.50 (3D/5D/8D)	Module type with double edges	Line up  SS-DRC SF-DRC Chamfering attachment
DRX K34	Silver Coating	φ12 φ12.5 φ13 (2D/3D/4D) φ12,φ13 (5D)	Two Cutting Edges per Insert Outer edge Inner edge ZXMT03	Chip Shape (Workpiece Material: S50C) Drill Dia. φ12 Chip from outer edge Chip from inner edge
		φ13.5~φ60 (2D/3D/4D) φ14~φ60 (5D)	Inner & Outer Edges on One Insert ZXMT	Chip Shape (Workpiece Material: S50C) Drill Dia. φ24 Chip from outer edge Chip from inner edge
DRS [MagicDrill Mini] K53	Silver Coating	φ10~φ12.5 (3.5D)	Inner & Outer Edges on One Insert	Chip Shape (Workpiece Material: S50C) Drill Dia. φ10 Chip from outer edge Chip from inner edge
DRZ K56	DRZ	φ13~φ59 (2D/3D) φ13~φ50 (4D) φ27~φ50 (5D)	Inner & Outer Edges on One Insert 	Chip Shape (Workpiece Material: S50C) Drill Dia. φ23 Chip from outer edge Chip from inner edge
DRZ-CR [Cartridge type] (Made to order) K63	DRZ-CR	φ60~ (2D/3D/4D)		
DRW (Made to order for some products) K67		φ60~ (1D/2D/3D)	Inner & Outer Edges on One Insert	Custom-order item BT integral arbor type is also available. Drilling diameter φ200 is also possible.

MagicDrill Series Application Map



Caution



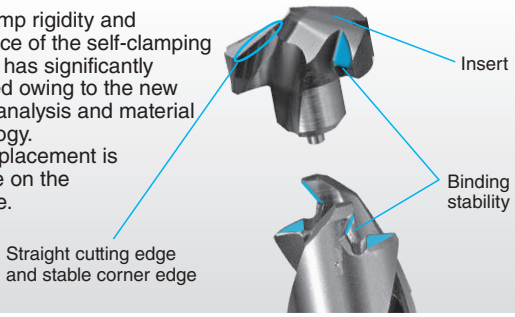
When drilling through the workpiece, a disk may be ejected.
Proper machine guarding is necessary to prevent injury.
The safety cover is necessary for the conventional lathe machines to prevent any accidents.

MagicDrill DRC Drill Dia. ϕ7.94~ϕ25.50 Drilling Depth 3D·5D·8D

4 unique characteristics of DRC type MagicDrill improve productivity as well as reduce machining costs owing to high speed and high feed rate machining.

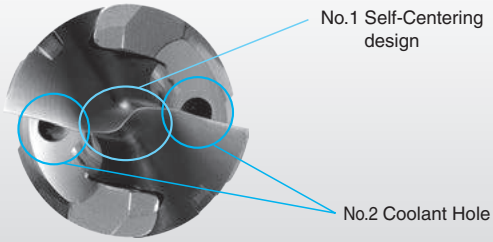
Advantages 1. Self-Clamping design

- The clamp rigidity and resistance of the self-clamping method has significantly improved owing to the new design analysis and material technology.
- Easy replacement is possible on the machine.



Advantages 2. Self-Centering design

- The S curve geometry of the insert known as the “Self-Centering design” enables smooth drilling, lower cutting forces and a high quality hole surface.



Advantages 3. Multiple Helical Angle Flute design

- Stronger drill body and smooth chip evacuation.

Advantages 4. Direct Cooling design

- The coolant is fed directly into the inserts cutting face, cooling the top of the drill and preventing chip adhesion, which allows for quick and smooth chip evacuation.

High Efficiency Modular Drill

MagicDrill DRA

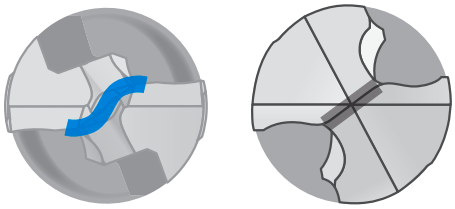
Excellent hole accuracy with a low cutting force design

5 advantages to efficiently solve common drilling difficulties

1 Low cutting force design improves hole accuracy

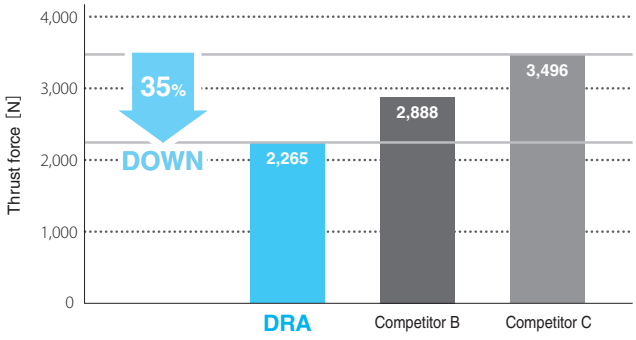
Special chisel edge with S-curve reduces thrust force and controls vibration

Cutting edge image



Cutting force comparison
(Internal evaluation)

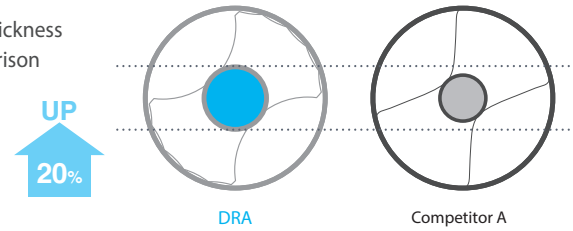
Cutting Conditions: Vc=120m/min, f=0.25mm/rev
Drill Dia. φ14, Drilling Depth 45mm, Wet
Workpiece Material: S50C



2 Optimal web thickness limits deflection

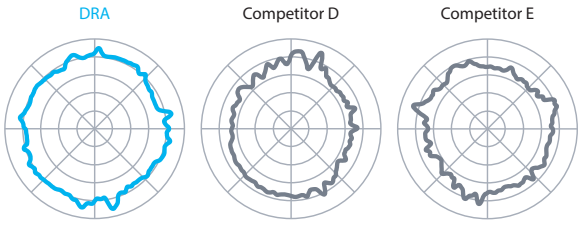
Improved hole accuracy by controlling drill deflection with a 20% thicker web compared with Competitor A

Web Thickness Comparison



Roundness Cylindricity Comparison
(Internal evaluation)

Cutting Conditions: Vc=120m/min, f=0.3mm/rev
Drill Dia. φ14, Measurement point 55mm, Wet
Workpiece Material: S50C



	DRA	Competitor D	Competitor E
Roundness	18.7μm	31.1μm	27.3μm
Cylindricity	23.6μm	34.3μm	30.1μm

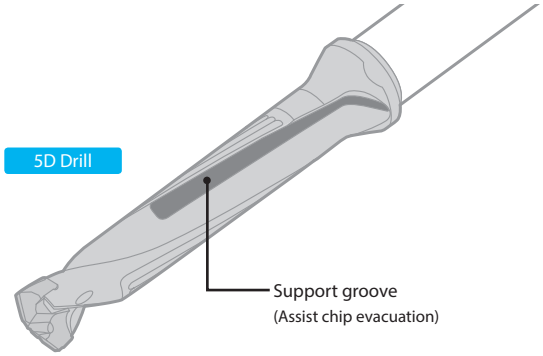
3 Fine chip breaking even in deep hole drilling applications

Optimized chip thinning for stable chip evacuation

Support groove with wider flute (5D, 8D) enables smooth chip evacuation

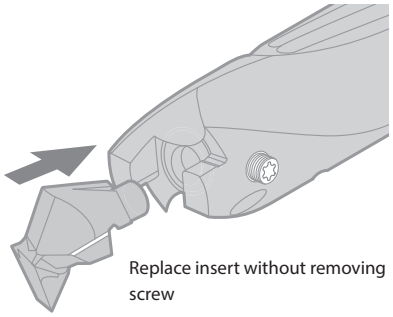
Chip Comparison
(Internal evaluation)

Cutting Conditions: Vc=60m/min, f=0.2mm/rev, Drill Dia. φ14
Drilling Depth 70mm, Wet Workpiece Material: SUS304

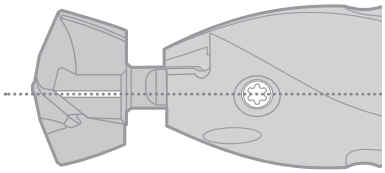


4 Easy insert replacement

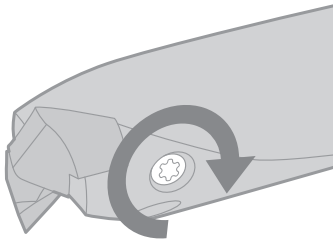
Replace insert without removing screw



Replace insert without removing screw



Install the insert onto toolholder
(align insert guide line with screw position)



Fix the insert by tightening the screw

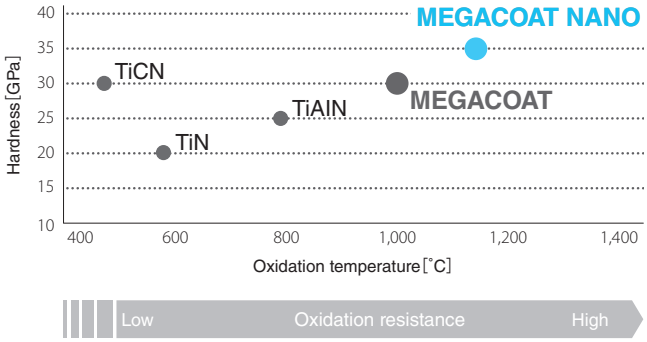
5 Long tool life and stable machining of various workpieces

MEGACOAT NANO grade PR1535 is used to machine various materials from steel to stainless steel,
with the combination of a tough substrate and a special nano layer coating

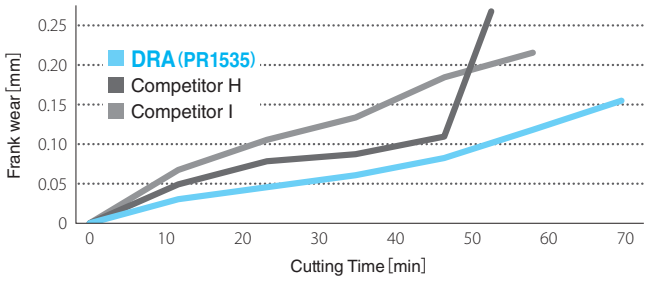
Recommended Insert Grades

Steel, Stainless Steel	Cast Iron
PR1535	PR1525

Properties of PVD Coating



Wear Resistance Comparison
(Internal evaluation)

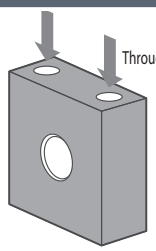


Cutting Conditions: Vc=100m/min, f=0.25mm/rev, Drill Dia. φ14,
Drilling Depth 45mm, Wet
Workpiece Material: SCM440H

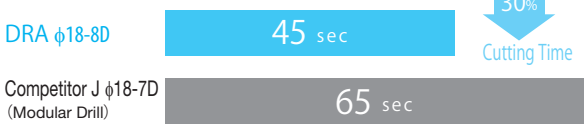
Case Studies

Attachment SS400

Vc=70m/min (n=1,240min^{-1})
f=0.23mm/rev (Vf=285mm/min)
Drilling Depth 100mm
Wet (Internal coolant)
With spot drilling
SF25-DRA180M-8
DA1800M-GM PR1535



Cutting Time

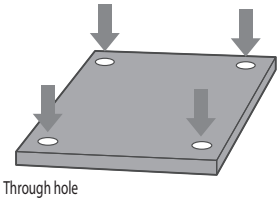


Competitor J applied a step feeding to avoid chip clogging.
DRA controlled chip evacuation without pecking.

(Evaluation by the user)

Plate SUS304

Vc=60m/min (n=2,120min^{-1})
f=0.12mm/rev (Vf=254mm/min)
Drilling Depth 15mm
Wet (Internal coolant)
SS10-DRA090M-3
DA0900M-GM PR1535



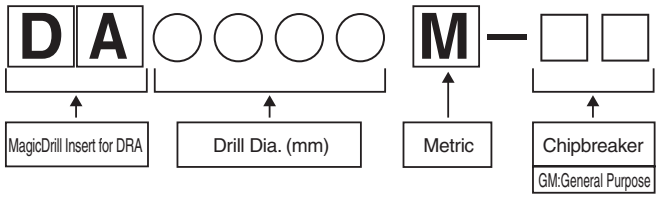
Number of holes

DRA extended the tool life by 5 times compared to Competitor K. DRA maintained stable machining and excellent surface finish with less cutting noise.

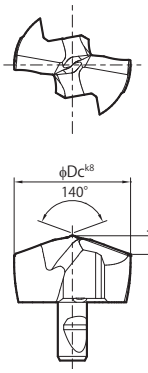
(Evaluation by the user)

MagicDrill Insert for DRA NEW

Description Identification System (Insert)



Applicable Inserts

Insert		Description		Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ➡ K9~K14
				φDc	Lp	PR1535	PR1525	
		DA	0794M-GM	7.94	1.34	●	●	SS10-DRA080M-○ SF12-DRA080M-○
			0800M-GM	8.00	1.35	●	●	
			0810M-GM	8.10	1.37	●	●	
			0820M-GM	8.20	1.38	●	●	
			0830M-GM	8.30	1.40	●	●	
			0840M-GM	8.40	1.42	●	●	
		DA	0850M-GM	8.50	1.44	●	●	SS10-DRA085M-○ SF12-DRA085M-○
			0860M-GM	8.60	1.46	●	●	
			0870M-GM	8.70	1.48	●	●	
			0880M-GM	8.80	1.49	●	●	
			0890M-GM	8.90	1.51	●	●	
		DA	0900M-GM	9.00	1.52	●	●	SS10-DRA090M-○ SF12-DRA090M-○
			0910M-GM	9.10	1.54	●	●	
			0920M-GM	9.20	1.56	●	●	
			0930M-GM	9.30	1.58	●	●	
			0940M-GM	9.40	1.59	●	●	
		DA	0950M-GM	9.50	1.61	●	●	SS10-DRA095M-○ SF12-DRA095M-○
			0960M-GM	9.60	1.63	●	●	
			0970M-GM	9.70	1.65	●	●	
			0980M-GM	9.80	1.67	●	●	
			0990M-GM	9.90	1.68	●	●	
		DA	1000M-GM	10.00	1.70	●	●	SS12-DRA100M-○ SF16-DRA100M-○
			1010M-GM	10.10	1.72	●	●	
			1020M-GM	10.20	1.74	●	●	
			1030M-GM	10.30	1.75	●	●	
			1040M-GM	10.40	1.77	●	●	
		DA	1050M-GM	10.50	1.79	●	●	SS12-DRA105M-○ SF16-DRA105M-○
			1060M-GM	10.60	1.81	●	●	
			1070M-GM	10.70	1.83	●	●	
			1080M-GM	10.80	1.85	●	●	
			1090M-GM	10.90	1.86	●	●	
		DA	1100M-GM	11.00	1.87	●	●	SS12-DRA110M-○ SF16-DRA110M-○
			1110M-GM	11.10	1.89	●	●	
			1120M-GM	11.20	1.91	●	●	
			1130M-GM	11.30	1.92	●	●	
			1140M-GM	11.40	1.94	●	●	
		DA	1150M-GM	11.50	1.96	●	●	SS12-DRA115M-○ SF16-DRA115M-○
			1160M-GM	11.60	1.98	●	●	
			1170M-GM	11.70	2.00	●	●	
			1180M-GM	11.80	2.01	●	●	
			1190M-GM	11.90	2.03	●	●	
		DA	1200M-GM	12.00	2.03	●	●	SS14-DRA120M-○ SF16-DRA120M-○
			1210M-GM	12.10	2.05	●	●	
			1220M-GM	12.20	2.07	●	●	
			1230M-GM	12.30	2.08	●	●	
			1240M-GM	12.40	2.10	●	●	

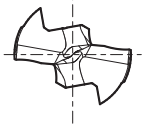
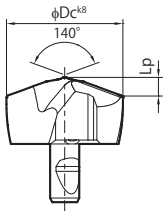
k8 tolerance

φDc	k8(mm)
7.94 ≤ 10.00	+0.022 0
10.10 ≤ 18.00	+0.027 0
18.10 ≤ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

DA inserts are sold in 1 piece boxes

● : Std. Item

Insert	Description		Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ➡ K9~K14
			φDc	Lp	PR1535	PR1525	
	 	DA 1250M-GM	12.50	2.12	●	●	SS14-DRA125M-○ SF16-DRA125M-○
		1260M-GM	12.60	2.14	●	●	
		1270M-GM	12.70	2.16	●	●	
		1280M-GM	12.80	2.17	●	●	
		1290M-GM	12.90	2.19	●	●	
		DA 1300M-GM	13.00	2.20	●	●	SS14-DRA130M-○ SF16-DRA130M-○
		1310M-GM	13.10	2.22	●	●	
		1320M-GM	13.20	2.24	●	●	
		1330M-GM	13.30	2.25	●	●	
		1340M-GM	13.40	2.27	●	●	
		DA 1350M-GM	13.50	2.29	●	●	SS14-DRA135M-○ SF16-DRA135M-○
		1360M-GM	13.60	2.31	●	●	
		1370M-GM	13.70	2.33	●	●	
		1380M-GM	13.80	2.35	●	●	
		1390M-GM	13.90	2.36	●	●	
		DA 1400M-GM	14.00	2.33	●	●	SS16-DRA140M-○ SF16-DRA140M-○
		1410M-GM	14.10	2.34	●	●	
		1420M-GM	14.20	2.36	●	●	
		1430M-GM	14.30	2.38	●	●	
		1440M-GM	14.40	2.40	●	●	
		DA 1450M-GM	14.50	2.42	●	●	SS16-DRA145M-○ SF16-DRA145M-○
		1460M-GM	14.60	2.43	●	●	
		1470M-GM	14.70	2.45	●	●	
		1480M-GM	14.80	2.47	●	●	
		1490M-GM	14.90	2.49	●	●	
		DA 1500M-GM	15.00	2.52	●	●	SS16-DRA150M-○ SF20-DRA150M-○
		1510M-GM	15.10	2.54	●	●	
		1520M-GM	15.20	2.55	●	●	
		1530M-GM	15.30	2.57	●	●	
		1540M-GM	15.40	2.59	●	●	
		1550M-GM	15.50	2.61	●	●	
		1560M-GM	15.60	2.63	●	●	
		1570M-GM	15.70	2.65	●	●	
		1580M-GM	15.80	2.66	●	●	
		1590M-GM	15.90	2.68	●	●	
		DA 1600M-GM	16.00	2.69	●	●	SS18-DRA160M-○ SF20-DRA160M-○
		1610M-GM	16.10	2.71	●	●	
		1620M-GM	16.20	2.73	●	●	
		1630M-GM	16.30	2.75	●	●	
		1640M-GM	16.40	2.76	●	●	
		1650M-GM	16.50	2.78	●	●	
		1660M-GM	16.60	2.80	●	●	
		1670M-GM	16.70	2.82	●	●	
		1680M-GM	16.80	2.84	●	●	
		1690M-GM	16.90	2.86	●	●	
		DA 1700M-GM	17.00	2.86	●	●	SS18-DRA170M-○ SF20-DRA170M-○
		1710M-GM	17.10	2.88	●	●	
		1720M-GM	17.20	2.90	●	●	
		1730M-GM	17.30	2.92	●	●	
		1740M-GM	17.40	2.93	●	●	
		1750M-GM	17.50	2.95	●	●	
		1760M-GM	17.60	2.97	●	●	
		1770M-GM	17.70	2.99	●	●	
		1780M-GM	17.80	3.01	●	●	
		1790M-GM	17.90	3.03	●	●	
		DA 1800M-GM	18.00	3.04	●	●	SS20-DRA180M-○ SF25-DRA180M-○
		1810M-GM	18.10	3.06	●	●	
		1820M-GM	18.20	3.07	●	●	
		1830M-GM	18.30	3.09	●	●	
		1840M-GM	18.40	3.11	●	●	
		1850M-GM	18.50	3.13	●	●	
		1860M-GM	18.60	3.15	●	●	
		1870M-GM	18.70	3.17	●	●	
		1880M-GM	18.80	3.18	●	●	
		1890M-GM	18.90	3.20	●	●	

k8 tolerance

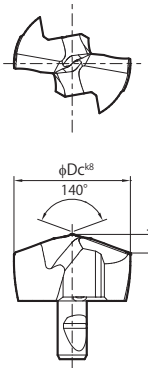
φDc	k8(mm)
7.94 ≤ 10.00	+0.022 0
10.10 ≤ 18.00	+0.027 0
18.10 ≤ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

● : Std. Item

DA inserts are sold in 1 piece boxes

MagicDrill Insert for DRA NEW

Insert		Description		Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ➔ K9~K14
				φDc	Lp	PR1535	PR1525	
		DA	1900M-GM	19.00	3.21	●	●	SS20-DRA190M-○ SF25-DRA190M-○
			1910M-GM	19.10	3.23	●	●	
			1920M-GM	19.20	3.25	●	●	
			1930M-GM	19.30	3.27	●	●	
			1940M-GM	19.40	3.29	●	●	
			1950M-GM	19.50	3.30	●	●	
			1960M-GM	19.60	3.32	●	●	
			1970M-GM	19.70	3.34	●	●	
			1980M-GM	19.80	3.36	●	●	
			1990M-GM	19.90	3.38	●	●	
		DA	2000M-GM	20.00	3.37	●	●	SS25-DRA200M-○ SF25-DRA200M-○
			2010M-GM	20.10	3.39	●	●	
			2020M-GM	20.20	3.41	●	●	
			2030M-GM	20.30	3.43	●	●	
			2040M-GM	20.40	3.45	●	●	
			2050M-GM	20.50	3.46	●	●	
			2060M-GM	20.60	3.48	●	●	
			2070M-GM	20.70	3.50	●	●	
			2080M-GM	20.80	3.52	●	●	
			2090M-GM	20.90	3.54	●	●	
		DA	2100M-GM	21.00	3.54	●	●	SS25-DRA210M-○ SF25-DRA210M-○
			2150M-GM	21.50	3.63	●	●	
		DA	2200M-GM	22.00	3.71	●	●	SS25-DRA220M-○ SF25-DRA220M-○
			2250M-GM	22.50	3.80	●	●	
		DA	2300M-GM	23.00	3.87	●	●	SS25-DRA230M-○ SF25-DRA230M-○
			2350M-GM	23.50	3.96	●	●	
		DA	2400M-GM	24.00	4.04	●	●	SS25-DRA240M-○ SF25-DRA240M-○
			2450M-GM	24.50	4.13	●	●	
		DA	2500M-GM	25.00	4.20	●	●	SS32-DRA250M-○ SF25-DRA250M-○
			2550M-GM	25.50	4.29	●	●	

k8 tolerance

φDc	k8(mm)
7.94 ≀ 10.00	+0.022 0
10.10 ≀ 18.00	+0.027 0
18.10 ≀ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

DA inserts are sold in 1 piece boxes

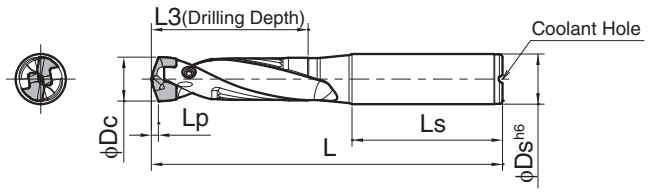
● : Std. Item

Description Identification System (Toolholder)

□□○○— DRA ○○○ M —○

Shank Type	Shank Dia. (mm)	Minimum Insert Dia.	Metric	Drilling Depth
SS:Straight Shank SF:Flanged Shank				3(L3≈3×Dc) 5(L3≈5×Dc) 8(L3≈8×Dc)

SS-DRA (Drilling Depth:3×D)



3D

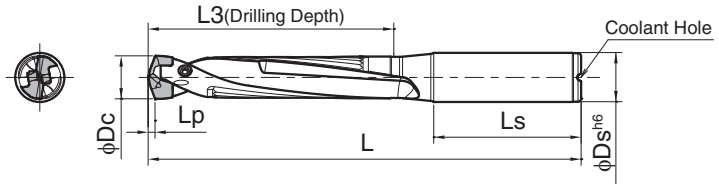
· For Lp indicates distance from drill point to corner edge K6~K8

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts		Applicable Inserts K6~K8
			Applicable Insert Dia. φDc		φDs (h6)	L	L3	Ls	Clamp Screw	Wrench	
			min.	max.							
SS10-	DRA080M-3	●	7.94	8.49	10	79	25.5	40	HS-2524TRP	FTP-5	DA0794M-GM~DA0840M-GM
	DRA085M-3	●	8.50	8.99		81	27.0				DA0850M-GM~DA0890M-GM
	DRA090M-3	●	9.00	9.49		83	28.5				DA0900M-GM~DA0940M-GM
	DRA095M-3	●	9.50	9.99		85	30.0				DA0950M-GM~DA0990M-GM
SS12-	DRA100M-3	●	10.00	10.49	12	92	31.5	45	HS-2534TRP		DA1000M-GM~DA1040M-GM
	DRA105M-3	●	10.50	10.99		94	33.0				DA1050M-GM~DA1090M-GM
	DRA110M-3	●	11.00	11.49		97	34.5				DA1100M-GM~DA1140M-GM
	DRA115M-3	●	11.50	11.99		99	36.0				DA1150M-GM~DA1190M-GM
SS14-	DRA120M-3	●	12.00	12.49	14	101	37.5				DA1200M-GM~DA1240M-GM
	DRA125M-3	●	12.50	12.99		103	39.0				DA1250M-GM~DA1290M-GM
	DRA130M-3	●	13.00	13.49		105	40.5				DA1300M-GM~DA1340M-GM
	DRA135M-3	●	13.50	13.99		107	42.0				DA1350M-GM~DA1390M-GM
SS16-	DRA140M-3	●	14.00	14.49	16	112	43.5	48	HS-3048TRP	FTP-6	DA1400M-GM~DA1440M-GM
	DRA145M-3	●	14.50	14.99		114	45.0				DA1450M-GM~DA1490M-GM
	DRA150M-3	●	15.00	15.99		119	48.0				DA1500M-GM~DA1590M-GM
SS18-	DRA160M-3	●	16.00	16.99	18	124	51.0				DA1600M-GM~DA1690M-GM
	DRA170M-3	●	17.00	17.99		128	54.0				DA1700M-GM~DA1790M-GM
SS20-	DRA180M-3	●	18.00	18.99	20	135	57.0	50	HS-4067TRP	FTP-7	DA1800M-GM~DA1890M-GM
	DRA190M-3	●	19.00	19.99		139	60.0				DA1900M-GM~DA1990M-GM
SS25-	DRA200M-3	●	20.00	20.99	25	149	63.0	56			DA2000M-GM~DA2090M-GM
	DRA210M-3	●	21.00	21.99		153	66.0				DA2100M-GM~DA2150M-GM
	DRA220M-3	●	22.00	22.99		158	69.0				DA2200M-GM~DA2250M-GM
	DRA230M-3	●	23.00	23.99		162	72.0				DA2300M-GM~DA2350M-GM
	DRA240M-3	●	24.00	24.99		166	75.0				DA2400M-GM~DA2450M-GM
SS32-	DRA250M-3	●	25.00	25.50	32	174	78.0	60			DA2500M-GM~DA2550M-GM

● : Std. Item

SS-DRA (Drilling Depth:5×D)



5D

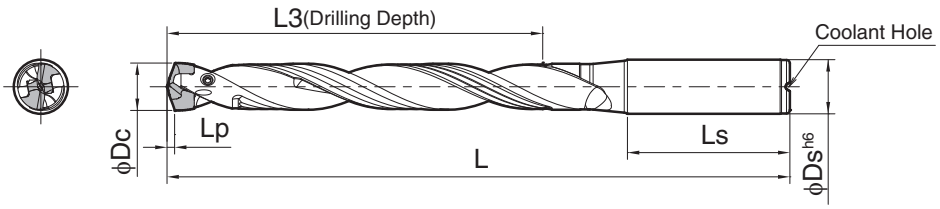
· For Lp indicates distance from drill point to corner edge K6~K8

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts		Applicable Inserts K6~K8
			Applicable Insert Dia. φDc		φDs (h6)	L	L3	Ls	Clamp Screw	Wrench	
			min.	max.							
SS10-	DRA080M-5	●	7.94	8.49	10	96	42.5	40	HS-2524TRP	FTP-5	DA0794M-GM~DA0840M-GM
	DRA085M-5	●	8.50	8.99		99	45.0				DA0850M-GM~DA0890M-GM
	DRA090M-5	●	9.00	9.49		102	47.5				DA0900M-GM~DA0940M-GM
	DRA095M-5	●	9.50	9.99		105	50.0				DA0950M-GM~DA0990M-GM
SS12-	DRA100M-5	●	10.00	10.49	12	113	52.5	45	HS-2534TRP		DA1000M-GM~DA1040M-GM
	DRA105M-5	●	10.50	10.99		116	55.0				DA1050M-GM~DA1090M-GM
	DRA110M-5	●	11.00	11.49		120	57.5				DA1100M-GM~DA1140M-GM
	DRA115M-5	●	11.50	11.99		123	60.0				DA1150M-GM~DA1190M-GM
SS14-	DRA120M-5	●	12.00	12.49	14	126	62.5				DA1200M-GM~DA1240M-GM
	DRA125M-5	●	12.50	12.99		129	65.0				DA1250M-GM~DA1290M-GM
	DRA130M-5	●	13.00	13.49		132	67.5				DA1300M-GM~DA1340M-GM
	DRA135M-5	●	13.50	13.99		135	70.0				DA1350M-GM~DA1390M-GM
SS16-	DRA140M-5	●	14.00	14.49	16	141	72.5	48	HS-3048TRP	FTP-6	DA1400M-GM~DA1440M-GM
	DRA145M-5	●	14.50	14.99		144	75.0				DA1450M-GM~DA1490M-GM
	DRA150M-5	●	15.00	15.99		151	80.0				DA1500M-GM~DA1590M-GM
SS18-	DRA160M-5	●	16.00	16.99	18	158	85.0				DA1600M-GM~DA1690M-GM
	DRA170M-5	●	17.00	17.99		164	90.0				DA1700M-GM~DA1790M-GM
SS20-	DRA180M-5	●	18.00	18.99	20	173	95.0	50	HS-4067TRP	FTP-7	DA1800M-GM~DA1890M-GM
	DRA190M-5	●	19.00	19.99		179	100.0				DA1900M-GM~DA1990M-GM
SS25-	DRA200M-5	●	20.00	20.99	25	191	105.0	56			DA2000M-GM~DA2090M-GM
	DRA210M-5	●	21.00	21.99		197	110.0				DA2100M-GM~DA2150M-GM
	DRA220M-5	●	22.00	22.99		204	115.0				DA2200M-GM~DA2250M-GM
	DRA230M-5	●	23.00	23.99		210	120.0				DA2300M-GM~DA2350M-GM
	DRA240M-5	●	24.00	24.99		216	125.0				DA2400M-GM~DA2450M-GM
SS32-	DRA250M-5	●	25.00	25.50	32	226	130.0	60			DA2500M-GM~DA2550M-GM

● : Std. Item

SS-DRA (Drilling Depth:8×D)



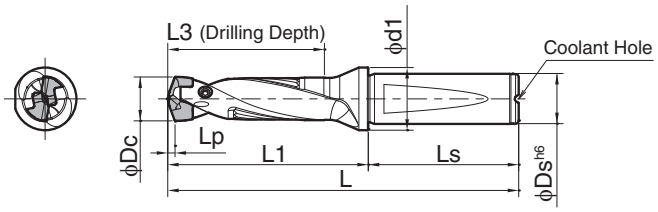
· For Lp indicates distance from drill point to corner edge K6~K8

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts		Applicable Inserts K6~K8
			Applicable Insert Dia. φDc		φDs (h6)	L	L3	Ls	Clamp Screw	Wrench	
			min.	max.							
SS10-	DRA080M-8	●	7.94	8.49	10	121	68.0	40	HS-2524TRP	FTP-5	DA0794M-GM~DA0840M-GM
	DRA085M-8	●	8.50	8.99		126	72.0				DA0850M-GM~DA0890M-GM
	DRA090M-8	●	9.00	9.49		130	76.0				DA0900M-GM~DA0940M-GM
	DRA095M-8	●	9.50	9.99		135	80.0				DA0950M-GM~DA0990M-GM
SS12-	DRA100M-8	●	10.00	10.49	12	144	84.0	45	HS-2534TRP		DA1000M-GM~DA1040M-GM
	DRA105M-8	●	10.50	10.99		149	88.0				DA1050M-GM~DA1090M-GM
	DRA110M-8	●	11.00	11.49		154	92.0				DA1100M-GM~DA1140M-GM
	DRA115M-8	●	11.50	11.99		159	96.0				DA1150M-GM~DA1190M-GM
SS14-	DRA120M-8	●	12.00	12.49	14	163	100.0				DA1200M-GM~DA1240M-GM
	DRA125M-8	●	12.50	12.99		168	104.0				DA1250M-GM~DA1290M-GM
	DRA130M-8	●	13.00	13.49		172	108.0				DA1300M-GM~DA1340M-GM
	DRA135M-8	●	13.50	13.99		177	112.0				DA1350M-GM~DA1390M-GM
SS16-	DRA140M-8	●	14.00	14.49	16	184	116.0	48	HS-3048TRP	FTP-6	DA1400M-GM~DA1440M-GM
	DRA145M-8	●	14.50	14.99		189	120.0				DA1450M-GM~DA1490M-GM
	DRA150M-8	●	15.00	15.99		199	128.0				DA1500M-GM~DA1590M-GM
SS18-	DRA160M-8	●	16.00	16.99	18	209	136.0				DA1600M-GM~DA1690M-GM
	DRA170M-8	●	17.00	17.99		218	144.0				DA1700M-GM~DA1790M-GM
SS20-	DRA180M-8	●	18.00	18.99	20	230	152.0	50	HS-4067TRP	FTP-7	DA1800M-GM~DA1890M-GM
	DRA190M-8	●	19.00	19.99		239	160.0				DA1900M-GM~DA1990M-GM
SS25-	DRA200M-8	●	20.00	20.99	25	254	168.0	56			DA2000M-GM~DA2090M-GM
	DRA210M-8	●	21.00	21.99		263	176.0				DA2100M-GM~DA2150M-GM
	DRA220M-8	●	22.00	22.99		273	184.0				DA2200M-GM~DA2250M-GM
	DRA230M-8	●	23.00	23.99		282	192.0				DA2300M-GM~DA2350M-GM
	DRA240M-8	●	24.00	24.99		291	200.0				DA2400M-GM~DA2450M-GM
SS32-	DRA250M-8	●	25.00	25.50	32	304	208.0	60			DA2500M-GM~DA2550M-GM

● : Std. Item

SF-DRA (Drilling Depth:3×D)



3D

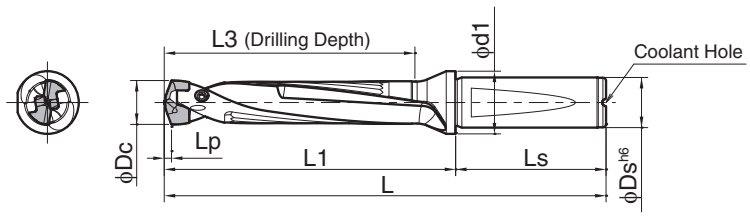
· For Lp indicates distance from drill point to corner edge K6~K8

Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts		Applicable Inserts K6~K8
			Applicable Insert Dia. φDc		φDs (h6)	L	L1	L3	Ls	φd1	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-3	●	7.94	8.49	12	84	39	25.5	45	16	HS-2524TRP	FTP-5	DA0794M-GM~DA0840M-GM
	DRA085M-3	●	8.50	8.99		86	41	27.0					DA0850M-GM~DA0890M-GM
	DRA090M-3	●	9.00	9.49		88	43	28.5					DA0900M-GM~DA0940M-GM
	DRA095M-3	●	9.50	9.99		90	45	30.0					DA0950M-GM~DA0990M-GM
SF16-	DRA100M-3	●	10.00	10.49	16	95	47	31.5	48	20	HS-2534TRP		DA1000M-GM~DA1040M-GM
	DRA105M-3	●	10.50	10.99		97	49	33.0					DA1050M-GM~DA1090M-GM
	DRA110M-3	●	11.00	11.49		100	52	34.5					DA1100M-GM~DA1140M-GM
	DRA115M-3	●	11.50	11.99		102	54	36.0					DA1150M-GM~DA1190M-GM
	DRA120M-3	●	12.00	12.49		104	56	37.5					DA1200M-GM~DA1240M-GM
	DRA125M-3	●	12.50	12.99		106	58	39.0					DA1250M-GM~DA1290M-GM
	DRA130M-3	●	13.00	13.49		108	60	40.5					DA1300M-GM~DA1340M-GM
	DRA135M-3	●	13.50	13.99		110	62	42.0					DA1350M-GM~DA1390M-GM
	DRA140M-3	●	14.00	14.49		112	64	43.5			HS-3048TRP	FTP-6	DA1400M-GM~DA1440M-GM
	DRA145M-3	●	14.50	14.99		114	66	45.0					DA1450M-GM~DA1490M-GM
SF20-	DRA150M-3	●	15.00	15.99	20	121	71	48.0	50	25			DA1500M-GM~DA1590M-GM
	DRA160M-3	●	16.00	16.99		126	76	51.0					DA1600M-GM~DA1690M-GM
	DRA170M-3	●	17.00	17.99		130	80	54.0					DA1700M-GM~DA1790M-GM
SF25-	DRA180M-3	●	18.00	18.99	25	141	85	57.0	56	32	HS-4067TRP	FTP-7	DA1800M-GM~DA1890M-GM
	DRA190M-3	●	19.00	19.99		145	85	60.0					DA1900M-GM~DA1990M-GM
	DRA200M-3	●	20.00	20.99		149	93	63.0					DA2000M-GM~DA2090M-GM
	DRA210M-3	●	21.00	21.99		153	97	66.0					DA2100M-GM~DA2150M-GM
	DRA220M-3	●	22.00	22.99		158	102	69.0					DA2200M-GM~DA2250M-GM
	DRA230M-3	●	23.00	23.99		162	106	72.0					DA2300M-GM~DA2350M-GM
	DRA240M-3	●	24.00	24.99		166	110	75.0					DA2400M-GM~DA2450M-GM
	DRA250M-3	●	25.00	25.50		170	114	78.0					DA2500M-GM~DA2550M-GM

● : Std. Item

SF-DRA (Drilling Depth:5×D)



5D

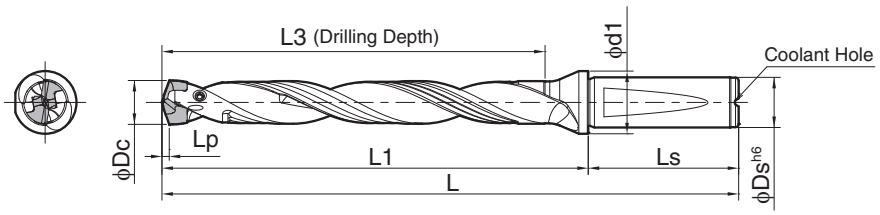
· For Lp indicates distance from drill point to corner edge K6~K8

Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts		Applicable Inserts K6~K8
			Applicable Insert Dia. φDc		φDs (h6)	L	L1	L3	Ls	φd1	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-5	●	7.94	8.49	12	101	56	42.5	45	16	HS-2524TRP	FTP-5	DA0794M-GM~DA0840M-GM
	DRA085M-5	●	8.50	8.99		104	59	45.0					DA0850M-GM~DA0890M-GM
	DRA090M-5	●	9.00	9.49		107	62	47.5					DA0900M-GM~DA0940M-GM
	DRA095M-5	●	9.50	9.99		110	65	50.0					DA0950M-GM~DA0990M-GM
SF16-	DRA100M-5	●	10.00	10.49	16	116	68	52.5	48	20	HS-2534TRP		DA1000M-GM~DA1040M-GM
	DRA105M-5	●	10.50	10.99		119	71	55.0					DA1050M-GM~DA1090M-GM
	DRA110M-5	●	11.00	11.49		123	75	57.5					DA1100M-GM~DA1140M-GM
	DRA115M-5	●	11.50	11.99		126	78	60.0					DA1150M-GM~DA1190M-GM
	DRA120M-5	●	12.00	12.49		129	81	62.5					DA1200M-GM~DA1240M-GM
	DRA125M-5	●	12.50	12.99		132	84	65.0					DA1250M-GM~DA1290M-GM
	DRA130M-5	●	13.00	13.49		135	87	67.5					DA1300M-GM~DA1340M-GM
	DRA135M-5	●	13.50	13.99		138	90	70.0					DA1350M-GM~DA1390M-GM
	DRA140M-5	●	14.00	14.49		141	93	72.5			HS-3048TRP	FTP-6	DA1400M-GM~DA1440M-GM
	DRA145M-5	●	14.50	14.99		144	96	75.0					DA1450M-GM~DA1490M-GM
SF20-	DRA150M-5	●	15.00	15.99	20	153	103	80.0	50	25			DA1500M-GM~DA1590M-GM
	DRA160M-5	●	16.00	16.99		160	110	85.0					DA1600M-GM~DA1690M-GM
	DRA170M-5	●	17.00	17.99		166	116	90.0					DA1700M-GM~DA1790M-GM
SF25-	DRA180M-5	●	18.00	18.99	25	179	123	95.0	56	32	HS-4067TRP	FTP-7	DA1800M-GM~DA1890M-GM
	DRA190M-5	●	19.00	19.99		185	129	100.0					DA1900M-GM~DA1990M-GM
	DRA200M-5	●	20.00	20.99		191	135	105.0					DA2000M-GM~DA2090M-GM
	DRA210M-5	●	21.00	21.99		197	141	110.0					DA2100M-GM~DA2150M-GM
	DRA220M-5	●	22.00	22.99		204	148	115.0					DA2200M-GM~DA2250M-GM
	DRA230M-5	●	23.00	23.99		210	154	120.0					DA2300M-GM~DA2350M-GM
	DRA240M-5	●	24.00	24.99		216	160	125.0					DA2400M-GM~DA2450M-GM
	DRA250M-5	●	25.00	25.50		222	166	130.0					DA2500M-GM~DA2550M-GM

● : Std. Item

SF-DRA (Drilling Depth:8×D)



8D

· For Lp indicates distance from drill point to corner edge K6~K8

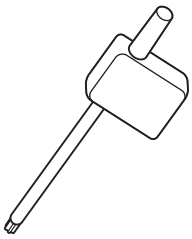
Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts		Applicable Inserts K6~K8
			Applicable Insert Dia. φDc		φDs (h6)	L	L1	L3	Ls	φd1	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-8	●	7.94	8.49	12	126	81	68.0	45	16	HS-2524TRP	FTP-5	DA0794M-GM~DA0840M-GM
	DRA085M-8	●	8.50	8.99		131	86	72.0					DA0850M-GM~DA0890M-GM
	DRA090M-8	●	9.00	9.49		135	90	76.0					DA0900M-GM~DA0940M-GM
	DRA095M-8	●	9.50	9.99		140	95	80.0					DA0950M-GM~DA0990M-GM
SF16-	DRA100M-8	●	10.00	10.49	16	147	99	84.0	48	20	HS-2534TRP		DA1000M-GM~DA1040M-GM
	DRA105M-8	●	10.50	10.99		152	104	88.0					DA1050M-GM~DA1090M-GM
	DRA110M-8	●	11.00	11.49		157	109	92.0					DA1100M-GM~DA1140M-GM
	DRA115M-8	●	11.50	11.99		162	114	96.0					DA1150M-GM~DA1190M-GM
	DRA120M-8	●	12.00	12.49		166	118	100.0					DA1200M-GM~DA1240M-GM
	DRA125M-8	●	12.50	12.99		171	123	104.0					DA1250M-GM~DA1290M-GM
	DRA130M-8	●	13.00	13.49		175	127	108.0					DA1300M-GM~DA1340M-GM
	DRA135M-8	●	13.50	13.99		180	132	112.0					DA1350M-GM~DA1390M-GM
	DRA140M-8	●	14.00	14.49		184	136	116.0			HS-3048TRP	FTP-6	DA1400M-GM~DA1440M-GM
	DRA145M-8	●	14.50	14.99		189	141	120.0					DA1450M-GM~DA1490M-GM
SF20-	DRA150M-8	●	15.00	15.99	20	201	151	128.0	50	25			DA1500M-GM~DA1590M-GM
	DRA160M-8	●	16.00	16.99		211	161	136.0					DA1600M-GM~DA1690M-GM
	DRA170M-8	●	17.00	17.99		220	170	144.0					DA1700M-GM~DA1790M-GM
SF25-	DRA180M-8	●	18.00	18.99	25	236	180	152.0	56	32	HS-4067TRP	FTP-7	DA1800M-GM~DA1890M-GM
	DRA190M-8	●	19.00	19.99		245	189	160.0					DA1900M-GM~DA1990M-GM
	DRA200M-8	●	20.00	20.99		254	198	168.0					DA2000M-GM~DA2090M-GM
	DRA210M-8	●	21.00	21.99		263	207	176.0					DA2100M-GM~DA2150M-GM
	DRA220M-8	●	22.00	22.99		273	217	184.0					DA2200M-GM~DA2250M-GM
	DRA230M-8	●	23.00	23.99		282	226	192.0					DA2300M-GM~DA2350M-GM
	DRA240M-8	●	24.00	24.99		291	235	200.0					DA2400M-GM~DA2450M-GM
	DRA250M-8	●	25.00	25.50		300	244	208.0					DA2500M-GM~DA2550M-GM

● : Std. Item

Spare Parts

Clamp Screw	Description
	HS-2524TRP
	HS-2534TRP
	HS-3048TRP
	HS-4067TRP

Wrench	Description	Tightening Torque (N·m)
	FTP-5	0.4
	FTP-6	0.5
	FTP-7	0.8

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades / Cutting Speed Vc (m/min)		n (min^{-1})	Drill Dia. φDc(mm)						Remarks
	PR1535	PR1525	f (mm/rev)	φ8	φ11	φ14	φ18	φ22	φ25	
Low Carbon Steel	★ 100–180	☆ 100–180	n (min^{-1})	3,980 - 7,160	2,890 - 5,210	2,270 - 4,090	1,770 - 3,180	1,450 - 2,600	1,270 - 2,290	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
Carbon Steel	★ 100–150	☆ 100–150	n (min^{-1})	3,980 - 5,970	2,890 - 4,340	2,270 - 3,410	1,770 - 2,650	1,450 - 2,170	1,270 - 1,910	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
Alloy Steel	★ 70–120	☆ 70–120	n (min^{-1})	2,790 - 4,780	2,030 - 3,470	1,590 - 2,730	1,240 - 2,120	1,010 - 1,740	890 - 1,530	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
Mold Steel	★ 50–90	☆ 50–90	n (min^{-1})	1,990 - 3,580	1,450 - 2,600	1,140 - 2,050	880 - 1,590	720 - 1,300	640 - 1,150	
			f (mm/rev)	0.08 - 0.17	0.08 - 0.22	0.11 - 0.25	0.11 - 0.28	0.14 - 0.32	0.14 - 0.32	Coolant ➔ K16
Stainless Steel	★ 40–70	☆ 40–70	n (min^{-1})	1,590 - 2,790	1,160 - 2,030	910 - 1,590	710 - 1,240	580 - 1,010	510 - 890	
			f (mm/rev)	0.1 - 0.24	0.1 - 0.24	0.12 - 0.3	0.15 - 0.3	0.15 - 0.3	0.15 - 0.35	
				*Feed Rate 0.15 mm/rev or less is recommended until drilling depth reaches 0.5D						
Gray Cast Iron	☆ 90–170	★ 90–170	n (min^{-1})	3,580 - 6,760	2,600 - 4,920	2,050 - 3,870	1,590 - 3,010	1,300 - 2,460	1,150 - 2,170	
			f (mm/rev)	0.14 - 0.29	0.14 - 0.37	0.19 - 0.43	0.19 - 0.45	0.24 - 0.45	0.24 - 0.45	
Nodular Cast Iron	☆ 40–120	★ 40–120	n (min^{-1})	1,590 - 4,780	1,160 - 3,470	910 - 2,730	710 - 2,120	580 - 1,740	510 - 1,530	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	

★1st Recommendation ☆2nd Recommendation

As drilling depth increases (3D 5D 8D), feed rates should be reduced.
Recommended feed rate: 3D type = 100%, 5D type = 80% or less, 8D type = 70% or less.

Coolant

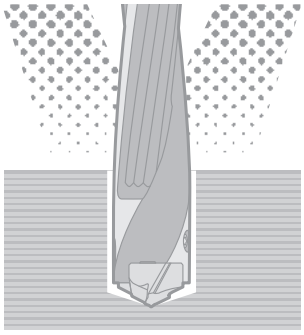
1st Recommendation

Internal coolant

The combination of internal and external coolant is recommended for stainless steel or high-feed machining.

In case of external coolant

Lathe: 3D or less
Vertical M/C: 1.5D or less

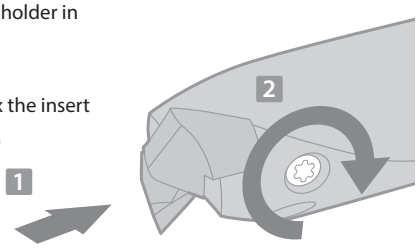


* Dry machining is not recommended.

How to attach inserts

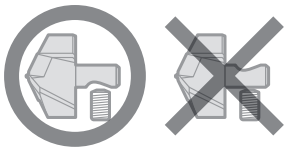
1 Install insert onto the toolholder in the right direction.

2 Tighten clamp screw to fix the insert
Tightening Torque K15



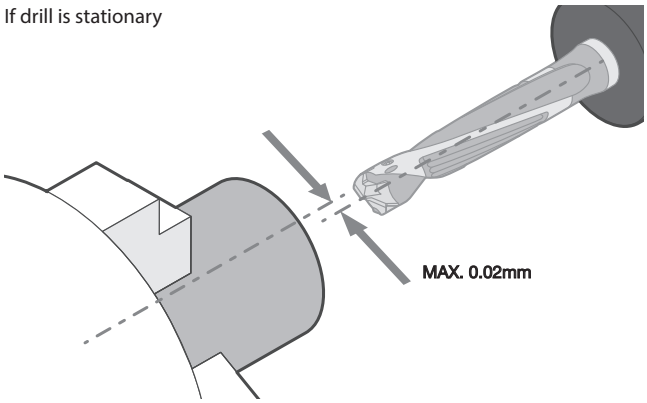
* 1 Remove dust on insert pocket using air blow for every replacement.
* 2 Make sure that the locating surfaces of the insert closely contacts the toolholder.

Be careful of the insert direction



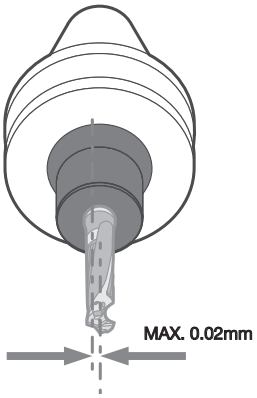
Core Deviation

If drill is stationary



This is be used with a boring sleeve and collet chuck, please be sure to set deviation amount under 0.02mm between workpiece and drill.

If drill is rotating



Make sure to use arbor that is not deformed.
Center of arbor deviation must be within 0.02mm.

Cautions for installation on Machining Center

For installation of MagicDrill DRA

1st Choice

use Hydro Chuck, Power Chuck, Collet Chuck, etc.

Hydro Chuck

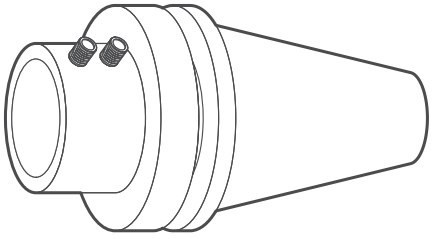
Power Chuck

Collet Chuck

Install MagicDrill DRA to above chuck

2nd choice

Side lock arbor

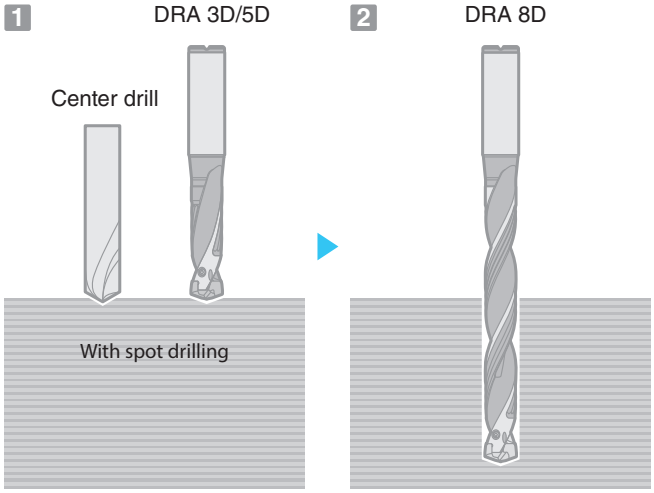


Example of side lock arbor

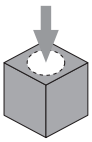
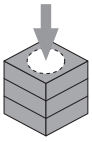
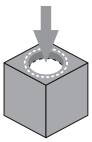
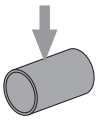
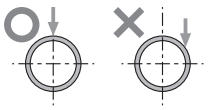
Cautions for machining with 8D holder

Recommended machining

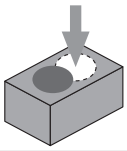
1 Make a center spot using DRA 3D/5D type or a commercially available center drill which has a vertex angle of about 140°.
(Center spot should be at least half of cutting diameter)
2 Then drill the hole using DRA (8D type).

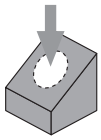


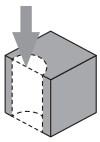
Applicable workpiece

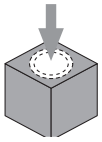
Applications	Shape of Workpiece	Caution for machining
Plain Surface		1.When machining stainless steel, for hole depths of up to 0.5D, keep feed rate at less than 0.15mm/rev. 2.Internal coolant is recommended for smooth chip removal. For stainless steel, the combination of internal and external coolant is recommended.
Stacked Plates		1.Fix stacked plates securely to ensure they do not slip while machining.
Concave Surface		1.When machining concave holes, set the feed rate at less than half of recommended feed for continuous hole machining. 2.Utilize a step feeding if chips are not broken short at the inlet.
Pipe Material		1.Hole machining above the centerline of the pipe is possible. 2.Do not machine on curved surface areas.  Center portion machining / Curved surface portion machining

Not Recommended workpieces

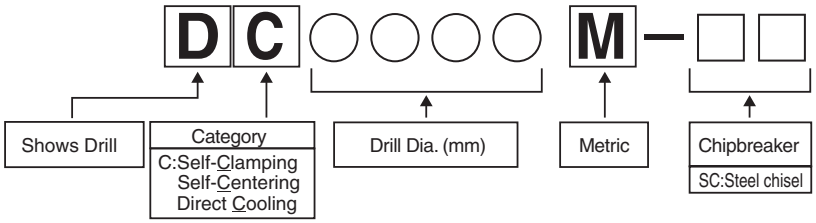
Applications	Shape of Workpiece
Hole Expansion	

Applications	Shape of Workpiece
Slant Surface	

Applications	Shape of Workpiece
Half Cylindrical	

Applications	Shape of Workpiece
Cored Hole	

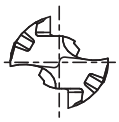
Description Identification System (Insert)

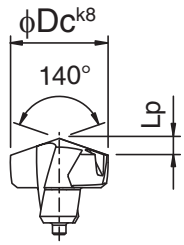


Insert Grades PR0315

PR0315 is tough super micro grain carbide grade with TiAlN coating, with excellent wear resistance and fracture resistance.
It enables stable machining of carbon steel, alloy steel and cast iron.

Insert	Description		Dimension (mm) φDc	Dimension (mm) Lp	PVD Coated Carbide PR0315	Applicable Toolholders ➡K21~K23,K26~K28
	DC	0794M-SC	7.94	1.44	●	SS10-DRC080M-○ SF12-DRC080M-○
		0800M-SC	8.00	1.46	●	
		0810M-SC	8.10	1.47	●	
		0820M-SC	8.20	1.49	●	
		0830M-SC	8.30	1.51	●	
		0840M-SC	8.40	1.53	●	
	DC	0850M-SC	8.50	1.55	●	SS10-DRC085M-○ SF12-DRC085M-○
		0860M-SC	8.60	1.56	●	
		0870M-SC	8.70	1.58	●	
		0880M-SC	8.80	1.60	●	
		0890M-SC	8.90	1.62	●	
	DC	0900M-SC	9.00	1.64	●	SS10-DRC090M-○ SF12-DRC090M-○
		0910M-SC	9.10	1.66	●	
		0920M-SC	9.20	1.67	●	
		0930M-SC	9.30	1.69	●	
		0940M-SC	9.40	1.71	●	
	DC	0950M-SC	9.50	1.73	●	SS10-DRC095M-○ SF12-DRC095M-○
		0960M-SC	9.60	1.75	●	
		0970M-SC	9.70	1.76	●	
		0980M-SC	9.80	1.78	●	
		0990M-SC	9.90	1.80	●	
	DC	1000M-SC	10.00	1.82	●	SS12-DRC100M-○ SF16-DRC100M-○
		1010M-SC	10.10	1.84	●	
		1020M-SC	10.20	1.86	●	
		1030M-SC	10.30	1.87	●	
		1040M-SC	10.40	1.89	●	
	DC	1050M-SC	10.50	1.91	●	SS12-DRC105M-○ SF16-DRC105M-○
		1060M-SC	10.60	1.93	●	
		1070M-SC	10.70	1.95	●	
		1080M-SC	10.80	1.96	●	
		1090M-SC	10.90	1.98	●	
	DC	1100M-SC	11.00	2.00	●	SS12-DRC110M-○ SF16-DRC110M-○
		1110M-SC	11.10	2.02	●	
		1120M-SC	11.20	2.04	●	
		1130M-SC	11.30	2.06	●	
		1140M-SC	11.40	2.07	●	
	DC	1150M-SC	11.50	2.09	●	SS12-DRC115M-○ SF16-DRC115M-○
		1160M-SC	11.60	2.11	●	
		1170M-SC	11.70	2.13	●	
		1180M-SC	11.80	2.15	●	
		1190M-SC	11.90	2.16	●	
	DC	1200M-SC	12.00	2.18	●	SS14-DRC120M-○ SF16-DRC120M-○
		1210M-SC	12.10	2.20	●	
		1220M-SC	12.20	2.22	●	
		1230M-SC	12.30	2.24	●	
		1240M-SC	12.40	2.26	●	





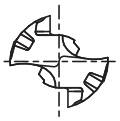
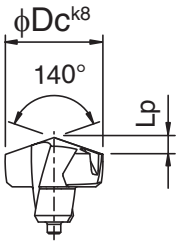
k8 tolerance

φDc	k8(mm)
7.94 ≀ 10.00	+0.022 0
10.10 ≀ 18.00	+0.027 0
18.10 ≀ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

● : Std. Item

DC inserts are sold in 1 piece boxes

Insert	Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholders ➡K21~K23,K26~K28
			φDc	Lp	PR0315	
	DC	1250M-SC	12.50	2.27	●	SS14-DRC125M-○ SF16-DRC125M-○
		1260M-SC	12.60	2.29	●	
		1270M-SC	12.70	2.31	●	
		1280M-SC	12.80	2.33	●	
		1290M-SC	12.90	2.35	●	
	DC	1300M-SC	13.00	2.36	●	SS14-DRC130M-○ SF16-DRC130M-○
		1310M-SC	13.10	2.38	●	
		1320M-SC	13.20	2.40	●	
		1330M-SC	13.30	2.42	●	
		1340M-SC	13.40	2.44	●	
	DC	1350M-SC	13.50	2.46	●	SS14-DRC135M-○ SF16-DRC135M-○
		1360M-SC	13.60	2.47	●	
		1370M-SC	13.70	2.49	●	
		1380M-SC	13.80	2.51	●	
		1390M-SC	13.90	2.53	●	
	DC	1400M-SC	14.00	2.55	●	SS16-DRC140M-○ SF16-DRC140M-○
		1410M-SC	14.10	2.56	●	
		1420M-SC	14.20	2.58	●	
		1430M-SC	14.30	2.60	●	
		1440M-SC	14.40	2.62	●	
	DC	1450M-SC	14.50	2.64	●	SS16-DRC145M-○ SF16-DRC145M-○
		1460M-SC	14.60	2.66	●	
		1470M-SC	14.70	2.67	●	
		1480M-SC	14.80	2.69	●	
		1490M-SC	14.90	2.71	●	
 	DC	1500M-SC	15.00	2.73	●	SS16-DRC150M-○ SF20-DRC150M-○
		1510M-SC	15.10	2.75	●	
		1520M-SC	15.20	2.76	●	
		1530M-SC	15.30	2.78	●	
		1540M-SC	15.40	2.80	●	
		1550M-SC	15.50	2.82	●	
		1560M-SC	15.60	2.84	●	
		1570M-SC	15.70	2.86	●	
		1580M-SC	15.80	2.87	●	
	DC	1600M-SC	16.00	2.91	●	SS18-DRC160M-○ SF20-DRC160M-○
		1610M-SC	16.10	2.93	●	
		1620M-SC	16.20	2.95	●	
		1630M-SC	16.30	2.96	●	
		1640M-SC	16.40	2.98	●	
		1650M-SC	16.50	3.00	●	
		1660M-SC	16.60	3.02	●	
		1670M-SC	16.70	3.04	●	
		1680M-SC	16.80	3.06	●	
		1690M-SC	16.90	3.07	●	
	DC	1700M-SC	17.00	3.09	●	SS18-DRC170M-○ SF20-DRC170M-○
		1710M-SC	17.10	3.11	●	
		1720M-SC	17.20	3.13	●	
		1730M-SC	17.30	3.15	●	
		1740M-SC	17.40	3.16	●	
		1750M-SC	17.50	3.18	●	
		1760M-SC	17.60	3.20	●	
		1770M-SC	17.70	3.22	●	
		1780M-SC	17.80	3.24	●	
		1790M-SC	17.90	3.26	●	
	DC	1800M-SC	18.00	3.27	●	SS20-DRC180M-○ SF25-DRC180M-○
		1810M-SC	18.10	3.29	●	
		1820M-SC	18.20	3.31	●	
		1830M-SC	18.30	3.33	●	
		1840M-SC	18.40	3.35	●	
		1850M-SC	18.50	3.36	●	
		1860M-SC	18.60	3.38	●	
		1870M-SC	18.70	3.40	●	
		1880M-SC	18.80	3.42	●	
		1890M-SC	18.90	3.44	●	

k8 tolerance

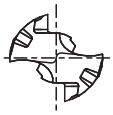
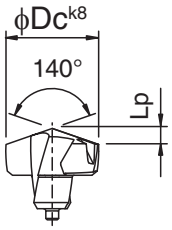
φDc	k8(mm)
7.94 ≤ 10.00	+0.022 0
10.10 ≤ 18.00	+0.027 0
18.10 ≤ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

● : Std. Item

DC inserts are sold in 1 piece boxes

MagicDrill Insert for DRC

Insert		Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholders
				φDc	Lp	PR0315	K21~K23,K26~K28
	 	DC	1900M-SC	19.00	3.46	●	SS20-DRC190M-○ SF25-DRC190M-○
			1910M-SC	19.10	3.47	●	
			1920M-SC	19.20	3.49	●	
			1930M-SC	19.30	3.51	●	
			1940M-SC	19.40	3.53	●	
			1950M-SC	19.50	3.55	●	
			1960M-SC	19.60	3.56	●	
			1970M-SC	19.70	3.58	●	
			1980M-SC	19.80	3.60	●	
			1990M-SC	19.90	3.62	●	
		DC	2000M-SC	20.00	3.64	●	SS25-DRC200M-○ SF25-DRC200M-○
			2010M-SC	20.10	3.66	●	
			2020M-SC	20.20	3.67	●	
			2030M-SC	20.30	3.69	●	
			2040M-SC	20.40	3.71	●	
			2050M-SC	20.50	3.73	●	
			2060M-SC	20.60	3.75	●	
			2070M-SC	20.70	3.77	●	
			2080M-SC	20.80	3.78	●	
			2090M-SC	20.90	3.80	●	
			2099M-SC	20.99	3.82	●	
		DC	2100M-SC	21.00	3.82	●	SS25-DRC210M-○ SF25-DRC210M-○
			2150M-SC	21.50	3.91	●	
			2200M-SC	22.00	4.00	●	SS25-DRC220M-○ SF25-DRC220M-○
			2250M-SC	22.50	4.09	●	
			2300M-SC	23.00	4.18	●	SS25-DRC230M-○ SF25-DRC230M-○
			2350M-SC	23.50	4.27	●	
			2400M-SC	24.00	4.37	●	SS25-DRC240M-○ SF25-DRC240M-○
			2450M-SC	24.50	4.46	●	
			2500M-SC	25.00	4.55	●	SS32-DRC250M-○ SF25-DRC250M-○
			2550M-SC	25.50	4.64	●	

k8 tolerance

φDc	k8(mm)
7.94 ≤ 10.00	+0.022 0
10.10 ≤ 18.00	+0.027 0
18.10 ≤ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Q&A

Q-1 Is re-grinding available?

A-1 We don't recommend it. Grinding of edge nose chisel is not possible.

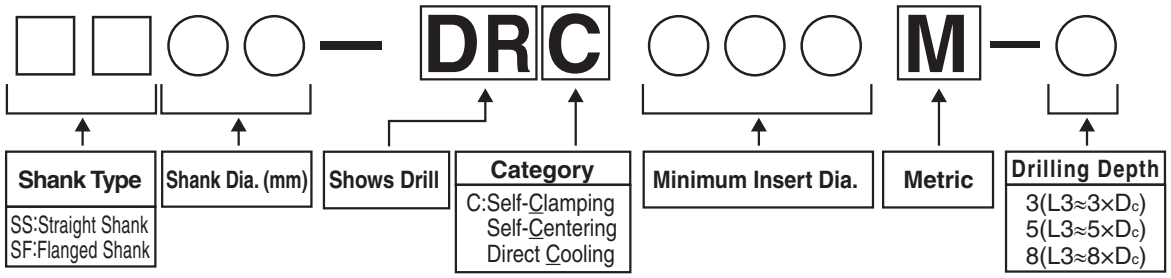
Q-2 How large would the machining hole be to the insert diameter (φDc)?

A-2 The machining hole with SCM435, comparing to the insert diameter(φDc), will be about +0.020~+0.040mm.

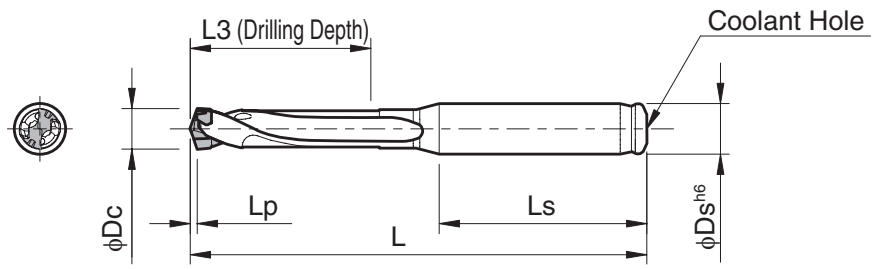
DC inserts are sold in 1 piece boxes

● : Std. Item

Description Identification System (Toolholder)



SS-DRC (Drilling Depth:3×D)



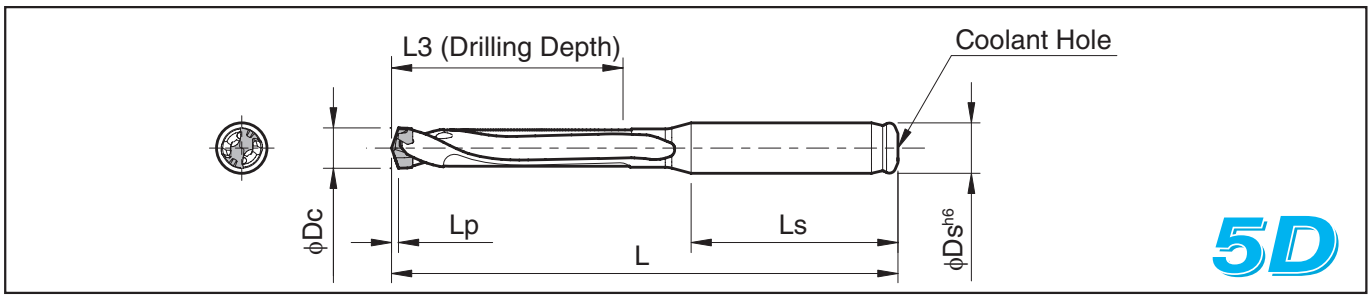
· For Lp indicates distance from drill point to corner edge K18~K20

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts	Applicable Inserts K18~K20	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. φDc		φDs (h6)	L	L3	Ls	Wrench K29		Holder	Insert
			min.	max.								
SS10-	DRC080M-3	●	7.94	8.49	10	79	25.5	40	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-3	●	8.50	8.99		81	27.0			DC0850M-SC~DC0890M-SC		
	DRC090M-3	●	9.00	9.49		83	28.5			DC0900M-SC~DC0940M-SC		
	DRC095M-3	●	9.50	9.99		85	30.0			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-3	●	10.00	10.49	12	92	31.5	45	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-3	●	10.50	10.99		94	33.0			DC1050M-SC~DC1090M-SC		
	DRC110M-3	●	11.00	11.49		96	34.5			DC1100M-SC~DC1140M-SC		
	DRC115M-3	●	11.50	11.99		98	36.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-3	●	12.00	12.49	14	101	37.5		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-3	●	12.50	12.99		103	39.0			DC1250M-SC~DC1290M-SC		
	DRC130M-3	●	13.00	13.49		105	40.5			DC1300M-SC~DC1340M-SC		
	DRC135M-3	●	13.50	13.99		107	42.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-3	●	14.00	14.49	16	112	43.5	48	WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-3	●	14.50	14.99		114	45.0			DC1450M-SC~DC1490M-SC		
	DRC150M-3	●	15.00	15.99		118	48.0			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-3	●	16.00	16.99	18	122	51.0			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-3	●	17.00	17.99		127	54.0		WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-3	●	18.00	18.99	20	133	57.0	50		DC1800M-SC~DC1890M-SC	-	-
	DRC190M-3	●	19.00	19.99		137	60.0			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-3	●	20.00	20.99	25	147	63.0	56		DC2000M-SC~DC2099M-SC		
	DRC210M-3	●	21.00	21.99		151	66.0			DC2100M-SC~DC2150M-SC		
	DRC220M-3	●	22.00	22.99		156	69.0			DC2200M-SC~DC2250M-SC		
	DRC230M-3	●	23.00	23.99		160	72.0			DC2300M-SC~DC2350M-SC		
	DRC240M-3	●	24.00	24.99		164	75.0			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-3	●	25.00	25.50	32	172	78.0	60		DC2500M-SC~DC2550M-SC		

● : Std. Item

SS-DRC (Drilling Depth:5×D)



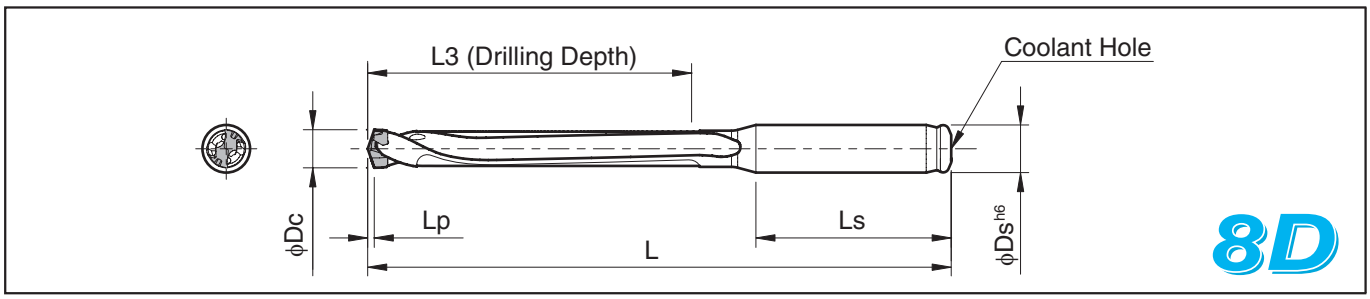
· For Lp indicates distance from drill point to corner edge K18~K20

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts	Applicable Inserts K18~K20	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. φDc		φDs (h6)	L	L3	Ls	Wrench K29		Holder	Insert
			min.	max.								
SS10-	DRC080M-5	●	7.94	8.49	10	97	42.5	40	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-5	●	8.50	8.99		100	45.0			DC0850M-SC~DC0890M-SC		
	DRC090M-5	●	9.00	9.49		103	47.5			DC0900M-SC~DC0940M-SC		
	DRC095M-5	●	9.50	9.99		107	50.0			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-5	●	10.00	10.49	12	115	52.5	45	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-5	●	10.50	10.99		118	55.0			DC1050M-SC~DC1090M-SC		
	DRC110M-5	●	11.00	11.49		121	57.5			DC1100M-SC~DC1140M-SC		
	DRC115M-5	●	11.50	11.99		124	60.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-5	●	12.00	12.49	14	127	62.5		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-5	●	12.50	12.99		130	65.0			DC1250M-SC~DC1290M-SC		
	DRC130M-5	●	13.00	13.49		133	67.5			DC1300M-SC~DC1340M-SC		
	DRC135M-5	●	13.50	13.99		137	70.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-5	●	14.00	14.49	16	143	72.5	48	WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-5	●	14.50	14.99		146	75.0			DC1450M-SC~DC1490M-SC		
	DRC150M-5	●	15.00	15.99		152	80.0			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-5	●	16.00	16.99	18	158	85.0			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-5	●	17.00	17.99		165	90.0		WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-5	●	18.00	18.99	20	173	95.0	50		DC1800M-SC~DC1890M-SC	-	-
	DRC190M-5	●	19.00	19.99		179	100.0			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-5	●	20.00	20.99	25	191	105.0	56		DC2000M-SC~DC2099M-SC		
	DRC210M-5	●	21.00	21.99		198	110.0			DC2100M-SC~DC2150M-SC		
	DRC220M-5	●	22.00	22.99		204	115.0			DC2200M-SC~DC2250M-SC		
	DRC230M-5	●	23.00	23.99		210	120.0			DC2300M-SC~DC2350M-SC		
	DRC240M-5	●	24.00	24.99		216	125.0			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-5	●	25.00	25.50	32	227	130.0	60		DC2500M-SC~DC2550M-SC		

● : Std. Item

SS-DRC (Drilling Depth:8×D)



· For Lp indicates distance from drill point to corner edge K18~K20

Toolholder Dimensions

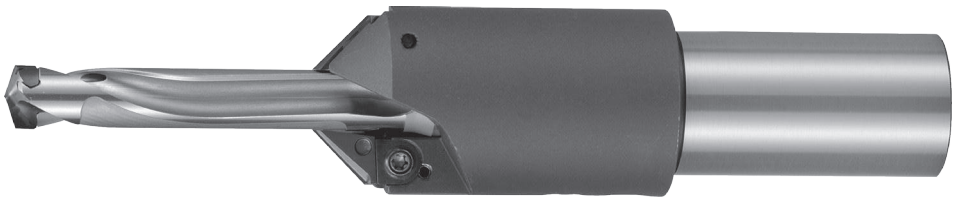
Description		Std.	Dimension (mm)						Spare Parts	Applicable Inserts K18~K20	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. φDc		φDs (h6)	L	L3	Ls	Wrench K29		Holder	Insert
			min.	max.								
SS10-	DRC080M-8	●	7.94	8.49	10	122.5	68	40	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-8	●	8.50	8.99		127.0	72			DC0850M-SC~DC0890M-SC		
	DRC090M-8	●	9.00	9.49		131.5	76			DC0900M-SC~DC0940M-SC		
	DRC095M-8	●	9.50	9.99		137.0	80			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-8	●	10.00	10.49	12	146.5	84	45	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-8	●	10.50	10.99		151.0	88			DC1050M-SC~DC1090M-SC		
	DRC110M-8	●	11.00	11.49		155.5	92			DC1100M-SC~DC1140M-SC		
	DRC115M-8	●	11.50	11.99		160.0	96			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-8	●	12.00	12.49	14	164.5	100		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-8	●	12.50	12.99		169.0	104			DC1250M-SC~DC1290M-SC		
	DRC130M-8	●	13.00	13.49		173.5	108			DC1300M-SC~DC1340M-SC		
	DRC135M-8	●	13.50	13.99		179.0	112			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-8	●	14.00	14.49	16	186.5	116	48	WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-8	●	14.50	14.99		191.0	120			DC1450M-SC~DC1490M-SC		
	DRC150M-8	●	15.00	15.99		200.0	128			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-8	●	16.00	16.99	18	209.0	136			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-8	●	17.00	17.99		219.0	144		WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-8	●	18.00	18.99	20	230.0	152	50		DC1800M-SC~DC1890M-SC	-	-
	DRC190M-8	●	19.00	19.99		239.0	160			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-8	●	20.00	20.99	25	254.0	168	56		DC2000M-SC~DC2099M-SC		
	DRC210M-8	●	21.00	21.99		264.0	176			DC2100M-SC~DC2150M-SC		
	DRC220M-8	●	22.00	22.99		273.0	184			DC2200M-SC~DC2250M-SC		
	DRC230M-8	●	23.00	23.99		282.0	192			DC2300M-SC~DC2350M-SC		
	DRC240M-8	●	24.00	24.99		291.0	200			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-8	●	25.00	25.50	32	305.0	208	60		DC2500M-SC~DC2550M-SC		

● : Std. Item

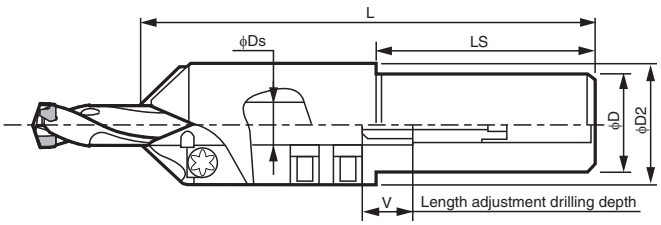
Chamfering attachment

Drilling and chamfering simultaneously

By using the chamfering attachment, the SS-DRC type can drill and chamfer simultaneously.



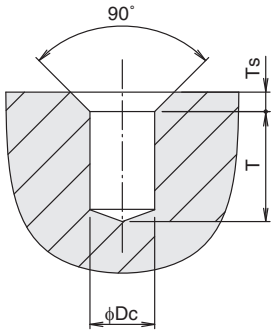
Holder



Description	Std.	Applicable Drill Shank Dia. φDs	Dimension (mm)					Applicable Inserts
			φD	φD2	L	LS	V	
S20-CH10	●	10	20	29	122	52	17	CT08T2-45A
S32-CH12	●	12	32	38	133	62	21	CT12T3-45A
S32-CH14	●	14		40	137		16	
S32-CH16	●	16		42	141		19	
S32-CH18	●	18		47	144		15	

Note) Chamfering attachment is dedicated for Straight Shank SS-DRC type.
It cannot be used for Flanged Shank SF-DRC type.

Drilling and chamfering depths

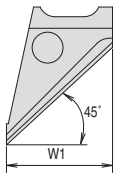


Drill Dia. (mm)		Drilling Depth (mm)						Chamfering dimension (mm)		Applicable Chamfering Holder
φDc		T (3D Drilling)		T (5D Drilling)		T (8D Drilling)		Ts		
min.	max.	min.	max.	min.	max.	min.	max.	Ts 100	Ts max.	
φ7.94	φ8.49	11	19	21	37	47	63	2.5	5.0	**S20-CH10**
φ8.50	φ8.99	12	21	24	40	51	67			
φ9.00	φ9.49	12	23	27	43	56	72			
φ9.50	φ9.99	13	25	31	47	61	77			
φ10.00	φ10.49	13	26	28	49	60	81	3.5	7.0	**S32-CH12**
φ10.50	φ10.99	14	28	31	52	64	85			
φ11.00	φ11.49	14	30	34	55	69	90			
φ11.50	φ11.99	15	32	37	58	73	94			
φ12.00	φ12.49	15	30	41	56	79	94	4.0	8.0	**S32-CH14**
φ12.50	φ12.99	17	32	44	59	83	96			
φ13.00	φ13.49	19	34	47	62	88	103			
φ13.50	φ13.99	21	36	51	66	93	108			
φ14.00	φ14.49	19	37	50	68	94	112	4.0	8.0	**S32-CH16**
φ14.50	φ14.99	21	39	53	71	98	116			
φ15.00	φ15.99	25	43	59	77	107	125			
φ16.00	φ16.99	30	44	66	80	117	131	4.0	8.0	**S32-CH18**
φ17.00	φ17.99	35	49	73	87	127	141			

Ts 100: Max. chamfering dimension at the full feed.
Ts max.: Max. chamfering dimension at a 50% feed reduction.
(Max. chamfering dimension of machining possible without step feeding)

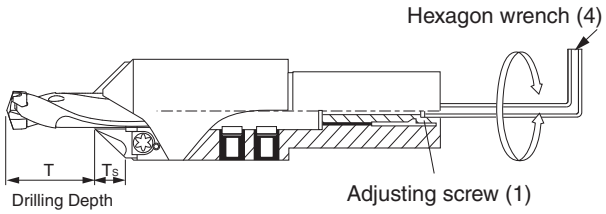
● : Std. Item

● Applicable Inserts

Insert			Description	Dimension (mm)		PVD Coated Carbide	Applicable Chamfering Holder
				W1	T	PR0315	
			**CT08T2-45A**	8	2.83	●	**S20-CH10**
			CT12T3-45A	12	3.98	●	**S32-CH12** ~ **S32-CH18**

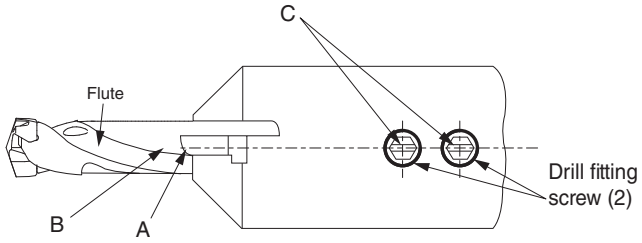
● Method to use DRC chamfering attachment

Ⅰ. Drilling Depth adjustment



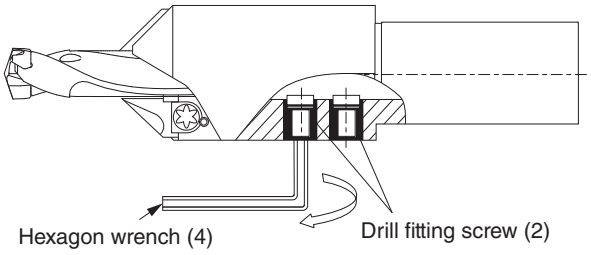
Insert drill into chamfering holder.
Next, temporarily attach the chamfering insert A.
Turn the adjusting screw (1) with the hexagon wrench (4) to set the drilling depth T.

Ⅱ. Drill location check



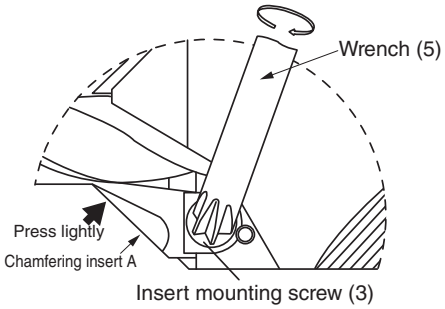
Rotate the drill so that the lower end of the chamfering insert A is aligned with the body clearance B of the drill.
Set it so that slot C and the drill fitting screws (2) are lined up as shown in the figure above.

Ⅲ. Fix the drill



Tighten the drill fitting screws (2) with the hexagon wrench (4).
(In the case of using a torque wrench, then please refer to the table below)

Ⅳ. Installation of the chamfering insert



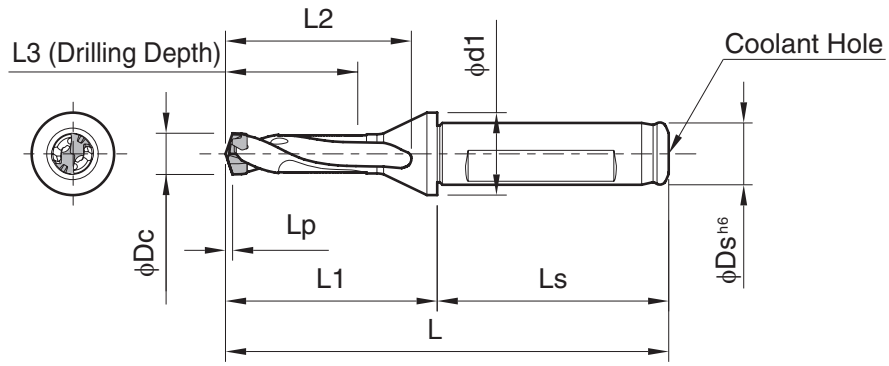
Press the chamfering insert A lightly into the drill and tighten the insert mounting screw (3) with wrench (5).

Chamfering Holder	Tightening Torque [N·m]	Adjusting screw (1)	Drill fitting screw (2)	Insert mounting screw (3)	Hexagon wrench (4)	Wrench (5)
S20-CH10	10	AJ-6×38	FS-10	MT-3	LW-3	DT-9
S32-CH12	15	AJ-8×44-9.5	FS-12	MT-4	LW-4	DT-15
S32-CH14	20	AJ-10×46	FS-14		LW-5	
S32-CH16	30		FS-16			
S32-CH18	45		FS-18			

● : Std. Item

Inserts are sold in 10 piece boxes

SF-DRC (Drilling Depth:3×D)



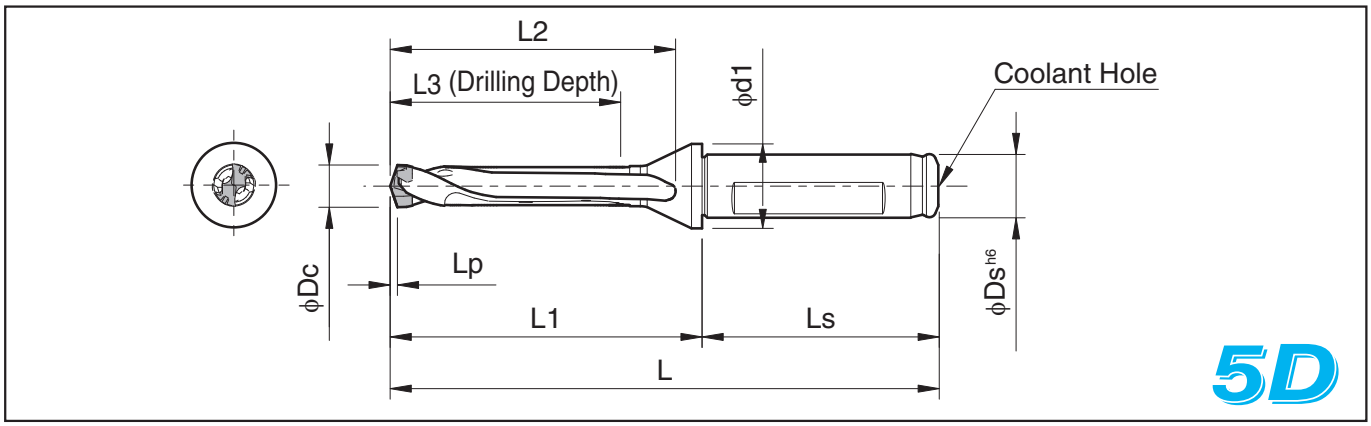
· For Lp indicates distance from drill point to corner edge K18~K20

Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. φDc		φDs (h6)	L	L1	L2	L3	Ls	φd1	Wrench	
			min.	max.								K29	K18~K20
SF12-	DRC080M-3	●	7.94	8.49	12	86	41	35	26	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-3	●	8.50	8.99		88	43	37	27				DC0850M-SC~DC0890M-SC
	DRC090M-3	●	9.00	9.49		90	45	39	29				DC0900M-SC~DC0940M-SC
	DRC095M-3	●	9.50	9.99		92	47	41	30				DC0950M-SC~DC0990M-SC
SF16-	DRC100M-3	●	10.00	10.49	16	97	49	43	32	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-3	●	10.50	10.99		99	51	45	33				DC1050M-SC~DC1090M-SC
	DRC110M-3	●	11.00	11.49		101	53	47	35				DC1100M-SC~DC1140M-SC
	DRC115M-3	●	11.50	11.99		103	55	49	36				DC1150M-SC~DC1190M-SC
	DRC120M-3	●	12.00	12.49		106	58	52	38			WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-3	●	12.50	12.99		108	60	54	39				DC1250M-SC~DC1290M-SC
	DRC130M-3	●	13.00	13.49		110	62	56	41				DC1300M-SC~DC1340M-SC
	DRC135M-3	●	13.50	13.99		112	64	58	42				DC1350M-SC~DC1390M-SC
	DRC140M-3	●	14.00	14.49		114	66	60	44			WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-3	●	14.50	14.99		116	68	62	45				DC1450M-SC~DC1490M-SC
SF20-	DRC150M-3	●	15.00	15.99	20	122	72	66	48	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-3	●	16.00	16.99		126	76	70	51				DC1600M-SC~DC1690M-SC
	DRC170M-3	●	17.00	17.99		131	81	75	54			WDRC17	DC1700M-SC~DC1790M-SC
SF25-	DRC180M-3	●	18.00	18.99	25	141	85	79	57	56	32		DC1800M-SC~DC1890M-SC
	DRC190M-3	●	19.00	19.99		145	89	83	60				DC1900M-SC~DC1990M-SC
	DRC200M-3	●	20.00	20.99		149	93	87	63				DC2000M-SC~DC2099M-SC
	DRC210M-3	●	21.00	21.99		153	97	91	66				DC2100M-SC~DC2150M-SC
	DRC220M-3	●	22.00	22.99		158	102	96	69				DC2200M-SC~DC2250M-SC
	DRC230M-3	●	23.00	23.99		162	106	100	72				DC2300M-SC~DC2350M-SC
	DRC240M-3	●	24.00	24.99		166	110	104	75				DC2400M-SC~DC2450M-SC
	DRC250M-3	●	25.00	25.50		170	114	108	78				DC2500M-SC~DC2550M-SC

● : Std. Item

SF-DRC (Drilling Depth:5×D)



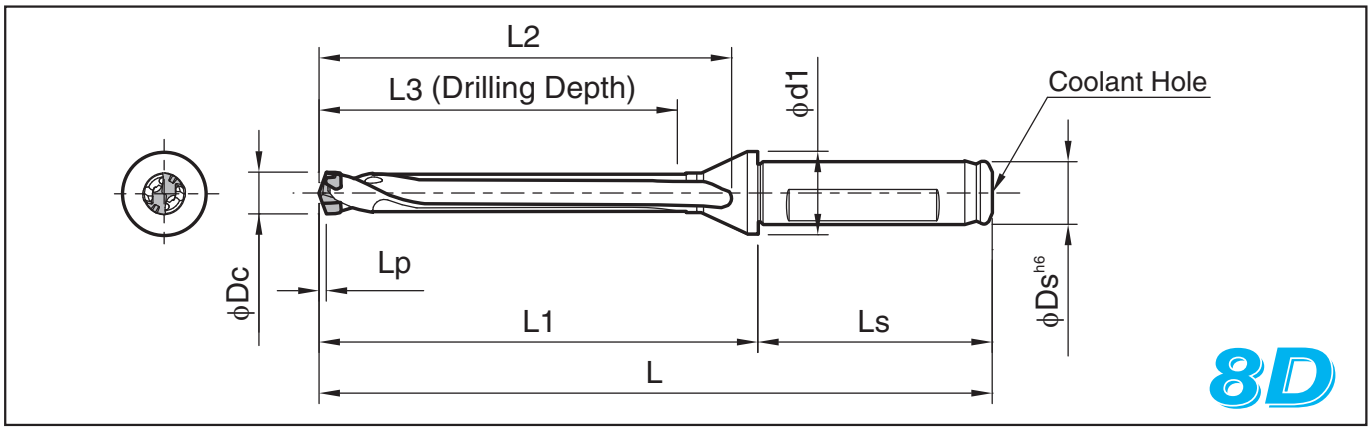
· For Lp indicates distance from drill point to corner edge K18~K20

Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. φDc		φDs (h6)	L	L1	L2	L3	Ls	φd1	Wrench	
			min.	max.								K29	K18~K20
SF12-	DRC080M-5	●	7.94	8.49	12	104	59	53	43	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-5	●	8.50	8.99		107	62	56	45				DC0850M-SC~DC0890M-SC
	DRC090M-5	●	9.00	9.49		110	65	59	48				DC0900M-SC~DC0940M-SC
	DRC095M-5	●	9.50	9.99		114	69	63	50				DC0950M-SC~DC0990M-SC
SF16-	DRC100M-5	●	10.00	10.49	16	120	72	66	53	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-5	●	10.50	10.99		123	75	69	55				DC1050M-SC~DC1090M-SC
	DRC110M-5	●	11.00	11.49		126	78	72	58				DC1100M-SC~DC1140M-SC
	DRC115M-5	●	11.50	11.99		129	81	75	60				DC1150M-SC~DC1190M-SC
	DRC120M-5	●	12.00	12.49		132	84	78	63			WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-5	●	12.50	12.99		135	87	81	65				DC1250M-SC~DC1290M-SC
	DRC130M-5	●	13.00	13.49		138	90	84	68				DC1300M-SC~DC1340M-SC
	DRC135M-5	●	13.50	13.99		142	94	88	70				DC1350M-SC~DC1390M-SC
	DRC140M-5	●	14.00	14.49		145	97	91	73			WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-5	●	14.50	14.99		148	100	94	75				DC1450M-SC~DC1490M-SC
SF20-	DRC150M-5	●	15.00	15.99	20	156	106	100	80	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-5	●	16.00	16.99		162	112	106	85				DC1600M-SC~DC1690M-SC
	DRC170M-5	●	17.00	17.99		169	119	113	90			WDRC17	DC1700M-SC~DC1790M-SC
SF25-	DRC180M-5	●	18.00	18.99	25	181	125	119	95	56	32		DC1800M-SC~DC1890M-SC
	DRC190M-5	●	19.00	19.99		187	131	125	100				DC1900M-SC~DC1990M-SC
	DRC200M-5	●	20.00	20.99		193	137	131	105				DC2000M-SC~DC2099M-SC
	DRC210M-5	●	21.00	21.99		200	144	138	110				DC2100M-SC~DC2150M-SC
	DRC220M-5	●	22.00	22.99		206	150	144	115				DC2200M-SC~DC2250M-SC
	DRC230M-5	●	23.00	23.99		212	156	150	120				DC2300M-SC~DC2350M-SC
	DRC240M-5	●	24.00	24.99		218	162	156	125				DC2400M-SC~DC2450M-SC
	DRC250M-5	●	25.00	25.50		225	169	163	130				DC2500M-SC~DC2550M-SC

● : Std. Item

SF-DRC (Drilling Depth:8×D)



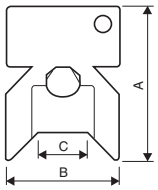
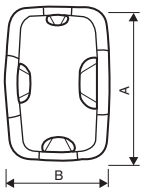
· For Lp indicates distance from drill point to corner edge K18~K20

Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. φDc		φDs (h6)	L	L1	L2	L3	Ls	φd1	Wrench	
			min.	max.								K29	K18~K20
SF12-	DRC080M-8	●	7.94	8.49	12	129	84	79	68	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-8	●	8.50	8.99		134	89	83	72				DC0850M-SC~DC0890M-SC
	DRC090M-8	●	9.00	9.49		138	93	88	76				DC0900M-SC~DC0940M-SC
	DRC095M-8	●	9.50	9.99		144	99	93	80				DC0950M-SC~DC0990M-SC
SF16-	DRC100M-8	●	10.00	10.49	16	151	103	97	84	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-8	●	10.50	10.99		156	108	102	88				DC1050M-SC~DC1090M-SC
	DRC110M-8	●	11.00	11.49		160	112	107	92				DC1100M-SC~DC1140M-SC
	DRC115M-8	●	11.50	11.99		165	117	111	96				DC1150M-SC~DC1190M-SC
	DRC120M-8	●	12.00	12.49		169	121	116	100			WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-8	●	12.50	12.99		174	126	120	104				DC1250M-SC~DC1290M-SC
	DRC130M-8	●	13.00	13.49		178	130	124	108				DC1300M-SC~DC1340M-SC
	DRC135M-8	●	13.50	13.99		184	136	130	112				DC1350M-SC~DC1390M-SC
	DRC140M-8	●	14.00	14.49		188	140	134	116			WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-8	●	14.50	14.99		193	145	139	120				DC1450M-SC~DC1490M-SC
SF20-	DRC150M-8	●	15.00	15.99	20	204	154	148	128	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-8	●	16.00	16.99		213	163	157	136				DC1600M-SC~DC1690M-SC
	DRC170M-8	●	17.00	17.99		223	173	167	144			WDRC17	DC1700M-SC~DC1790M-SC
SF25-	DRC180M-8	●	18.00	18.99	25	238	182	176	152	56	32		DC1800M-SC~DC1890M-SC
	DRC190M-8	●	19.00	19.99		247	191	185	160				DC1900M-SC~DC1990M-SC
	DRC200M-8	●	20.00	20.99		256	200	194	168				DC2000M-SC~DC2099M-SC
	DRC210M-8	●	21.00	21.99		266	210	204	176				DC2100M-SC~DC2150M-SC
	DRC220M-8	●	22.00	22.99		275	219	213	184				DC2200M-SC~DC2250M-SC
	DRC230M-8	●	23.00	23.99		284	228	222	192				DC2300M-SC~DC2350M-SC
	DRC240M-8	●	24.00	24.99		293	237	231	200				DC2400M-SC~DC2450M-SC
	DRC250M-8	●	25.00	25.50		303	247	241	208				DC2500M-SC~DC2550M-SC

● : Std. Item

Wrench

Shape		Description	Dimension (mm)			Remarks
			A	B	C	
		**WDRC8**	43	33	φ10.2	Description is printed in this area.
		WDRC10			φ12.2	
		WDRC12			φ14.2	
		WDRC14			φ17.2	
		**WDRC17**	77	52	-	· WDRC17(Multiple type wrench) has four insert entry points. If using an insert ranging from DC1700M-SC to DC2099M-SC, use the entry point printed as "φ17.00~φ20.99". · WDRC17 can be used instead of WDRC8~14 wrench.

Method to change DRC type MagicDrill inserts

How to attach inserts

(1) Fix drill holder on arbor. For insert exchange, fix arbor on the machine or set on toolpresetter.
(2) Use compressed air to remove dust.

(3) Install insert onto holder.
(Use gloves to protect your hand from any danger.)

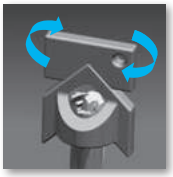
(4) Turn lightly in a clockwise direction.
(Use gloves to protect your hand from any danger.)

(5) Align the wrench properly with the insert.

(6) Make sure the wrench is aligned with the wrench slots on the insert.

(Improper alignment shown)

Slot for wrench



(7) Turn the wrench in a slow counterclockwise direction.
(8) Completed.

How to detach inserts

(1) Use compressed air to remove dust.
(2) Align the wrench properly with the insert.

(3) Make sure the wrench is aligned with the wrench slots on the insert.

(4) Turn the wrench in a counterclockwise direction.

(5) Once lock is released, insert can be turned by fingers.
(Use gloves to protect your hand from any danger.)

(6) Remove insert.
(Use gloves to protect your hand from any danger.)

◆ Recommended Cutting Conditions

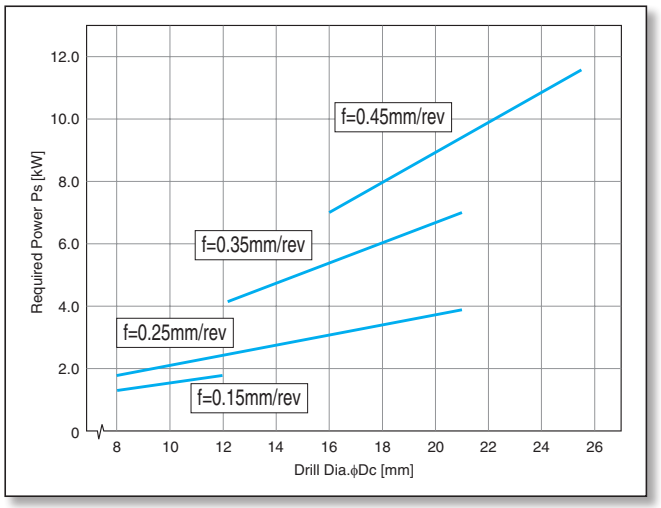
Workpiece Material		Hardness (HB)	Cutting Conditions		Drill Dia. φDc(mm)								Remarks
			Cutting Speed Vc (m/min)	n (min⁻¹) / f (mm/rev)	φ8	φ10	φ12	φ14	φ16	φ18	φ20	φ25	
Low Carbon Steel	SS400 S10C~S25C	125	120 - 180	n (min⁻¹)	4,780 - 7,170	3,820 - 5,730	3,180 - 4,780	2,730 - 4,090	2,390 - 3,580	2,120 - 3,180	1,910 - 2,870	1,530 - 2,290	Coolant (Ref. to Page K31)
				f (mm/rev)	0.11 - 0.20	0.13 - 0.24	0.14 - 0.28	0.17 - 0.32	0.19 - 0.35	0.23 - 0.38	0.25 - 0.41	0.30 - 0.50	
Carbon Steel	S30C~S58C (Annealed)	190	100 - 150	n (min⁻¹)	3,980 - 5,970	3,180 - 4,780	2,650 - 3,980	2,270 - 3,410	1,990 - 2,990	1,770 - 2,650	1,590 - 2,390	1,270 - 1,910	
				f (mm/rev)	0.13 - 0.24	0.15 - 0.29	0.17 - 0.33	0.19 - 0.36	0.22 - 0.41	0.25 - 0.46	0.28 - 0.48	0.32 - 0.60	
	S30C~S58C (Heat treated)	250	80 - 120	n (min⁻¹)	3,180 - 4,780	2,550 - 3,820	2,120 - 3,180	1,820 - 2,730	1,590 - 2,390	1,420 - 2,120	1,270 - 1,910	1,020 - 1,530	
				f (mm/rev)	0.13 - 0.21	0.15 - 0.25	0.18 - 0.31	0.21 - 0.39	0.23 - 0.45	0.25 - 0.53	0.28 - 0.61	0.38 - 0.64	
		300	50 - 75	n (min⁻¹)	1,990 - 2,990	1,590 - 2,390	1,330 - 1,990	1,140 - 1,710	1,000 - 1,490	880 - 1,330	800 - 1,190	640 - 960	
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.28	0.21 - 0.32	0.23 - 0.35	0.25 - 0.41	0.28 - 0.41	0.32 - 0.45	
Alloy Steel	SCM,SCr etc. (Annealed)	180	70 - 95	n (min⁻¹)	2,790 - 3,780	2,230 - 3,030	1,860 - 2,520	1,590 - 2,160	1,390 - 1,890	1,240 - 1,680	1,110 - 1,510	890 - 1,210	
				f (mm/rev)	0.15 - 0.28	0.16 - 0.35	0.21 - 0.37	0.23 - 0.46	0.25 - 0.46	0.25 - 0.51	0.30 - 0.51	0.35 - 0.60	
	SCM,SCr etc. (Heat treated)	275	70 - 95	n (min⁻¹)	2,790 - 3,780	2,230 - 3,030	1,860 - 2,520	1,590 - 2,160	1,390 - 1,890	1,240 - 1,680	1,110 - 1,510	890 - 1,210	
				f (mm/rev)	0.11 - 0.21	0.14 - 0.25	0.19 - 0.30	0.21 - 0.33	0.23 - 0.37	0.28 - 0.43	0.28 - 0.46	0.32 - 0.58	
		300	60 - 90	n (min⁻¹)	2,390 - 3,580	1,910 - 2,870	1,590 - 2,390	1,360 - 2,050	1,190 - 1,790	1,060 - 1,590	960 - 1,430	760 - 1,150	
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.26	0.18 - 0.31	0.21 - 0.33	0.23 - 0.36	0.25 - 0.38	0.30 - 0.50	
		350	50 - 75	n (min⁻¹)	1,990 - 2,990	1,590 - 2,390	1,330 - 1,990	1,140 - 1,710	1,000 - 1,490	880 - 1,330	800 - 1,190	640 - 960	
				f (mm/rev)	0.11 - 0.20	0.12 - 0.23	0.16 - 0.25	0.17 - 0.29	0.18 - 0.32	0.20 - 0.36	0.23 - 0.38	0.28 - 0.50	
Stainless Steel	SUS304 SUS316	220	60 - 80	n (min⁻¹)	2,390 - 3,180	1,910 - 2,550	1,590 - 2,120	1,360 - 1,820	1,190 - 1,590	1,060 - 1,420	960 - 1,270	760 - 1,020	
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.26	0.18 - 0.31	0.21 - 0.33	0.23 - 0.36	0.25 - 0.38	0.28 - 0.42	
	SUS630	300	50 - 70	n (min⁻¹)	1,990 - 2,790	1,590 - 2,230	1,330 - 1,860	1,140 - 1,590	1,000 - 1,390	880 - 1,240	800 - 1,110	640 - 890	
				f (mm/rev)	0.11 - 0.20	0.12 - 0.23	0.16 - 0.25	0.17 - 0.29	0.18 - 0.32	0.20 - 0.36	0.23 - 0.38	0.25 - 0.40	
Gray Cast Iron	FC150~FC200	180	120 - 170	n (min⁻¹)	4,780 - 6,770	3,820 - 5,410	3,180 - 4,510	2,730 - 3,870	2,390 - 3,380	2,120 - 3,010	1,910 - 2,710	1,530 - 2,170	
				f (mm/rev)	0.17 - 0.32	0.20 - 0.37	0.23 - 0.43	0.27 - 0.48	0.30 - 0.55	0.33 - 0.61	0.33 - 0.61	0.40 - 0.74	
	FC250~FC350	260	90 - 120	n (min⁻¹)	3,580 - 4,780	2,870 - 3,820	2,390 - 3,180	2,050 - 2,730	1,790 - 2,390	1,590 - 2,120	1,430 - 1,910	1,150 - 1,530	
				f (mm/rev)	0.14 - 0.25	0.16 - 0.31	0.19 - 0.35	0.23 - 0.42	0.26 - 0.47	0.28 - 0.53	0.30 - 0.58	0.36 - 0.70	
Nodular Cast Iron	FCD400~FCD500	160	60 - 90	n (min⁻¹)	2,390 - 3,580	1,910 - 2,870	1,590 - 2,390	1,360 - 2,050	1,190 - 1,790	1,060 - 1,590	960 - 1,430	760 - 1,150	
				f (mm/rev)	0.14 - 0.25	0.16 - 0.30	0.19 - 0.35	0.22 - 0.40	0.24 - 0.45	0.28 - 0.51	0.28 - 0.56	0.34 - 0.67	
	FCD600~FCD800	250	40 - 65	n (min⁻¹)	1,590 - 2,590	1,270 - 2,070	1,060 - 1,730	910 - 1,480	800 - 1,290	710 - 1,150	640 - 1,040	510 - 830	
				f (mm/rev)	0.10 - 0.19	0.12 - 0.22	0.14 - 0.25	0.16 - 0.31	0.19 - 0.35	0.23 - 0.51	0.25 - 0.53	0.30 - 0.60	

·As drilling depth increases (3D 5D 8D), feed rates should be reduced.

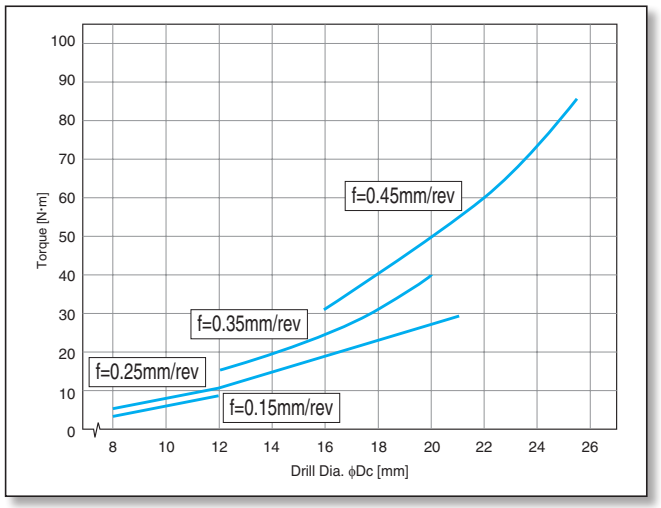
■ Reference charts

<Cutting Conditions>: Workpiece Material Heat treated steel (Hardness 240HB) Vc=80m/min, Wet

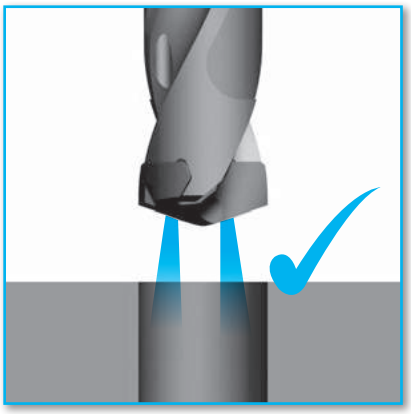
● Required Power



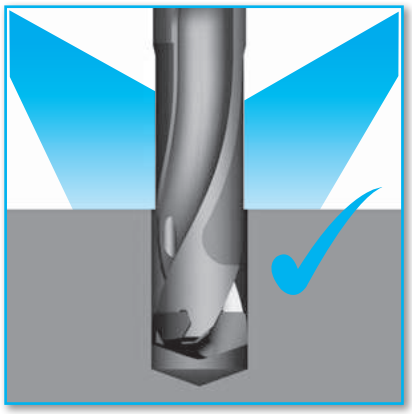
● Torque



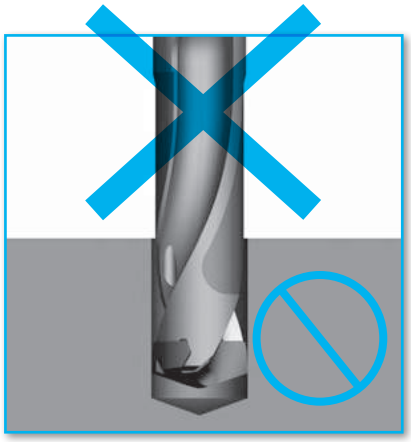
Coolant



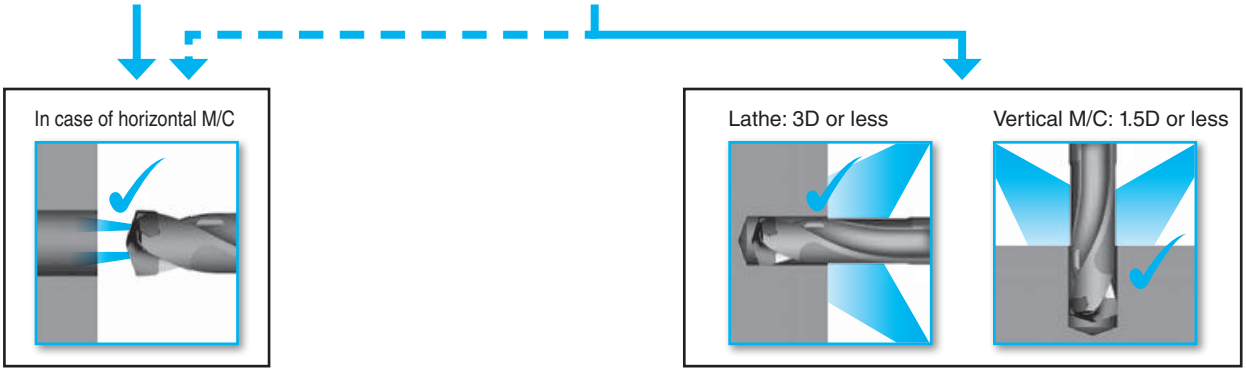
1) Internal coolant is recommended.



2) In case of external coolant.



3) Dry machining is not recommended.

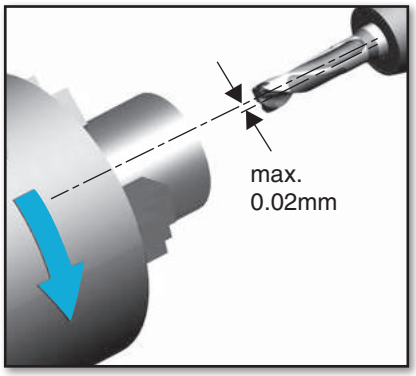


Internal coolant is recommended for horizontal machining center because external coolant may not sufficiently be applied to inside because the tool is revolving.

Precautions for use

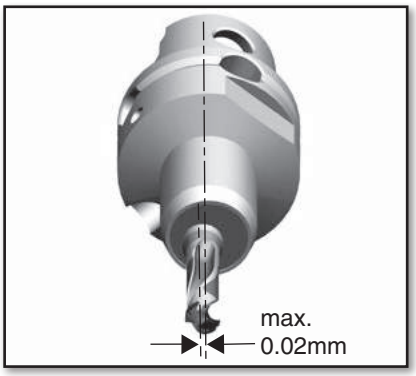
Core Deviation

1) If drill is stationary



This is be used with a boring sleeve (screw clamp) and collet chuck, please be sure to set deviation amount under 0.02mm between workpiece and drill.

2) If drill is rotating



Make sure to use arbor that is not deformed.
Center of arbor deviation must be within 0.02mm.

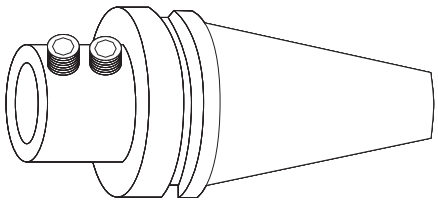
Cautions for installation on Machining Center

For installation of MagicDrill DRC,
1st choice…use Hydro Chuck, Power Chuck, Collet Chuck, etc.
2nd choice…Side lock arbor

Hydro Chuck
Power Chuck
Collet Chuck

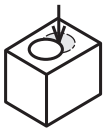
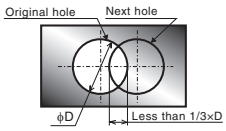
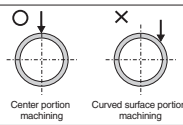
Install MagicDrill DRC to above chuck

1st choice

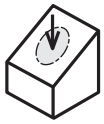
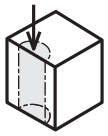


Example of side lock arbor
2nd choice

Applicable workpiece

Applications	Shape of Workpiece	Caution for machining
Plain Surface		1. Due to good chip control, step machining is not necessary for Low Carbon Steel. 2. When machining SUS304, for hole depths of more than 2.5D, utilize the step machining process. 3. In order to have smooth chip removal, we recommend internal coolant.
Stacked Plates		1. Fix stacked plates securely to ensure they do not slip while machining.
Hole Expansion		1. If the overlap amount is less than 1/3 x D, machining is possible. 
Concave Surface		1. When machining concave holes set the feed rates at half or less than continuous hole machining.
Pipe Material		1. Hole machining above the centerline of the pipe is possible. 2. Do not machine on curved surface areas. 

Not Recommended workpieces

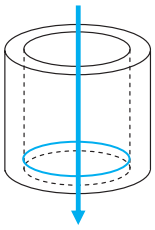
Applications	Shape of Workpiece
Slant Surface	
Half Cylindrical	
Cored Hole	

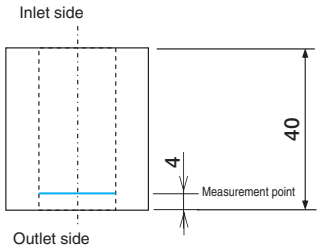
Comparison of Machining Precision

Cutting Condition and Measurement Point

<Cutting Conditions>

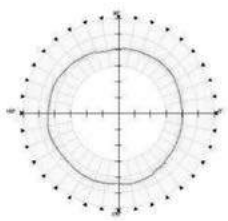
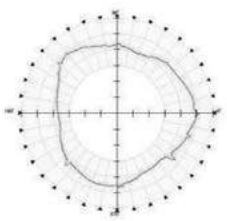
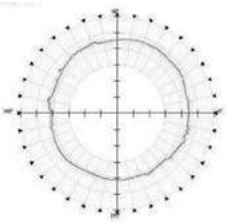
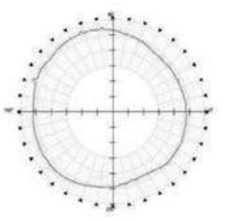
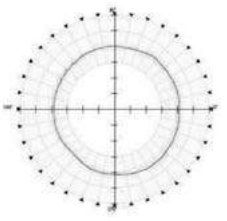
Workpiece Material	S45C
Vc (m/min)	100
f (mm/rev)	0.2mm/rev, 0.3mm/rev
Drilling Depth H (mm)	Through hole (40mm)
Coolant	Wet (Internal coolant)
Tool	φ14×3D type
Machine	M/C





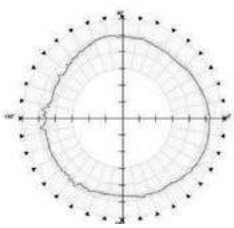
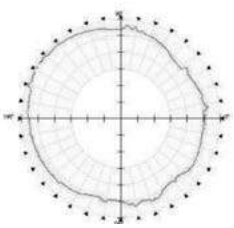
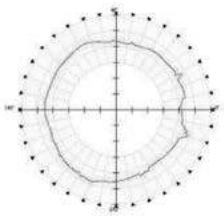
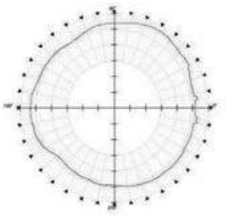
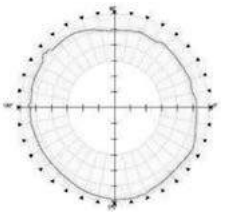
Roundness

1) Roundness (f=0.2mm/rev)

Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness: 5.5μm	Roundness: 22.5μm	Roundness: 6.4μm	Roundness: 9.8μm	Roundness: 5.2μm

(Internal evaluation)

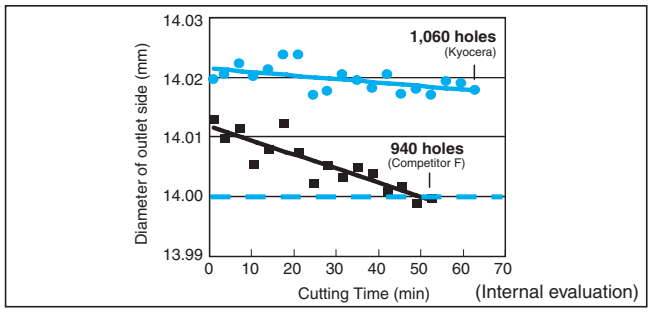
2) Roundness (f=0.3mm/rev)

Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness: 10.7μm	Roundness: 15.2μm	Roundness: 12.0μm	Roundness: 11.8μm	Roundness: 12.3μm

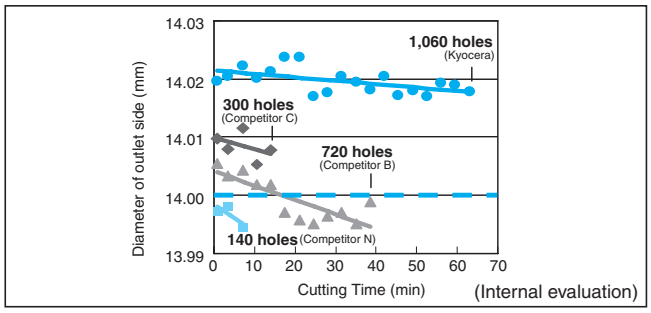
(Internal evaluation)

● Comparison of Hole Dia. (f=0.3mm/rev)

1) Comparison with indexable drill



2) Comparison with carbide solid drill



Q&A

Q-3 Drilling deep hole machining using DRC (8D type), dimension variation of diameters has occurred at inlet and far (outlet) side possibly due to deflection. Is there any countermeasure?

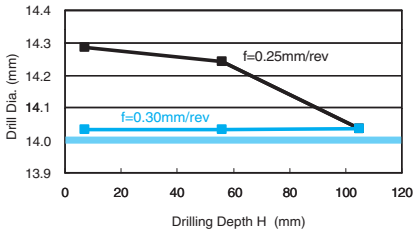
A-3 There are some countermeasures as follows to prevent deflection (to improve bite of drill).

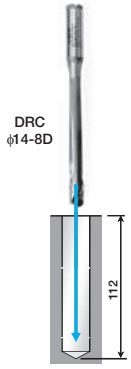
Countermeasures 1

- Increasing the feed rate

Increasing the feed rate may keep the processing diameters constant.
(Estimated rate: Current rate + 0.03 to 0.05 mm/rev)

<Cutting Conditions>
S55C Vc=80m/min H=112mm
f=0.25mm/rev→0.30mm/rev
Wet (Internal coolant)
SS16-DRC140M-8
DC1400M-SC (PR0315)





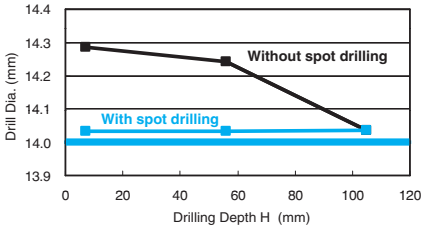
If increasing the feed rate is not possible because rigidity of machine or clamp is weak.

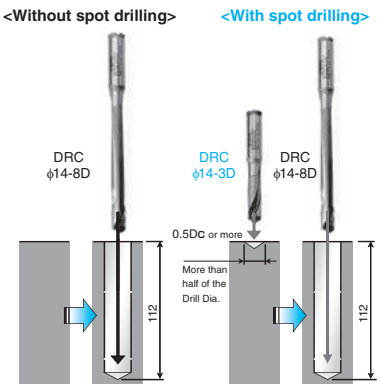
Countermeasures 2

- Make a center spot

1) Make a center spot using the DRC drill or a commercially available center drill which has a vertex angle of about 140°.
(If the center drill can be modified, make its vertex angle larger than 140°)
2) Then drill the hole using the DRC drill (8D type).

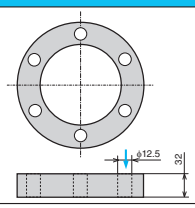
<Cutting Conditions>
S55C Vc=80m/min
f=0.25mm/rev H=112mm
Wet (Internal coolant)
SS16-DRC140M-3
SS16-DRC140M-8
DC1400M-SC (PR0315)





■ Case Studies

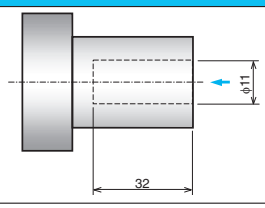
S50C

·Flange ·Vc=97m/min (n=2,490min⁻¹) ·H=32mm ·f=0.3mm/rev (Vf=747mm/min) ·Wet (Internal coolant) ·DC1250M-SC (PR0315)	
SS14-DRC120M-3	3,000 holes/insert
Competitor A	1,800 holes/drill

Compared to competitor's drill A, MagicDrill DRC type has reduced burr and reduced more than 10% of the power required.
Tool life has also improved greatly.

(Evaluation by the user)

SCM440

·Housing ·Vc=83m/min (n=2,400min⁻¹) ·H=32mm ·f=0.24mm/rev (Vf=576mm/min) ·Wet (Internal coolant) ·DC1100M-SC (PR0315)	
SS12-DRC110M-3	2,400 holes/insert
Competitor B	2,000 holes/drill

Compared to competitor's solid drill B, MagicDrill DRC type has greatly reduced preparation time with its easy insert replacement feature.
Also, the costs of spare tools for re-grinding has been reduced, and tool life has improved.

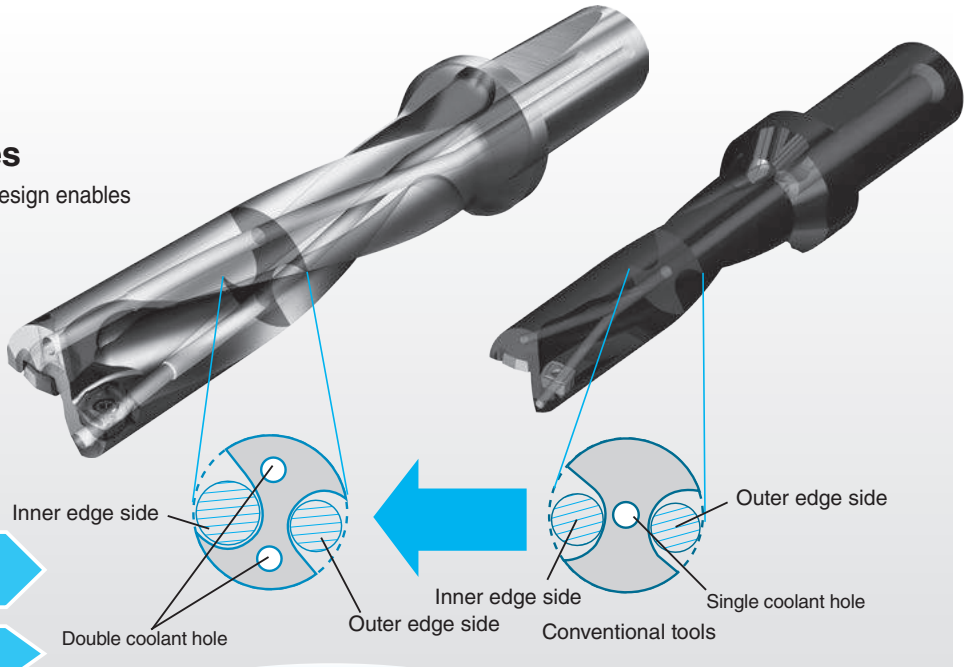
(Evaluation by the user)

DRX enables stable and efficient drilling

Twisted Coolant Holes

Twisted Coolant Holes technology design enables

Superior Chip Evacuation



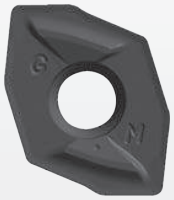
Better chip evacuation through the flute space of the internal cutting edge

1.25 times higher cooling performance

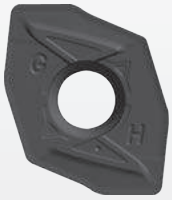
The special alloy enables toolholder stability and increased reliability.

Three chipbreaker types

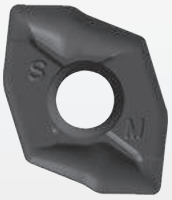
- Covers a variety of workpiece materials



GM Chipbreaker
Carbon Steel, Cast Iron
General Purpose



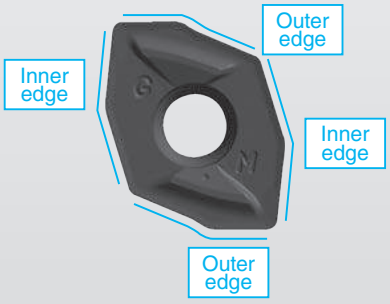
GH Chipbreaker
Hard materials,
interrupted drilling
Tough Edge

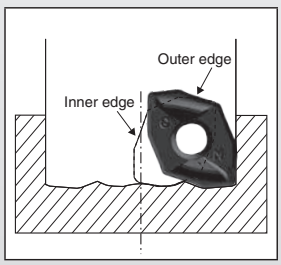


SM Chipbreaker
Stainless Steel,
Low Carbon Steel and
Non-ferrous Metals
Sharp cutting for deeper drilling

- Economical 4 edged type

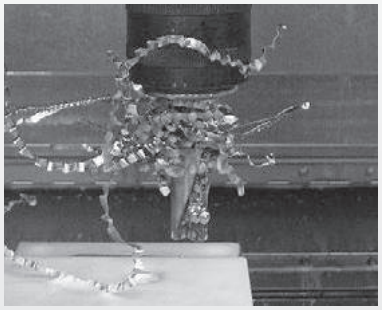
2 inner pocket cutting edges and 2 outer pocket cutting edges





Positioning of outer edge and inner edge

- The problem of sticky chip trouble when machining stainless steel or low carbon steel workpieces is solved.



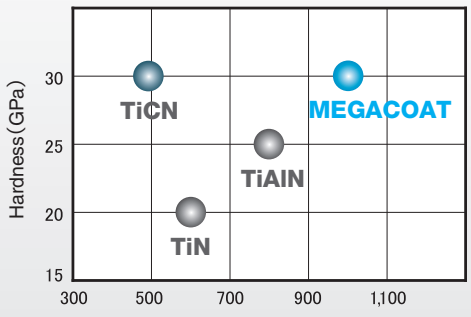
Long entangled chips (Competitor A)

Chips by SM chipbreaker (SUS304)

MEGACOAT

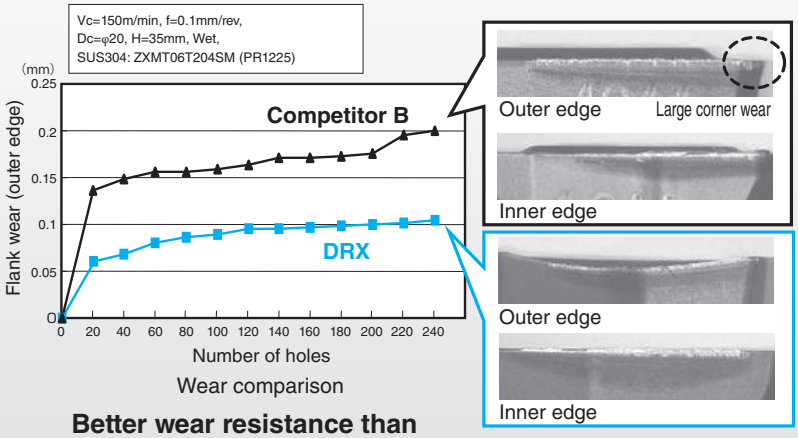
Four Insert Grades

(PR1230:for Steel, PR1225:for Stainless Steel / Low Carbon Steel, PR1210:for Cast Iron, GW15:for Non-ferrous Metals)



MEGACOAT's High oxidation resistance

MEGACOAT is used to enable longer Tool Life



Wear comparison

Better wear resistance than competitor B
Achieving long Tool Life

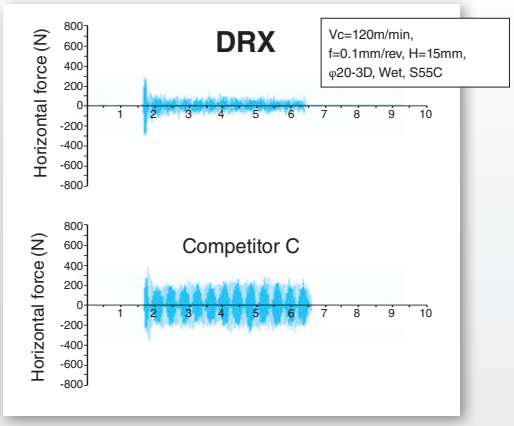
(Internal evaluation)

K

Drilling

High Precision: Balanced System

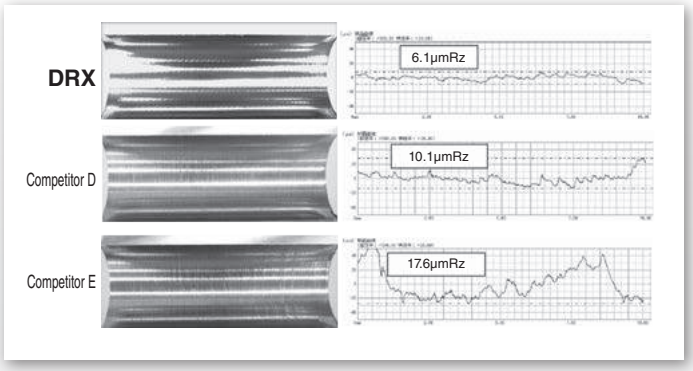
Vibration comparison



Less vibration due to well balanced at Drilling

Better finished surface

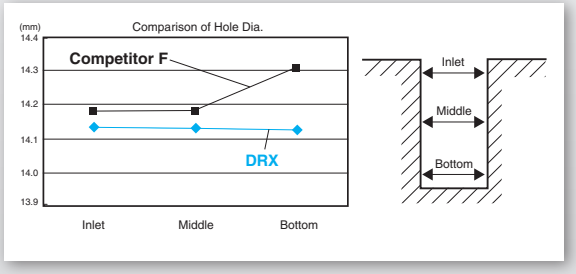
Finished surface comparison



Better finished surface than Competitor D and E

Possible to extend tool life of next process

Variation of Hole Dia.



Vc=180m/min, f=0.08mm/rev, H=56mm (blind hole),
φ14-4D, Wet, S50C

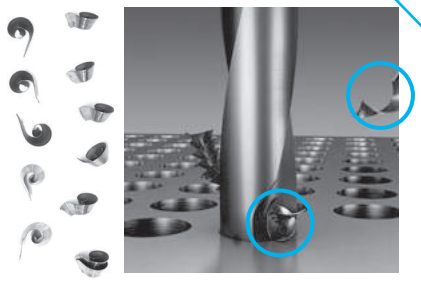
Comparing to competitor F, its excellent chip evacuation performance provides a maintained good balance and less variation in hole dia.
Drastically improved straight machining capability

(Internal evaluation)

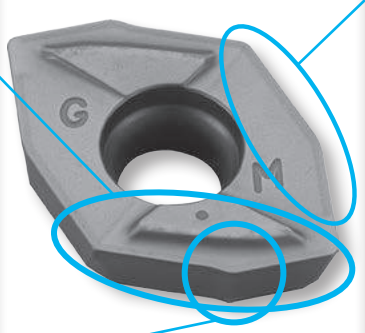
Covers a variety of workpiece materials with new chipbreaker

New chipbreaker features

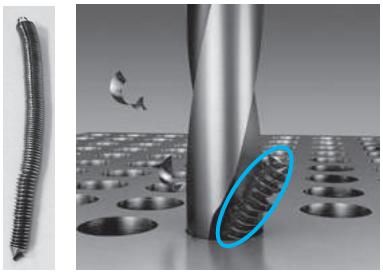
◆ Wider chipbreaker (outer edge)



small chips for better evacuation



◆ Flat chipbreaker (inner edge)

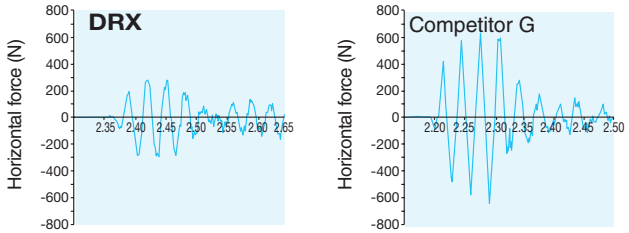


ideal continuous chips

◆ Sigmoid cutting edge (outer edge)

sigmoid outer cutting edge
↓
sharp cutting

Vc=120m/min, f=0.1mm/rev, H=15mm, φ20-3D, Wet, S55C

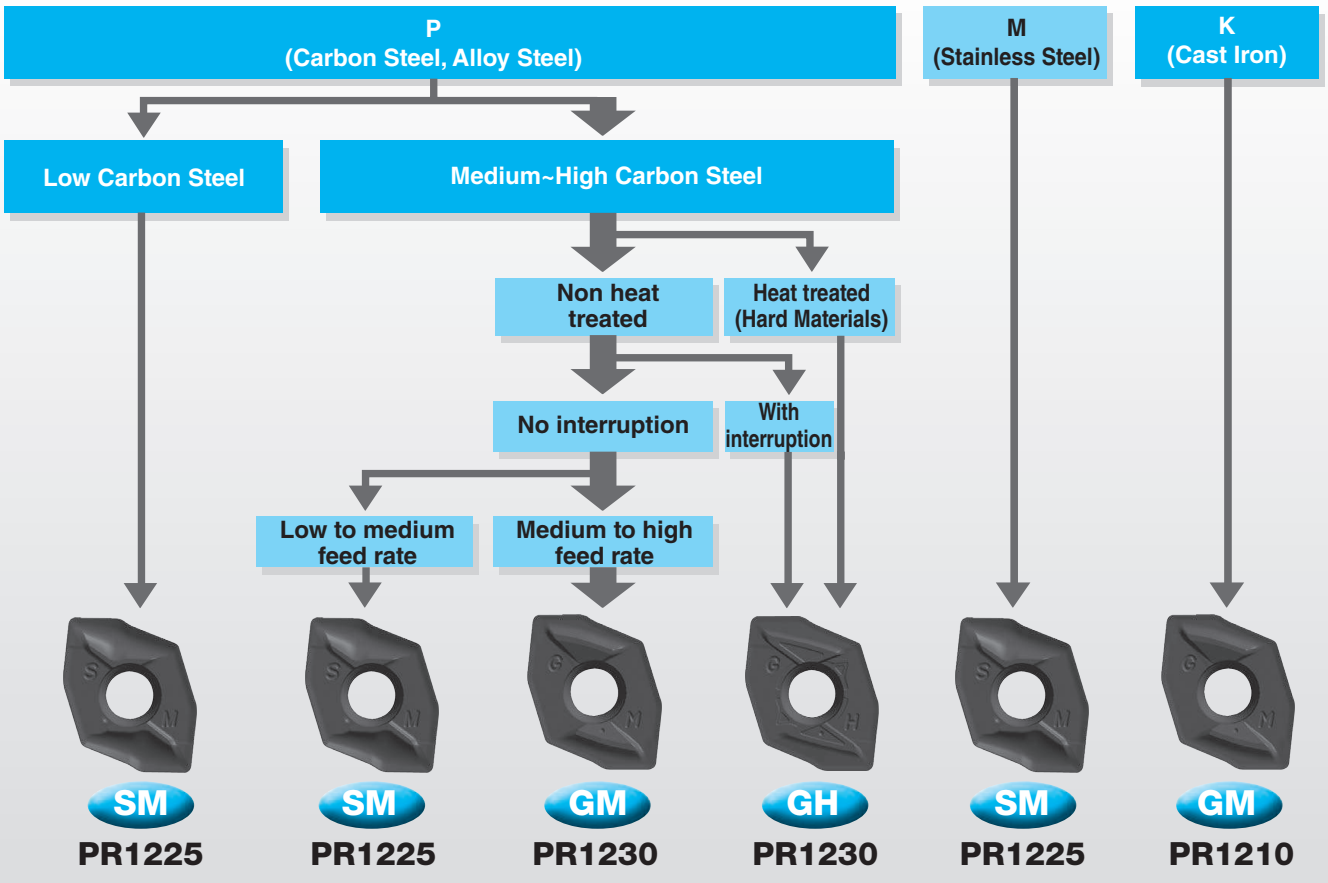


Cutting force comparison of outer edge at the start of drilling

Lowered impact force at the start

Reduces sudden breakage

Chipbreaker selection

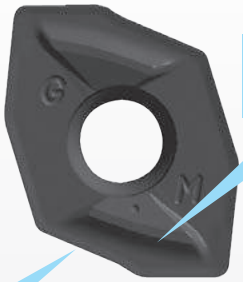


design developed through comprehensive technology

● **3 chipbreakers to cover various materials**

◆ GM Chipbreaker…General Purpose

for Steel:PR1230 **for Cast Iron:PR1210**



(1) Wider chipbreaker can cover variety of materials

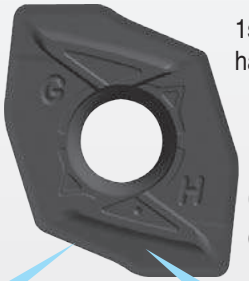
(2) Good balance of cutting edge strength and sharp cutting

for general drilling

Optimized cutting edge strength, sharpness and chip control

◆ GH Chipbreaker…Tough Edge

Hard materials, interrupted drilling:PR1230



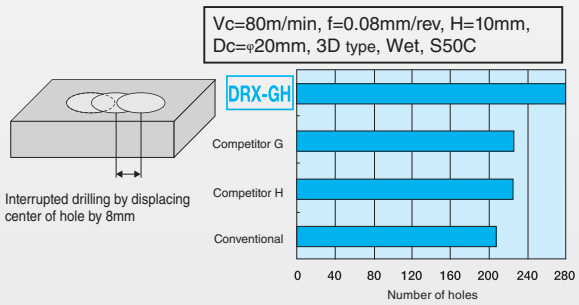
1st recommended chipbreaker for hard materials interrupted operation

Cutting edge strength oriented design of Chipbreaker

(1) Wider chipbreaker control breakage by pressed chips

(2) Cutting edge strength oriented design

·Fracture resistance comparison



Better fracture resistance than competitors

◆ SM Chipbreaker…Sharp Cutting for Deeper Drilling

for Stainless Steel / Low Carbon Steel:PR1225

for Non-ferrous Metals:GW15

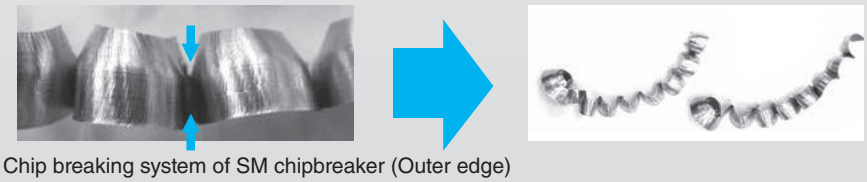
For deep drilling of difficult to control chip materials such as stainless steel and low carbon steel

Sharp cutting with large rake angle
Stable chip control owing to newly designed chipbreaker and U-shaped cutting edge

(2) Sharp cutting with large rake angle

(1) U-shaped cutting edge
Breaks chips by creating cracks from both ends

Outstanding chip control achieved by splitting chips from the leading edges

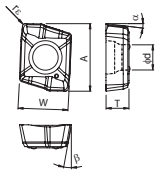
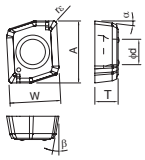
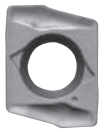
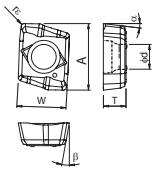
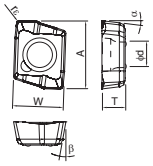
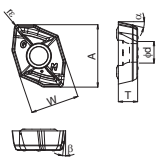
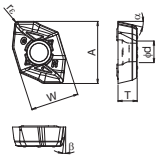
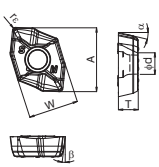


Chip breaking system of SM chipbreaker (Outer edge)

Applicable Inserts
(for DRX)

Classification of usage
● : 1st Choice
○ : 2nd Choice
(Steel; non heat treated)

P	Carbon Steel / Alloy Steel	●	○		
	Mold Steel	●			
M	Stainless Steel	○	●		
K	Cast Iron			●	
N	Non-ferrous Metals				●

Insert		Description	Dimension (mm)					Angle		MEGACOAT			Carbide	Applicable Toolholders Ref. to Page
			A	T	φd	W	rε	α	β	PR1230	PR1225	PR1210	GW15	
For outer edge / General Purpose		ZXMT 030203GM-E	6.4	2.30	2.4	4.8	0.3	7°	10°	●		●		K40 K42 K44 K46
For inner edge / General Purpose		ZXMT 030203GM-I	5.9	2.30	2.4	4.8	0.3	7°	10°	●	●	●	●	
 For outer edge / Tough Edge		ZXMT 030203GH-E	6.4	2.30	2.4	4.8	0.3	7°	10°	●				
For outer edge / Sharp Cutting		ZXMT 030203SM-E	6.4	2.30	2.4	4.8	0.3	7°	10°		●		●	
General Purpose		ZXMT 040203GM	6.2	2.60	2.4	5.1	0.3	13°	10°	●		●		K40 K41 K42 K43 K44 K45 K46
		05T203GM	7.3	2.76	2.5	5.5	0.3		7°	●		●		
		06T204GM	8.6	2.89	2.8	6.4	0.4			●		●		
		070305GM	10.2	3.24	3.0	8.0	0.5			●		●		
		09T306GM	12.2	4.03	3.6	9.6	0.6			●		●		
		11T306GM	14.5	4.06	4.6	11.6	0.6			●		●		
		140408GM	18.0	4.88	5.7	14.4	0.8			●		●		
		170608GM	22.1	6.58	6.8	17.7	0.8			●		●		
Tough Edge		ZXMT 040203GH	6.2	2.60	2.4	5.1	0.3	13°	10°	●				
		05T203GH	7.3	2.76	2.5	5.5	0.3		7°	●				
		06T204GH	8.6	2.89	2.8	6.4	0.4			●				
		070305GH	10.2	3.24	3.0	8.0	0.5			●				
		09T306GH	12.2	4.03	3.6	9.6	0.6			●				
		11T306GH	14.5	4.06	4.6	11.6	0.6			●				
		140408GH	18.0	4.88	5.7	14.4	0.8			●				
		170608GH	22.1	6.58	6.8	17.7	0.8			●				
Sharp Cutting / for Deeper Drilling		ZXMT 040203SM	6.2	2.60	2.4	5.1	0.3	13°	10°		●		●	
		05T203SM	7.3	2.76	2.5	5.5	0.3		7°		●		●	
		06T204SM	8.6	2.89	2.8	6.4	0.4				●		●	
		070305SM	10.2	3.24	3.0	8.0	0.5				●		●	
		09T306SM	12.2	4.03	3.6	9.6	0.6				●		●	
		11T306SM	14.5	4.06	4.6	11.6	0.6				●		●	
		140408SM	18.0	4.88	5.7	14.4	0.8				●		●	
		170608SM	22.1	6.58	6.8	17.7	0.8				●		●	

● : Std. Item

Suitable Chipbreaker (ZXMT)

Workpiece Material	Insert Type	ZXMT											
	Chipbreaker	GM				GH				SM			
	Drilling Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D
Low Carbon Steel		☆	☆	☆	☆					★	★	★	★
Carbon Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Alloy Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Mold Steel		☆	☆	☆	☆	★	★	★	★				
Stainless Steel										★	★	★	★
Cast Iron		★	★	★	★								
Aluminum Alloys										★	★	★	★
Brass										★	★	★	★
Titanium Alloys										★	★	★	★

★: 1st Choice ☆: 2nd Choice

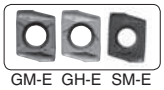
How to select ZXMT03

ZXMT03 type (Drill Dia.: φ12~φ13)

1) For outer edge, please select "-E" insert from three different chipbreakers for each application.
2) For inner edge, please select "-I" insert (GM chipbreaker only).

·Outer edge

ZXMT030203□□-E



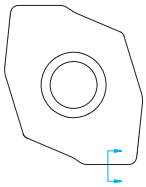
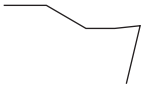
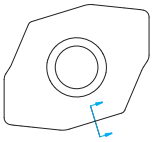
GM-E GH-E SM-E

·Inner edge

ZXMT030203GM-I

GM-I

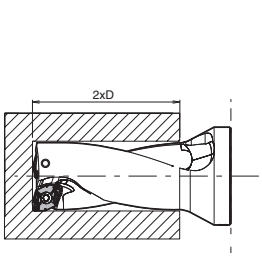
Features of the Chipbreaker

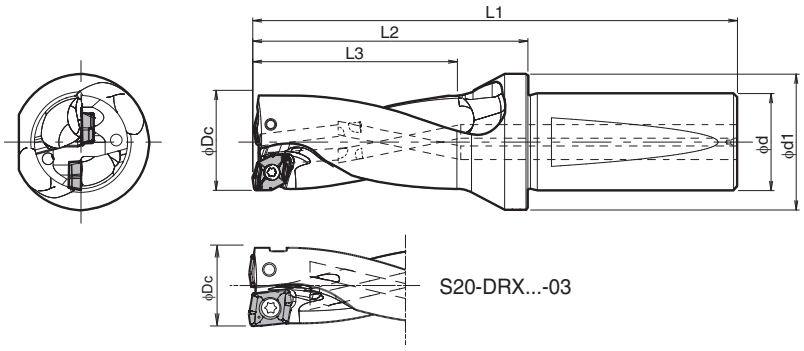
Chipbreaker			GM (General purpose)	GH (Tough Edge)	SM (Sharp Cutting / for Deeper Drilling)
Insert					
Features			1st. recommendation for carbon steel and alloy steel, 1st. recommendation for cast iron.	1st. recommendation for interrupted drilling and hard materials. Cutting edge strength oriented design.	Suitable for sticky materials such as stainless steel and low carbon steel.
			Good balance of sharp cutting and cutting edge strength	Middle to high feed rates of steel drilling, GM Chipbreaker alternative.	Sharp cutting, prevents chattering. For low to medium feed rates of steel.
Outer edge side	 Wide chipbreaker	Chipbreaker Cross-section			
		Chips from Outer edge			
Inner edge side	 Flat chipbreaker	Chipbreaker Cross-section			
		Chips from Inner edge			
Workpiece Material			S50C	S50C	SUS304

Indication of tool life of MagicDrill

How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	· When an insert is new the toolholder is slightly bent to the side during drilling. (therefore, the drill diameter is slightly bigger during drilling). Once drilling is finished, the toolholder will return back to normal size. No tool marks will appear on the finished surface (although this depends on workpiece and cutting condition: during external drilling slight tool mark might appear.) · When an insert is at the end of its tool life, Gradually the external corner part gets worn out, the toolholder does not bend slightly outwards, it starts to bend inwards. After the drilling is finished, the toolholder returns to the normal position. When taking off a toolholder under this condition the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking hole diameter	When hole diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause.
Checking the surface on the outlet side	If insert wear progresses, the burrs of penetrated hole entrance becomes bigger. This is a clear indication that the tool must be exchanged.
Variation of drilling noise	Light drilling noise at the beginning turns to brady noise which contains vibration noise.
Variation of vibration	As the end of tool life is getting closer, there is more vibration and the drilling noise changes. However, when drilling smaller diameters these factors are difficult to detect.

DRX (Drilling Depth:2×D)





S20-DRX...-03

2D

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts K38
S20 -DRX120M-2-03	●	2	12	88	45	24	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-2-03	●		12.5	89	46	25			+0.4			
-DRX130M-2-03	●		13	90	47	26			+0.3			
-DRX135M-2-04	●	2	13.5	91	48	27	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-2-04	●		14	92	49	28			+0.4			
-DRX145M-2-04	●		14.5	93	50	29			+0.3			
-DRX150M-2-04	●		15	94	51	30			+0.2			
S25 -DRX155M-2-05	●	2	15.5	109	55	31	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-2-05	●		16	110	56	32			+0.7			
-DRX165M-2-05	●		16.5	111	57	33			+0.5			
-DRX170M-2-05	●		17	112	58	34			+0.4			
-DRX175M-2-05	●		17.5	113	59	35			+0.3			
-DRX180M-2-05	●		18	114	60	36			+0.2			
-DRX185M-2-06	●	2	18.5	112	58	37	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-2-06	●		19	113	59	38			+0.8			
-DRX195M-2-06	●		19.5	114	60	39			+0.7			
-DRX200M-2-06	●		20	115	61	40			+0.5			
-DRX205M-2-06	●		20.5	116	62	41			+0.4			
-DRX210M-2-06	●		21	117	63	42			+0.3			
-DRX215M-2-06	●		21.5	118	64	43			+0.2			
-DRX220M-2-07	●	2	22	119	65	44	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-2-07	●		22.5	120	66	45			+1.0			
-DRX230M-2-07	●		23	121	67	46			+0.9			
-DRX235M-2-07	●		23.5	122	68	47			+0.8			
-DRX240M-2-07	●		24	123	69	48			+0.7			
-DRX245M-2-07	●		24.5	124	70	49			+0.5			
-DRX250M-2-07	●		25	125	71	50			+0.4			
-DRX255M-2-07	●		25.5	126	72	51			+0.3			
-DRX260M-2-07	●		26	127	73	52			+0.2			
S32 -DRX270M-2-09	●	2	27	136	77	54	32	41	+1.6	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX280M-2-09	●		28	138	79	56			+1.3			
-DRX290M-2-09	●		29	140	81	58			+1.1			
-DRX300M-2-09	●		30	142	83	60		43	+0.8			
-DRX310M-2-09	●		31	144	85	62			+0.6			

·When offset drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions K48
Trouble shooting K47

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S40 -DRX320M-2-11	●		32	169	100	64			+2.2			
-DRX330M-2-11	●		33	171	102	66			+1.9			
-DRX340M-2-11	●		34	173	104	68			+1.7			
-DRX350M-2-11	●	2	35	175	106	70	40	54	+1.4	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX360M-2-11	●		36	177	108	72			+1.2			
-DRX370M-2-11	●		37	179	110	74			+0.9			
-DRX380M-2-11	●		38	181	112	76			+0.7			
-DRX390M-2-14	●		39	179	110	78			+2.8			
-DRX400M-2-14	●		40	181	112	80		54	+2.5			
-DRX410M-2-14	●		41	183	114	82			+2.3			
-DRX420M-2-14	●		42	185	116	84			+2.0			
-DRX430M-2-14	●	2	43	187	118	86	40		+1.8	SB-5090TR	DT-20	ZXMT140408□□
-DRX440M-2-14	●		44	189	120	88			+1.5			
-DRX450M-2-14	●		45	191	122	90		59	+1.3			
-DRX460M-2-14	●		46	193	124	92			+1.0			
-DRX470M-2-14	●		47	195	126	94			+0.8			
-DRX480M-2-17	●		48	194	125	96			+3.8			
-DRX490M-2-17	●		49	196	127	98			+3.5			
-DRX500M-2-17	●		50	198	129	100		59	+3.3			
-DRX510M-2-17	●		51	200	131	102			+3.0			
-DRX520M-2-17	●		52	202	133	104			+2.8			
-DRX530M-2-17	●		53	204	135	106			+2.5			
-DRX540M-2-17	●	2	54	206	137	108	40		+2.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX550M-2-17	●		55	208	139	110			+2.0			
-DRX560M-2-17	●		56	210	141	112			+1.8			
-DRX570M-2-17	●		57	212	143	114		64	+1.5			
-DRX580M-2-17	●		58	214	145	116			+1.3			
-DRX590M-2-17	●		59	216	147	118			+1.0			
-DRX600M-2-17	●		60	218	149	120			+0.8			

·When offset drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ **K48**
Trouble shooting ➡ **K47**

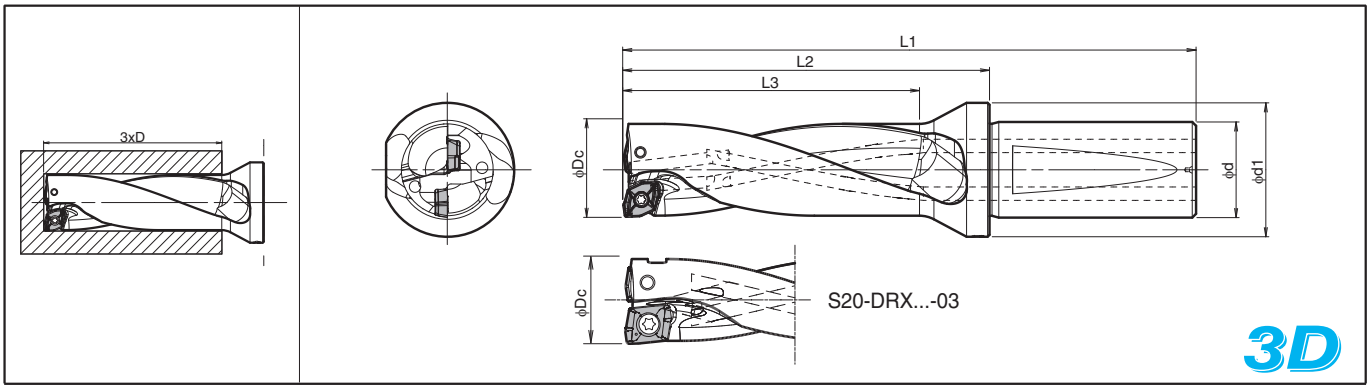
· Hole Dia. Tolerance (2D type)

Dc	Hole Dia. Tolerance (mm)
φ12~φ26	+0.20 - 0.10
φ27~φ38	+0.25 - 0.15
φ39~φ60	+0.30 - 0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRX (Drilling Depth:3×D)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S20 -DRX120M-3-03	●	2	12	100	57	36	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-3-03	●		12.5	102	59	37.5			+0.4			
-DRX130M-3-03	●		13	103	60	39			+0.3			
-DRX135M-3-04	●	2	13.5	105	62	40.5	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-3-04	●		14	106	63	42			+0.4			
-DRX145M-3-04	●		14.5	108	65	43.5			+0.3			
-DRX150M-3-04	●		15	109	66	45			+0.2			
S25 -DRX155M-3-05	●	2	15.5	124	70	46.5	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-3-05	●		16	126	72	48			+0.7			
-DRX165M-3-05	●		16.5	127	73	49.5			+0.5			
-DRX170M-3-05	●		17	129	75	51			+0.4			
-DRX175M-3-05	●		17.5	130	76	52.5			+0.3			
-DRX180M-3-05	●		18	132	78	54			+0.2			
-DRX185M-3-06	●	2	18.5	131	77	55.5	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-3-06	●		19	132	78	57			+0.8			
-DRX195M-3-06	●		19.5	134	80	58.5			+0.7			
-DRX200M-3-06	●		20	135	81	60			+0.5			
-DRX205M-3-06	●		20.5	137	83	61.5			+0.4			
-DRX210M-3-06	●		21	138	84	63			+0.3			
-DRX215M-3-06	●		21.5	140	86	64.5			+0.2			
-DRX220M-3-07	●	2	22	141	87	66	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-3-07	●		22.5	142	88	67.5			+1.0			
-DRX230M-3-07	●		23	144	90	69			+0.9			
-DRX235M-3-07	●		23.5	145	91	70.5			+0.8			
-DRX240M-3-07	●		24	147	93	72			+0.7			
-DRX245M-3-07	●		24.5	148	94	73.5			+0.5			
-DRX250M-3-07	●		25	150	96	75			+0.4			
-DRX255M-3-07	●		25.5	151	97	76.5			+0.3			
-DRX260M-3-07	●		26	153	99	78			+0.2			
S32 -DRX265M-3-09	●	2	26.5	161	102	79.5	32	41	+1.7	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX270M-3-09	●		27	163	104	81			+1.6			
-DRX275M-3-09	●		27.5	164	105	82.5			+1.5			
-DRX280M-3-09	●		28	166	107	84			+1.3			
-DRX285M-3-09	●		28.5	167	108	85.5			+1.2			
-DRX290M-3-09	●		29	169	110	87			+1.1			
-DRX295M-3-09	●		29.5	170	111	88.5		43	+1.1			
-DRX300M-3-09	●		30	172	113	90			+0.8			
-DRX305M-3-09	●		30.5	173	114	91.5			+0.7			
-DRX310M-3-09	●		31	175	116	93			+0.6			
-DRX315M-3-09	●		31.5	176	117	94.5			+0.5			
S40 -DRX320M-3-11	●	2	32	201	132	96	40	54	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX330M-3-11	●		33	204	135	99			+1.9			
-DRX340M-3-11	●		34	207	138	102			+1.7			
-DRX350M-3-11	●		35	210	141	105			+1.4			
-DRX360M-3-11	●		36	213	144	108			+1.2			
-DRX370M-3-11	●		37	216	147	111			+0.9			
-DRX380M-3-11	●		38	219	150	114			+0.7			

·When offset drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ K48
Trouble shooting ➡ K47

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S40 -DRX390M-3-14	●		39	218	149	117			+2.8			
-DRX400M-3-14	●		40	221	152	120		54	+2.5			
-DRX410M-3-14	●		41	224	155	123			+2.3			
-DRX420M-3-14	●		42	227	158	126			+2.0			
-DRX430M-3-14	●	2	43	230	161	129	40		+1.8	SB-5090TR	DT-20	ZXMT140408□□
-DRX440M-3-14	●		44	233	164	132			+1.5			
-DRX450M-3-14	●		45	236	167	135		59	+1.3			
-DRX460M-3-14	●		46	239	170	138			+1.0			
-DRX470M-3-14	●		47	242	173	141			+0.8			
-DRX480M-3-17	●		48	242	173	144			+3.8			
-DRX490M-3-17	●		49	245	176	147			+3.5			
-DRX500M-3-17	●		50	248	179	150		59	+3.3			
-DRX510M-3-17	●		51	251	182	153			+3.0			
-DRX520M-3-17	●		52	254	185	156			+2.8			
-DRX530M-3-17	●		53	257	188	159			+2.5			
-DRX540M-3-17	●	2	54	260	191	162	40		+2.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX550M-3-17	●		55	263	194	165			+2.0			
-DRX560M-3-17	●		56	266	197	168			+1.8			
-DRX570M-3-17	●		57	269	200	171		64	+1.5			
-DRX580M-3-17	●		58	272	203	174			+1.3			
-DRX590M-3-17	●		59	275	206	177			+1.0			
-DRX600M-3-17	●		60	278	209	180			+0.8			

·When offset drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ **K48**
Trouble shooting ➡ **K47**

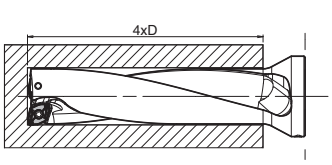
· Hole Dia. Tolerance (3D type)

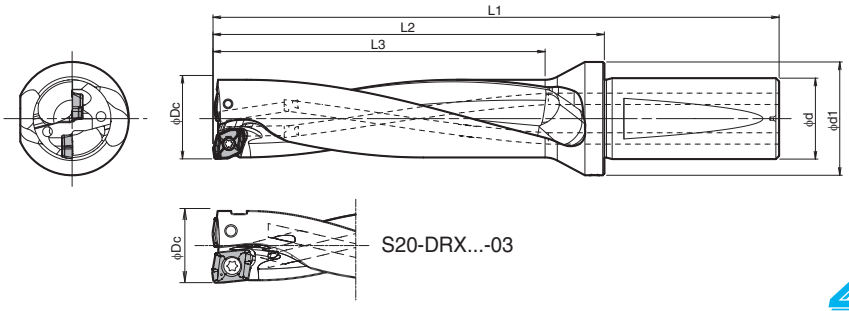
Dc	Hole Dia. Tolerance (mm)
φ12~φ26	+0.20 - 0.10
φ26.5~φ38	+0.25 - 0.15
φ39~φ60	+0.30 - 0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRX (Drilling Depth:4×D)





4D

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S20 -DRX120M-4-03	●	2	12	112	69	48	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-4-03	●		12.5	114	71	50			+0.4			
-DRX130M-4-03	●		13	116	73	52			+0.3			
-DRX135M-4-04	●	2	13.5	118	75	54	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-4-04	●		14	120	77	56			+0.4			
-DRX145M-4-04	●		14.5	122	79	58			+0.3			
-DRX150M-4-04	●		15	124	81	60			+0.2			
S25 -DRX155M-4-05	●	2	15.5	140	86	62	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-4-05	●		16	142	88	64			+0.7			
-DRX165M-4-05	●		16.5	144	90	66			+0.5			
-DRX170M-4-05	●		17	146	92	68			+0.4			
-DRX175M-4-05	●		17.5	148	94	70			+0.3			
-DRX180M-4-05	●		18	150	96	72			+0.2			
-DRX185M-4-06	●	2	18.5	149	95	74	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-4-06	●		19	151	97	76			+0.8			
-DRX195M-4-06	●		19.5	153	99	78			+0.7			
-DRX200M-4-06	●		20	155	101	80			+0.5			
-DRX205M-4-06	●		20.5	157	103	82			+0.4			
-DRX210M-4-06	●		21	159	105	84			+0.3			
-DRX215M-4-06	●		21.5	161	107	86			+0.2			
-DRX220M-4-07	●	2	22	163	109	88	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-4-07	●		22.5	165	111	90			+1.0			
-DRX230M-4-07	●		23	167	113	92			+0.9			
-DRX235M-4-07	●		23.5	169	115	94			+0.8			
-DRX240M-4-07	●		24	171	117	96			+0.7			
-DRX245M-4-07	●		24.5	173	119	98			+0.5			
-DRX250M-4-07	●		25	175	121	100			+0.4			
-DRX255M-4-07	●		25.5	177	123	102			+0.3			
-DRX260M-4-07	●		26	179	125	104			+0.2			
S32 -DRX270M-4-09	●	2	27	190	131	108	32	41	+1.6	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX280M-4-09	●		28	194	135	112			+1.3			
-DRX290M-4-09	●		29	198	139	116			+1.1			
-DRX300M-4-09	●		30	202	143	120		43	+0.8			
-DRX310M-4-09	●		31	206	147	124			+0.6			
S40 -DRX320M-4-11	●	2	32	223	154	128	40	49	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX330M-4-11	●		33	227	158	132			+1.9			
-DRX340M-4-11	●		34	231	162	136			+1.7			
-DRX350M-4-11	●		35	235	166	140			+1.4			
-DRX360M-4-11	●		36	239	170	144			+1.2			
-DRX370M-4-11	●		37	243	174	148			+0.9			
-DRX380M-4-11	●		38	247	178	152			+0.7			

·When offset drilling, reduce feed rate to 0.06mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ K48
Trouble shooting ➡ K47

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S40 -DRX390M-4-14	●	2	39	257	188	156	40	54	+2.8	SB-5090TR	DT-20	ZXMT140408□□
-DRX400M-4-14	●		40	261	192	160			+2.5			
-DRX410M-4-14	●		41	265	196	164			+2.3			
-DRX420M-4-14	●		42	269	200	168			+2.0			
-DRX430M-4-14	●		43	273	204	172		59	+1.8			
-DRX440M-4-14	●		44	277	208	176			+1.5			
-DRX450M-4-14	●		45	281	212	180			+1.3			
-DRX460M-4-14	●		46	285	216	184			+1.0			
-DRX470M-4-14	●		47	289	220	188			+0.8			
S50 -DRX480M-4-17	●	2	48	290	221	192	50	59	+3.8	SB-60120TR	DT-25	ZXMT170608□□
-DRX490M-4-17	●		49	294	225	196			+3.5			
-DRX500M-4-17	●		50	298	229	200			+3.3			
-DRX510M-4-17	●		51	302	233	204			+3.0			
-DRX520M-4-17	●		52	306	237	208			+2.8			
-DRX530M-4-17	●		53	310	241	212			+2.5			
-DRX540M-4-17	●		54	314	245	216		64	+2.3			
-DRX550M-4-17	●		55	318	249	220			+2.0			
-DRX560M-4-17	●		56	322	253	224			+1.8			
-DRX570M-4-17	●		57	326	257	228			+1.5			
-DRX580M-4-17	●		58	330	261	232			+1.3			
-DRX590M-4-17	●		59	334	265	236			+1.0			
-DRX600M-4-17	●		60	338	269	240			+0.8			

·When offset drilling, reduce feed rate to 0.06mm/rev or less.

·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ **K48**
Trouble shooting ➡ **K47**

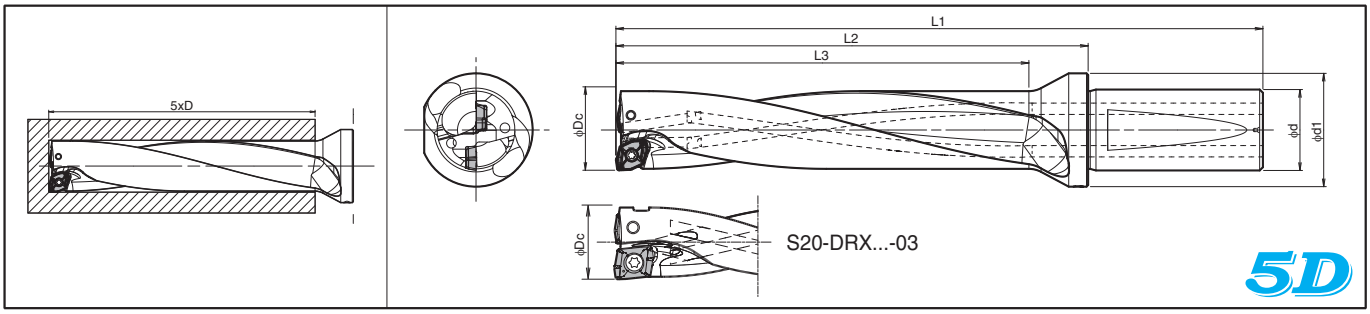
· Hole Dia. Tolerance (4D type)

Dc	Hole Dia. Tolerance (mm)
φ12~φ26	+ 0.25 - 0.10
φ27~φ38	+ 0.30 - 0.15
φ39~φ60	+ 0.35 - 0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRX (Drilling Depth:5×D)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S20 -DRX120M-5-03	●	2	12	120	77	60	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX130M-5-03	●		13	125	82	65			+0.3			
-DRX140M-5-04	●	2	14	134	91	70	20	27	+0.4	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX150M-5-04	●		15	139	96	75			+0.2			
S25 -DRX160M-5-05	●		16	158	104	80			+0.7			
-DRX170M-5-05	●	2	17	163	109	85	25	32	+0.4	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX180M-5-05	●		18	168	114	90			+0.2			
-DRX190M-5-06	●		19	170	116	95			+0.8			
-DRX200M-5-06	●	2	20	175	121	100	25	32	+0.5	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX210M-5-06	●		21	180	126	105			+0.3			
-DRX220M-5-07	●		22	185	131	110			+1.2			
-DRX230M-5-07	●		23	190	136	115			+0.9			
-DRX240M-5-07	●	2	24	195	141	120	25	33	+0.7	SB-2570TR	DTM-8	ZXMT070305□□
-DRX250M-5-07	●		25	200	146	125			+0.4			
-DRX260M-5-07	●		26	205	151	130			+0.2			
S32 -DRX270M-5-09	●		27	217	158	135			+1.6			
-DRX280M-5-09	●		28	222	163	140		41	+1.3			
-DRX290M-5-09	●	2	29	227	168	145	32		+1.1	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX300M-5-09	●		30	232	173	150		43	+0.8			
-DRX310M-5-09	●		31	237	178	155			+0.6			
S40 -DRX320M-5-11	●		32	255	186	160			+2.2			
-DRX330M-5-11	●		33	260	191	165			+1.9			
-DRX340M-5-11	●		34	265	196	170			+1.7			
-DRX350M-5-11	●	2	35	270	201	175		49	+1.4	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX360M-5-11	●		36	275	206	180			+1.2			
-DRX370M-5-11	●		37	280	211	185			+0.9			
-DRX380M-5-11	●		38	285	216	190			+0.7			
-DRX390M-5-14	●		39	296	227	195			+2.8			
-DRX400M-5-14	●		40	301	232	200		54	+2.5			
-DRX410M-5-14	●		41	306	237	205			+2.3			
-DRX420M-5-14	●		42	311	242	210			+2.0			
-DRX430M-5-14	●	2	43	316	247	215	40		+1.8	SB-5090TR	DT-20	ZXMT140408□□
-DRX440M-5-14	●		44	321	252	220			+1.5			
-DRX450M-5-14	●		45	326	257	225		59	+1.3			
-DRX460M-5-14	●		46	331	262	230			+1.0			
-DRX470M-5-14	●		47	336	267	235			+0.8			
S50 -DRX480M-5-17	●		48	338	269	240			+3.8			
-DRX490M-5-17	●		49	343	274	245			+3.5			
-DRX500M-5-17	●		50	348	279	250		59	+3.3			
-DRX510M-5-17	●		51	353	284	255			+3.0			
-DRX520M-5-17	●		52	358	289	260			+2.8			
-DRX530M-5-17	●		53	363	294	265			+2.5			
-DRX540M-5-17	●	2	54	368	299	270	50		+2.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX550M-5-17	●		55	373	304	275			+2.0			
-DRX560M-5-17	●		56	378	309	280			+1.8			
-DRX570M-5-17	●		57	383	314	285		64	+1.5			
-DRX580M-5-17	●		58	388	319	290			+1.3			
-DRX590M-5-17	●		59	393	324	295			+1.0			
-DRX600M-5-17	●		60	398	329	300			+0.8			

·When offset drilling, reduce feed rate to 0.05mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ K48
Trouble shooting ➡ K47

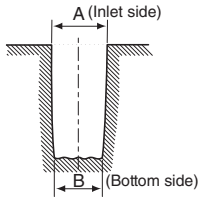
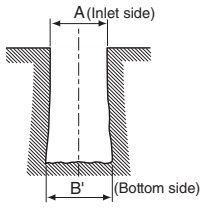
· Hole Dia. Tolerance (5D type)

Dc	Hole Dia. Tolerance (mm)	Dc	Hole Dia. Tolerance (mm)	Dc	Hole Dia. Tolerance (mm)
φ12~φ26	+ 0.30 - 0.10	φ27~φ38	+ 0.35 - 0.15	φ39~φ60	+ 0.40 - 0.20

* The values shown in the left are only estimation. It may vary depending on machines / workpieces / clamping status / cutting conditions.

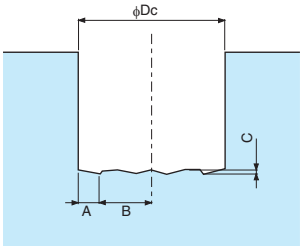
● : Std. Item

Trouble shooting (DRX)

Trouble condition	Condition		Cause	Countermeasures
Hole diameter is small (at hole bottom)		There is no problem for inlet, however gradually hole diameter is getting smaller at the bottom. A>B	Chip jam (External or Internal edge chip stuck)	Change the cutting conditions · Increase the cutting speed · Lower the feed rate Ref. to page **K48** for "Recommended Cutting Conditions"
Hole diameter becomes larger (at hole bottom)		There is no problem for inlet, however gradually hole diameter is getting larger at the bottom. A<B'	Internal edge chip jam.	Change the cutting conditions · Increase the cutting speed · Lower the feed rate Ref. to page **K48** for "Recommended Cutting Conditions" · Check the core height Ref. to page **K50~K51**
Hole diameter is small (from the hole inlet)		Hole diameter is small from inlet. (At turning moment)	Inappropriate adjustment of hole diameter.	In case of using lathe machine, use X-axis and adjustment hole diameter. Ref. to page **K50**
			No core at internal edge. (No core remains)	Adjust the center height. Ref. to page **K50~K51**

MagicDrill (DRX) Hole Bottom Shape (mm)

φDc	A	B	C	φDc	A	B	C	φDc	A	B	C
12.0	1.8	4.2	0.5	24.5	3.2	9.1	0.8	39.0	5.8	13.7	1.5
12.5		4.5		25.0		9.3	0.9	40.0		14.2	
13.0		4.7		25.5		9.6		41.0		14.7	
13.5	2	4.8	0.5	26.0		9.8		42.0		15.2	
14.0		5.0		26.5	3.9	9.4	1.0	43.0		15.7	
14.5		5.3		27.0		9.6		44.0		16.2	
15.0		5.5		27.5		9.9		45.0		16.7	
15.5		5.8	0.6	28.0		10.1		46.0		17.2	
16.0		6.0		28.5		10.4		47.0		17.7	1.6
16.5		6.3		29.0		10.6		48.0	7.1	16.9	1.7
17.0		6.5		29.5		10.9		49.0		17.4	
17.5		6.8		30.0		11.1	1.1	50.0		17.9	
18.0		7.0	0.7	30.5		11.4		51.0		18.4	
18.5	2.4	6.9	0.7	31.0		11.6		52.0		18.9	
19.0		7.1		31.5		11.9	1.2	53.0		19.4	
19.5		7.4		32.0	4.7	11.3	1.1	54.0		19.9	
20.0		7.6		33.0		11.8		55.0		20.4	1.8
20.5		7.9		34.0		12.3		56.0		20.9	
21.0		8.1	0.8	35.0		12.8		57.0		21.4	1.9
21.5		8.4		36.0		13.3	1.2	58.0		21.9	2.0
22.0	3.2	7.8	0.8	37.0		13.8	1.3	59.0		22.4	
22.5		8.1		38.0		14.3		60.0		22.9	2.1
23.0		8.3									
23.5		8.6									
24.0		8.8									



Common for 2×D, 3×D, 4×D, 5×D type

* Figures above are nominal sizes (Varies within ±0.1mm depending on workpiece materials and cutting conditions)

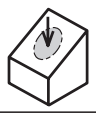
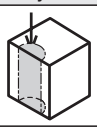
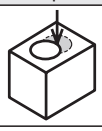
DRX Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc:m/min) MEGACOAT PR1230 GM GH	MEGACOAT PR1225 SM	MEGACOAT PR1210 GM	Carbide GW15 SM	Drill Dia. φDc (mm)	Drill type 2D~3D f (mm/rev) GM	2D~3D GH	2D~3D SM	4D GM	4D GH	4D SM	5D GM	5D GH	5D SM
Low Carbon Steel	☆ 120-240	★ 120-240			φ12~φ15	0.06~0.10	0.06~0.10	0.04~0.10	0.05~0.08	0.05~0.08	0.04~0.08	0.04~0.07	0.04~0.07	0.04~0.08
					φ15.5~φ18	0.06~0.12	0.06~0.12	0.06~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08	0.05~0.08	0.04~0.09
					φ18.5~φ26	0.08~0.14	0.08~0.14	0.06~0.14	0.06~0.12	0.08~0.12	0.05~0.12	0.06~0.10	0.06~0.10	0.04~0.10
					φ26.5~φ60	0.08~0.14	0.08~0.14	0.06~0.14	0.06~0.12	0.08~0.12	0.05~0.12	0.06~0.10	0.06~0.10	0.04~0.10
Carbon Steel	★ 100-180	☆ 100-180			φ12~φ15	0.04~0.14	0.04~0.14	0.04~0.10	0.04~0.10	0.04~0.10	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					φ15.5~φ18	0.06~0.16	0.06~0.16	0.06~0.12	0.05~0.12	0.05~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					φ18.5~φ26	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
					φ26.5~φ60	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
Alloy Steel	★ 100-160	☆ 100-160			φ12~φ15	0.04~0.14	0.04~0.14	0.04~0.10	0.04~0.10	0.04~0.10	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					φ15.5~φ18	0.06~0.16	0.06~0.16	0.06~0.12	0.05~0.12	0.05~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					φ18.5~φ26	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
					φ26.5~φ60	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
Mold Steel	★ 80-150	☆ 80-150			φ12~φ15	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07	0.04~0.07	0.04~0.07	0.04~0.06	0.04~0.06	0.04~0.06
					φ15.5~φ18	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					φ18.5~φ26	0.08~0.15	0.08~0.15	0.06~0.12	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					φ26.5~φ60	0.08~0.15	0.08~0.15	0.06~0.12	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08
Stainless Steel (Austenitic related)	☆ 70-140	★ 70-140			φ12~φ15	0.06~0.10	0.06~0.10	0.04~0.10	0.05~0.08	0.05~0.08	0.04~0.08	0.04~0.07	0.04~0.08	0.04~0.08
					φ15.5~φ18	0.06~0.10	0.06~0.10	0.06~0.12	0.05~0.08	0.05~0.08	0.05~0.11	0.04~0.07	0.04~0.07	0.04~0.10
					φ18.5~φ26	0.08~0.12	0.08~0.12	0.06~0.14	0.07~0.10	0.07~0.10	0.06~0.12	0.07~0.10	0.07~0.10	0.06~0.12
					φ26.5~φ60	0.08~0.12	0.08~0.12	0.06~0.14	0.07~0.10	0.07~0.10	0.06~0.12	0.07~0.10	0.07~0.10	0.06~0.12
Gray Cast Iron			★ 100-150		φ12~φ15	0.08~0.14	-	-	0.06~0.12	-	-	0.04~0.10	-	-
					φ15.5~φ18	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
					φ18.5~φ26	0.08~0.20	-	-	0.08~0.18	-	-	0.06~0.14	-	-
					φ26.5~φ60	0.08~0.20	-	-	0.08~0.18	-	-	0.06~0.14	-	-
Nodular Cast Iron			★ 80-120		φ12~φ15	0.08~0.12	-	-	0.06~0.10	-	-	0.04~0.08	-	-
					φ15.5~φ18	0.08~0.16	-	-	0.08~0.14	-	-	0.06~0.10	-	-
					φ18.5~φ26	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
					φ26.5~φ60	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
Non-ferrous Metals				★ 200-600	φ12~φ15	-	-	0.06~0.12	-	-	0.05~0.10	-	-	0.04~0.08
					φ15.5~φ18	-	-	0.08~0.14	-	-	0.06~0.12	-	-	0.05~0.10
					φ18.5~φ26	-	-	0.08~0.16	-	-	0.06~0.14	-	-	0.05~0.12
					φ26.5~φ60	-	-	0.08~0.20	-	-	0.08~0.16	-	-	0.07~0.14
Titanium Alloys				★ 40-70	φ12~φ15	-	-	0.05~0.08	-	-	0.04~0.07	-	-	0.04~0.06
					φ15.5~φ18	-	-	0.05~0.08	-	-	0.04~0.07	-	-	0.04~0.06
					φ18.5~φ26	-	-	0.06~0.10	-	-	0.06~0.08	-	-	0.05~0.07
					φ26.5~φ60	-	-	0.06~0.10	-	-	0.06~0.08	-	-	0.05~0.07

· Apply a sufficient amount of coolant.

★ : 1st Recommendation ☆ : 2nd Recommendation

Cutting Conditions by Application

Applications		Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole*	Stacked Plates
Shape of Workpiece								
DRX	Cutting Speed (m/min)	120	120	120	120	120	120	Not Available
	f (mm/rev)	0.1	0.05	0.05	0.05	Concave Surface 0.05 Continuous Part 0.1	0.05	Not Available
Coolant (Internal)		Yes	Yes	Yes	Yes	Yes	Yes	Not Available

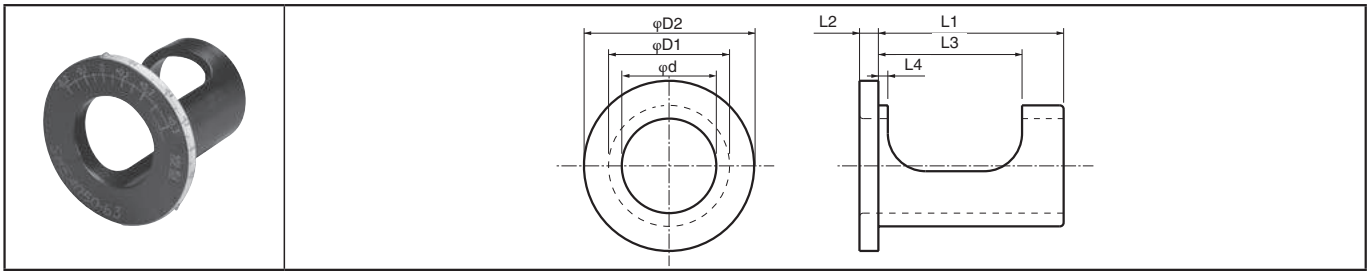
* Cutting width (Torus-shaped part) when drilling cored hole.

Drill type	2D~3D	4D	5D
Cutting width (Torus-shaped part)	0.1×Dc or less	Less than corner radius	Not recommended

◆ Max. Depth for Drilling with External Coolant

In case of using external coolant system, chip evacuation will be bad. Therefore ap should be measured within 1.5 times (1.5×Dc) of drill diameter (φDc).

SHE



Sleeve Dimensions

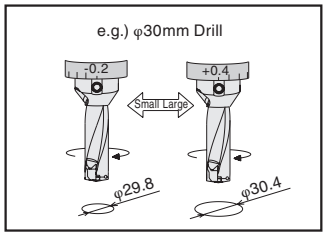
Description	Std.	Dimension (mm)							* Drill Dia. Adjustable Range	Center Height Adjustable Range
		φd	φD1	φD2	L1	L2	L3	L4		
SHE 2025-43	●	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
2532-48	●	25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
3240-53	●	32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
4050-63	●	40	50	74	63	6	49	3.0	+0.6~-0.2	+0.2~-0.2

· Diameter Adjustment Range adjusts the drill diameter.

● : Std. Item

· SHE type is for MagicDrill **DRX / DRZ**. It is not suitable for MagicDrill **DRS** type, because large correction amount is required.

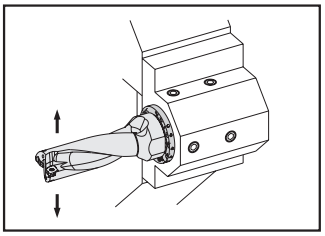
1. Diameter Adjustment ~For Machining Center~



● Diameter Adjustment Range (mm)

Shank Dia.	Adjustment Range
φ20	+0.4~-0.2
φ25	
φ32	
φ40	+0.6~-0.2

2. Center Height Adjustment ~Fewer problems owing to height adjustment for lathes~



● Center Height Adjustment Range (mm)

Shank Dia.	Adjustment Range
φ20	+0.2~-0.15
φ25	
φ32	
φ40	+0.3~-0.2

◆ How to Use the Adjustable Sleeve

1. Hole Diameter Adjustment when Drilling

(1) Adjust the scale at the flange periphery of the sleeve to the center of the drill coolant plug. (Fig.1)

(2) When making the hole diameter larger, rotate the sleeve in (+) direction and to make it smaller, rotate the sleeve in (-) direction.

(3) When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.

(4) Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window.
The upper screw should be tightened slightly so that the sleeve will not be damage.

Caution:

· Not applicable for Collet Chuck type Arbor.

· Scale on the sleeve is the reference value.
Check the actual hole diameter after adjusting.

DRX

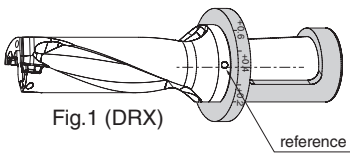


Fig.1 (DRX)

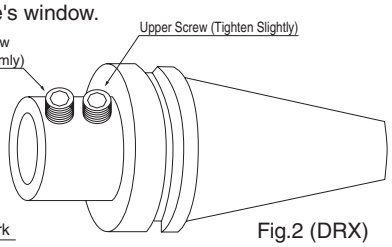


Fig.2 (DRX)

DRZ

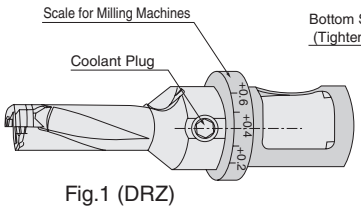


Fig.1 (DRZ)

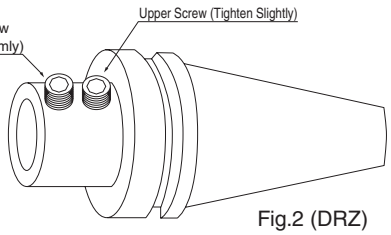


Fig.2 (DRZ)

(Example of Adjusting the Hole Dia. +0.4mm)

2. Center-Height Adjustment for Lathes

Most Lathe problem occur due to Center Height Deviation.

The Center Height is appropriate if a core approximately 0.5mm diameter remains at the center of the end face. (Fig.3)

Center-height adjustment is necessary for the case as follows:

◆No core remains or ◆ Core diameter is more than 1mm

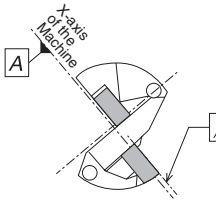


Fig.4

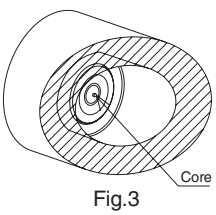


Fig.3

(1) Align the drill with the outer insert face parallel to the X-axis of the tool turret. (Fig.4)

(2) Align the scale (for the lathe) on the flange face of the sleeve to the center of the drill coolant plug.

(3) When no core remains, rotate the sleeve to (+) direction to make the core larger, and when the core diameter is more than 1mm, rotate the sleeve to (-) direction to make the core smaller.

(4) When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.

(5) After Completing the adjustment, firmly tighten on the drill directly through the sleeve's window.

Note: Depending on amount of the center height adjustment, the hole diameter may change. It is recommended that the hole diameter is checked after the center height adjustment.

Lathe Installation

(1) The top face of the outer insert should be parallel to the X-axis to allow for offset machining.
Drill diameter can be changed by moving X-axis.
(2) It is recommended to set the outer insert as shown in Fig.1 with the outer insert facing the operator. (Fig.1)
(It is also possible to use it by setting it in 180° reverse position)
If the lathe has two turrets, when installing the drill into the lower turret, the outer insert should be set to face the operator.
(It is also possible to use it by setting at 180° reverse position)

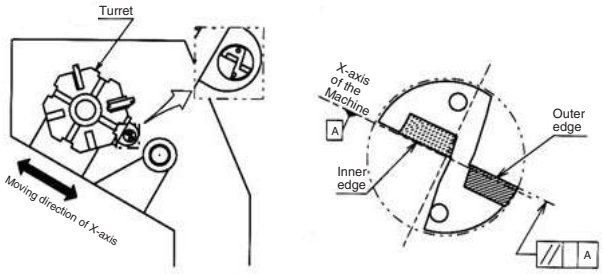


Fig.1 Installed to the Lathe

Drill Diameter Adjustment

1. Drill Diameter Adjustment
(1) Drill diameter is adjusted by moving X-axis.
The moving direction of the X-axis depends on the position of the toolholder.
(2) In case of making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig.2, Fig.3)
For making the hole diameter smaller, slide the tool along the X-axis in the opposite direction.
(This movement of the axis is called "Offset")
However, be sure not to make the hole diameter smaller than the drill diameter by 0.2mm or more. Otherwise, the toolholder will interfere with the drilled hole. (Fig.4)
e.g.) In case of using φ20 drill, the hole diameter must not be smaller than 19.8mm.

2. Offset Limit of the Drill Diameter
For the maximum limit of the drill diameter, refer to "Max. Offset (Radial)" in the Toolholder Dimensions table.
(The figure in the table shows how much it is possible the offset the drill in the radial direction.)
e.g.) In case of using φ20 drill, it is possible to make a hole up to φ21 since "Max. Offset (Radial)" is +0.5mm.

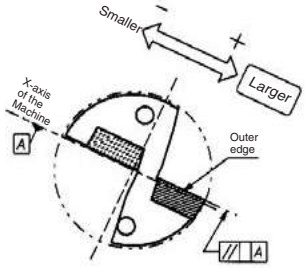


Fig.2 Outer insert Facing Up

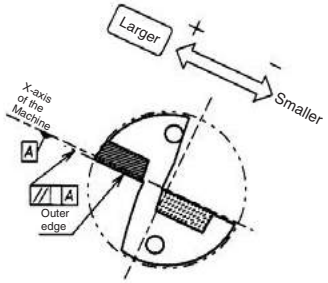


Fig.3 Outer insert Facing Down

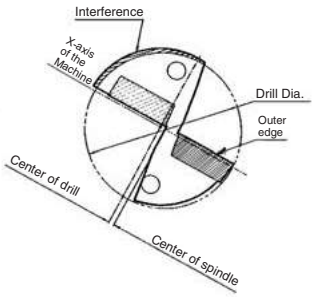


Fig.4 Excessive offset
(For Smaller Hole Diameter)

Center Height Adjustment

1. Center Height of the Inner Insert

When installing inner insert as shown in Fig.1, it will be set around 0.2mm below the Center of Spindle. (Fig.5)
This is the normal position of the center height and the drill is designed to be handled in this condition.
However, in case that the turret of the lathe is out of the center of Spindle, sometimes the inner insert may be set above the center, or excessively below the center.
For stable drilling, it is essential to check the Center Height carefully.

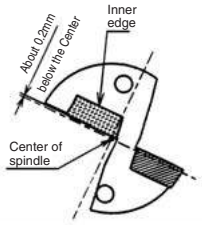


Fig.5 Front View of the Drill

2. How to Check the Center Height

For checking the center height of the inner insert, see the core which remains at the center of the end face of the drilled hole. (Fig.6)

If the center height is in the normal condition, the core about 0.5mm in diameter, will remain after drilling

In the following cases, it is necessary to adjust the Center Height.

- No core remains
- Core diameter is more than 1mm

* To test the Center Height, drill a shallow hole about 10mm in depth at low feed rate, less than 0.1mm/rev.

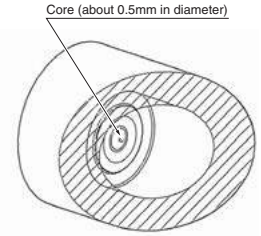


Fig.6 Center Core

3. Center Height Adjustment

a) No core remains / Core with Excessively Small Diameter

This happens when the Inner Insert is set above the Center Height.
In this case, adjustment is necessary since insert breakage will be probable at the center of the drill. (Fig.7)

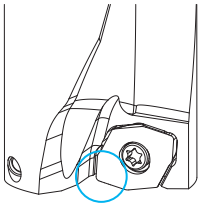


Fig.7 Insert breakage near the center of the drill

[How to Adjust]

(1) Install the drill rotated 180°.
Most problems will be solved by this method.
(Fig.8)

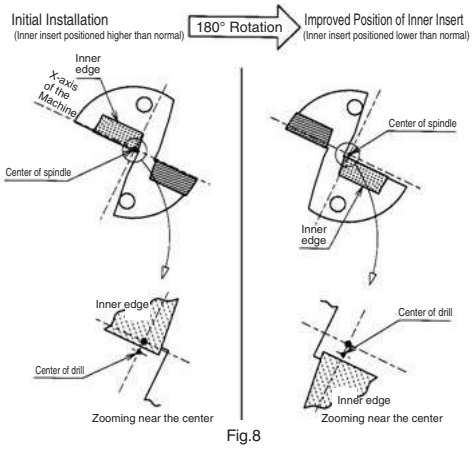


Fig.8

[How to Adjust]

(2) If the core diameter becomes too large after the above adjustment, install the drill by rotating 90° counter-clockwise as shown in Fig.9 (outer insert is positioned lower) and adjust the center height by moving the tool in the X-axis direction.
(However, this makes it impossible to adjust the drill diameter)

Caution: In case of installing the drill in the reverse direction (outer insert is positioned above), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.
The best solution is to readjust the center position of the turret itself.

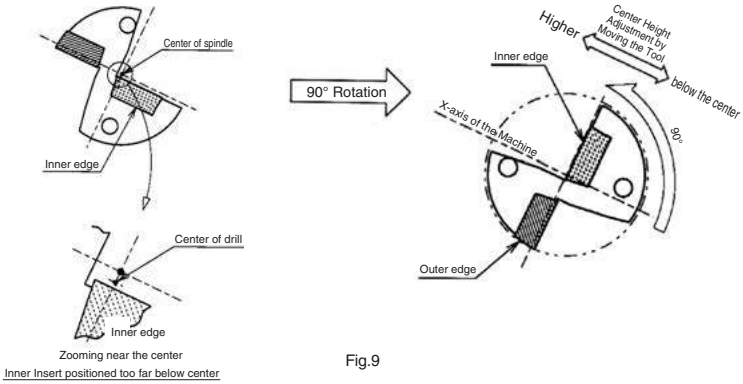


Fig.9

b) Core with excessively large diameter (More than 1mm)

This occurs when the inner insert is excessively below the center.
This condition causes poor chip evacuation and an adjustment is required.

[How to Adjust]

Install the drill rotating 90° as shown in Fig.10. (outer insert is positioned on the upper side) and adjust the center height by moving tool in the X-axis direction.
(However, this makes it impossible to adjust the drill diameter)

Caution: In case of installing the drill in the opposite direction (outer insert is positioned lower), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.
The best solution is to readjust the center position of the turret itself.

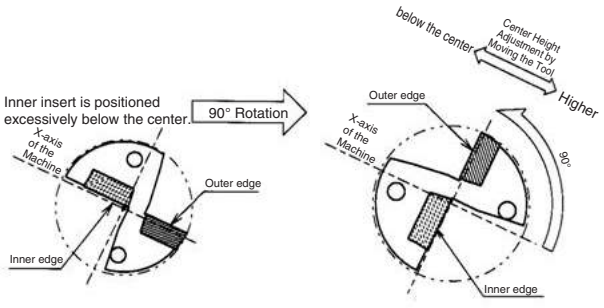
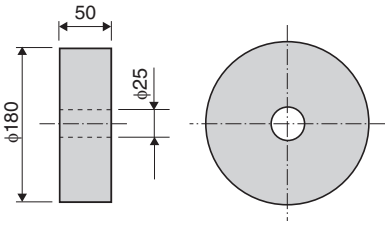


Fig.10

Case Studies

SKD62 (45HRC)

·Vc=60m/min
·f=0.05mm/rev
·H=50mm (through hole)
·Wet (Internal coolant)
·S25-DRX250M-4-07
·ZXMT070305GH
(PR1230)



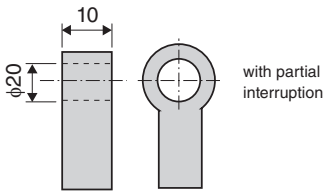
MagicDrill DRX	6 holes/edge
Competitor J	4 holes/edge (breakage)

150% of tool life

· MagicDrill DRX has 1.5 times longer life than Competitor J
Breakage is confirmed after machining 4 holes for Competitor J
Interrupted drilling is still possible after drilling 6 holes with MagicDrill DRX
· Finishing is not necessary because MagicDrill DRX provides a good finished surface.
(Evaluation by the user)

SUS303

·Vc=75m/min
·f=0.1mm/rev
·H=10mm (through hole)
·Wet (Internal coolant)
·S25-DRX200M-3-06
·ZXMT06T204SM
(PR1225)



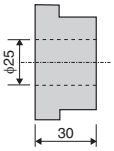
MagicDrill DRX	1,300 holes/edge
Competitor K	500 holes/edge

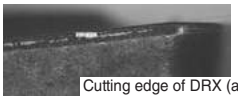
260% of tool life

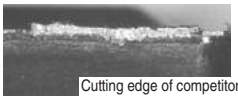
· MagicDrill DRX had no sudden breakage that occurred for Competitor K and achieved stable drilling with 2.6 times longer tool life.
(Evaluation by the user)

SCM420HV (Cold Forging)

·Vc=118m/min
·f=0.08mm/rev
(0.05 at the beginning)
·H=30mm (through hole)
·Wet (Internal coolant)
·S25-DRX250M-3-07
·ZXMT070305SM
(PR1225)




Cutting edge of DRX (after 400 holes)

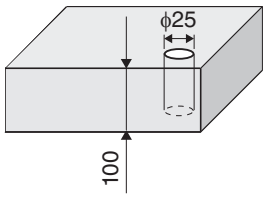

Cutting edge of competitors (after 400 holes)

MagicDrill DRX	Less adhesion, continue to use even after 400 holes
Competitor L	Large adhesion after 400 holes

· MagicDrill DRX had a good chip control and low adhesion for drilling of the same number comparing to Competitor L.
(Evaluation by the user)

SKT4 (42HRC)

·Vc=100m/min
·f=0.07~0.08mm/rev
·H=100mm (through hole)
·Wet (External Coolant)
·S25-DRX250M-4-07
·ZXMT070305GM
(PR1230)



Mold component φ25x100mm (through hole)
24 locations

MagicDrill DRX	Machining time: 28 min/pc
Conventional tool M	Machining time: 58 min/pc

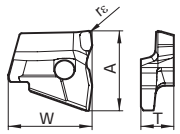
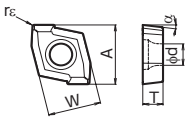
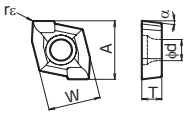
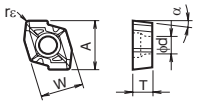
50% reduction

· For deep hole drilling (4xD), MagicDrill DRX had no chip stuck and enabled drilling without step feeding (machining time was reduced in half) despite use of external coolant
· MagicDrill DRX has improved 3 times longer tool life than Conventional tool M
(Evaluation by the user)

Applicable Inserts (for DRS / DRZ)

Applicable Inserts (for DRS / DRZ)

Classification of usage										Applicable Toolholders Ref. to Page
● : 1st Choice ○ : 2nd Choice (Steel; non heat treated)	P	Carbon Steel / Alloy Steel	●	○			○			
		Mold Steel	●				○			
	M	Stainless Steel	○	●						
	K	Cast Iron			●					
	N	Non-ferrous Metals							○	

Insert		Description		Dimension (mm)					Angle	MEGACOAT			PVD Coated Carbide		Carbide	Applicable Toolholders Ref. to Page
				A	T	φd	W	rε	α	PR1230	PR1225	PR1210	PR660	PR830	KW10	
		DS	100	8.8	3.5	-	9.0	0.2	-	●		●	○			K54
			105	9.3	3.7		9.7			●		●	○			
			110	9.8	3.9		10.0			●		●	○			
			115	10.2	4.1		10.3			●		●	○			
			120	10.8	4.3		10.9	0.25		●		●	○			
		ZCMT	050203	5.9	2.38	2.3	5.0	0.3	7°	●	●	●	○	●	●	K56 ~ K63
			06T204	7.0	2.80	2.5	6.0	0.4		●	●	●	○	●	●	
			080304	9.7	3.18	2.9	8.2			●	●	●	○	●	●	
			10T304	12.0	3.97	4.4	10.4			●	●	●	○	●	●	
			12T306	14.3	3.97	5.6	12.8	0.6		●	●	●	○	●	●	
			150408	17.8	4.76	5.6	15.8	0.8		●	●	●	○	●	●	
			200608	22.8	6.35	6.5	20.3			●			○	●	●	
 For Sharp Cutting / Deep drilling		ZCMT	050203SP	5.9	2.38	2.3	5.0	0.3	7°	●	●		○	●	●	
			06T204SP	7.0	2.80	2.5	6.0	0.4		●	●		○	●	●	
			080304SP	9.7	3.18	2.9	8.2			●	●		○	●	●	
			10T304SP	12.0	3.97	4.4	10.4			●	●		○	●	●	
			12T304SP	14.3	3.97	5.6	12.8			●	●		○	●	●	
			150406SP	17.8	4.76	5.6	15.8	0.6		●	●		○	●	●	
 For Stainless Steel		ZCMT	050203SU	5.9	2.38	2.3	5.0	0.3	7°	●	●		○	●		
			06T204SU	7.0	2.80	2.5	6.0	0.4		●	●		○	●		

* Features of SP Chipbreaker··· 1. Less cutting force due to large rake angle.
2. Suitable for chip control of sticky materials such as stainless steel or soft steel.
3. Larger size inserts have smaller corner-R(rε) than standard chipbreaker type and can reduce burrs.

Suitable Chipbreaker (ZCMT)

Workpiece Material	Insert Size	ZCMT05									ZCMT06									ZCMT08					
	Chipbreaker	Standard			SP			SU			Standard			SP			SU			Standard			SP		
	Drilling Depth	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D
Low Carbon Steel		☆	☆	-	★	★	★	-	-	-	☆	☆	-	★	★	★	☆	☆	☆	☆	☆	-	★	★	★
Carbon Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★
Alloy Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★
Mold Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★
Stainless Steel		☆	☆	-	★	★	★	☆	☆	-	-	-	-	☆	☆	☆	★	★	★	☆	☆	-	★	★	★
Cast Iron		★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆
Aluminum Alloys		☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★
Brass		★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆
Titanium Alloys		☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★

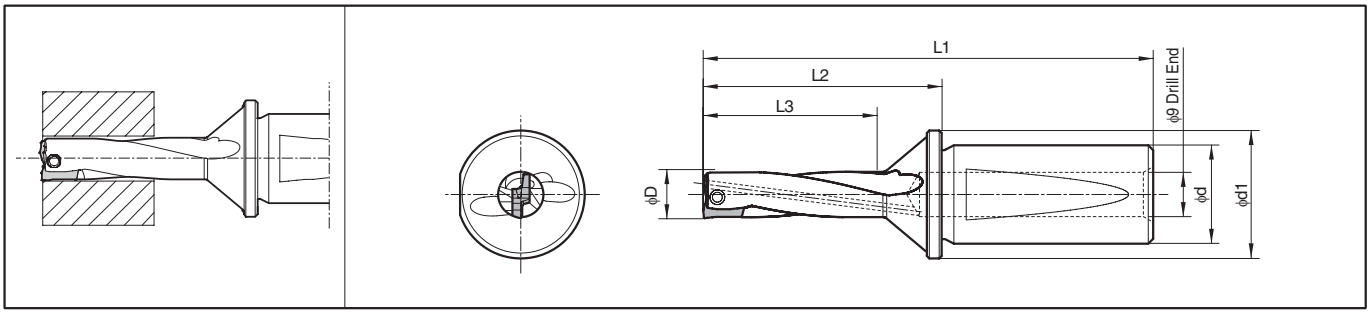
Workpiece Material	Insert Size	ZCMT10								ZCMT12								ZCMT15								ZCMT20		
	Chipbreaker	Standard				SP				Standard				SP				Standard				SP				Standard		
	Drilling Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D
Low Carbon Steel		☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	★	★	★
Carbon Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★
Alloy Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★
Mold Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★
Stainless Steel		☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	★	★	★
Cast Iron		★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★
Aluminum Alloys		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★	★
Brass		★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★
Titanium Alloys		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★	★

· Standard chipbreakers (without symbol) may function better with interrupted drilling.
· When drilling aluminum alloys, chips become long and difficult to be discharged at the depth over 2D.
· 5D type is the same as 4D type.

★ : 1st Choice ☆ : 2nd Choice

● : Std. Item
○ : Check Availability

DRS

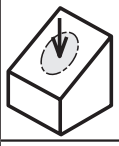
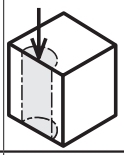
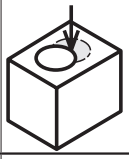
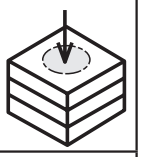


Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φD	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Wrench	Applicable Inserts ➡ K53
S20 -DRS10035	●	1	10.0	92	49	35.0	20	26	+0.2	SB-2080TR	FT-6	-	DS100
-DRS10336	●	1	10.3	92	49	36.0			+0.1				
-DRS10537	●	1	10.5	93	50	37.0			+0.2				DS105
-DRS11038	●	1	11.0	96	53	38.5			+0.2	SB-2290TR			DS110
-DRS11540	●	1	11.5	97	54	40.5			+0.2				DS115
-DRS12042	●	1	12.0	99	56	42.0			+0.4	SB-25100TR	-	DT-7	DS120
-DRS12544	●	1	12.5	101	58	44.0			+0.2				

Cutting Conditions by Application

[Workpiece Material: S50C]

Applications		Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole	Stacked Plates
Shape of Workpiece								
DRS	Vc (m/min)	80	80	Not recommended	Not recommended	80	Not recommended	Not Available
DRS	f (mm/rev)	0.08	0.04	Not recommended	Not recommended	Concave Surface 0.04 Continuous Part 0.08	Not recommended	Not Available
Coolant (Internal)		Yes	Yes	–	–	Yes	–	–

·In case of using external coolant system, chip evacuation will be bad. Therefore ap should be measured within 1.5 times (1.5×D) of drill diameter (φD).

DRS Recommended Cutting Conditions (Coolant)

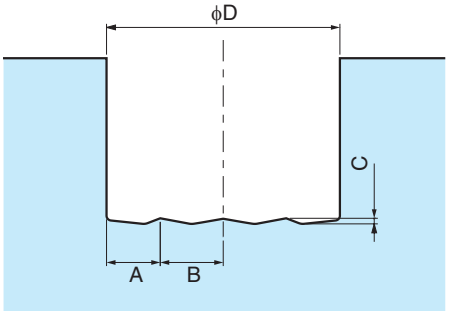
Workpiece Material	Recommended Insert Grades Vc (m/min) MEGACOAT PR1230	MEGACOAT PR1210	PVD Coated Carbide PR660	f (mm/rev)
Low Carbon Steel	★ 80 ~ 100	-	☆ 80 ~ 100	0.06
Carbon Steel	★ 80 ~ 100	-	☆ 80 ~ 100	0.08 ~ 0.1
Alloy Steel	★ 80	-	☆ 80	0.04 ~ 0.06
Mold Steel	★ 80	-	☆ 80	0.04 ~ 0.06
Stainless Steel (Austenitic related)	★ 70 ~ 80	-	☆ 70 ~ 80	0.05 ~ 0.06
Gray Cast Iron	-	★ 80 ~ 100	-	0.08 ~ 0.1

★ : 1st Recommendation ☆ : 2nd Recommendation

1. Apply a sufficient amount of coolant.
2. If cutting speed is decreased too much from above condition, chip evacuation performance will deteriorate.
   If the feed rate is increased too much from above condition, inner edge chip evacuation will deteriorate.
   If the feed rate is decreased too much from above condition, outer edge chip evacuation will deteriorate.
3. If chips are too long when low carbon steel drilling, increased the cutting speed to 120~150m/min.
   If this does not solve the problem, try step feeding.
   [How to step feeding] (1) Cut 1~2mm (2) Return 0.1mm (3) Repeat (1) and (2)

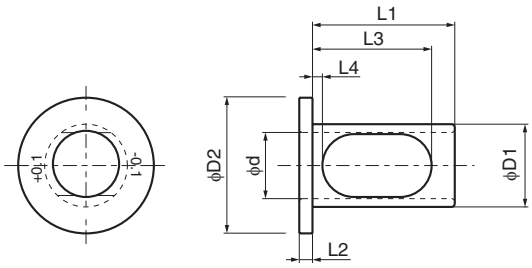
DRS Hole Bottom Shape (mm)

φD	A	B	C
10.0	2.2	2.80	0.2
10.3	2.3	2.85	0.2
10.5	2.3	2.95	0.2
11.0	2.4	3.10	0.2
11.5	2.5	3.25	0.2
12.0	2.8	3.20	0.3
12.5	2.9	3.35	0.4



● : Std. Item

SHEM



Sleeve Dimensions

Description	Std.	Dimension (mm)							* Drill Dia. Adjustable Range
		φd	φD1	φD2	L1	L2	L3	L4	
SHEM 2025-43	●	20	25	41	43	4	36	3.0	+0.1,-0.1
2032-43	●		32	49		6		2.5	+0.1,-0.1

* Diameter Adjustment Range adjusts the drill diameter.

How to Use the Adjustable Sleeve

· SHEM is designed for only MagicDrill Mini (DRS-type)
· SHEM is for drill diameter adjustment only. (up to +0.1mm or -0.1mm)
SHEM is not for center height adjustment like conventional adjustable sleeve (SHE-type)
· Apply SHEM when adjusting the hole diameter for pre-drilling before threading.

(1) Set the outer edge horizontally with 90° to making line on the sleeve. (Fig.1)
(2) When making the hole diameter larger, align the +0.1 mark on the sleeve with the flat on the drill shank.
To adjust to smaller diameter, align the -0.1 mark on the sleeve with the flat on the drill shank. (Fig.1)
(3) Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window.
The upper screw should be tightened slightly so that the sleeve will not be damage. (Fig.2.)

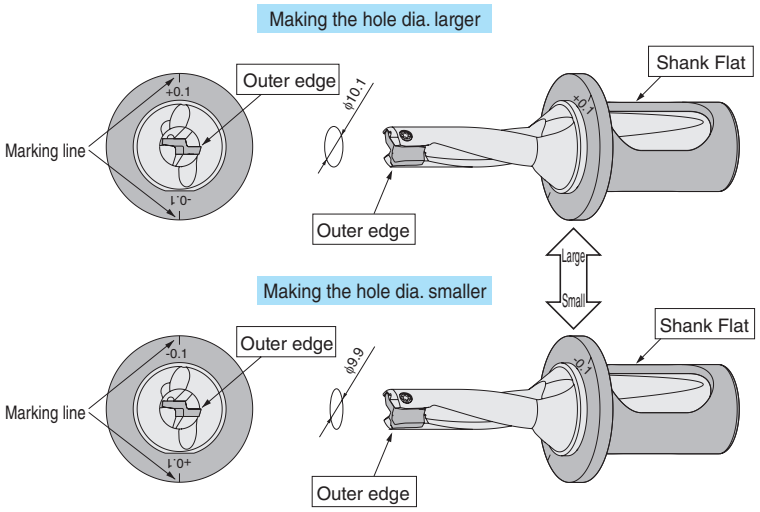


Fig.1 Diameter Adjustment Method (e.g.) ϕ10 Drill

Caution: Not applicable for Collet Chuck type Arbor.

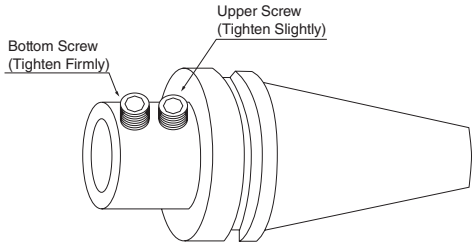
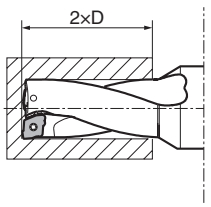
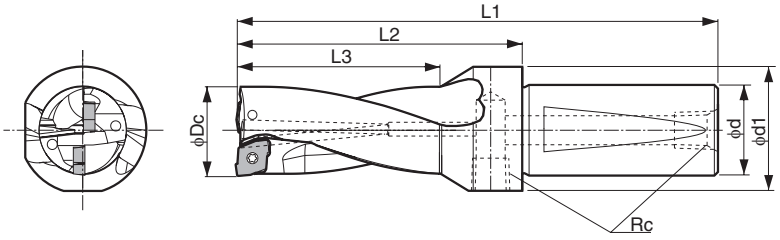


Fig.2

● : Std. Item

DRZ (Drilling Depth:2×D)





2D

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Plug	Applicable Inserts ➡ K53
S20 -DRZ1326-05	●	2	13	95	52	26	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135270-05	●		13.5	95	52	27				+0.5				
-DRZ1428-05	●		14	98	55	28				+0.5				
-DRZ145290-05	●		14.5	98	55	29				+0.5				
-DRZ1530-05	●		15	100	57	30				+0.5				
-DRZ155310-05	●		15.5	100	57	31				+0.5				
S25 -DRZ1632-06	●	2	16	115	61	32	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165330-06	●		16.5	115	61	33				+0.9				
-DRZ1734-06	●		17	116	62	34				+0.8				
-DRZ175350-06	●		17.5	116	62	35				+0.7				
-DRZ1836-06	●		18	118	64	36				+0.6				
-DRZ185370-06	●		18.5	118	64	37				+0.6				
-DRZ1938-06	●		19	120	66	38				+0.5				
-DRZ195390-06	●		19.5	120	66	39				+0.5				
-DRZ2040-06	●		20	123	69	40				+0.5				
-DRZ205410-06	●		20.5	125	71	41				+0.3				
-DRZ2142-06	●		21	125	71	42				+0.2				
-DRZ215430-08	●	2	21.5	128	74	43	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2244-08	●		22	128	74	44				+1.6				
-DRZ225450-08	●		22.5	128	74	45				+1.4				
-DRZ2346-08	●		23	130	76	46				+1.3				
-DRZ235470-08	●		23.5	130	76	47				+1.2				
-DRZ2448-08	●		24	131	77	48		35		+1.1				
-DRZ245490-08	●		24.5	131	77	49				+0.9				
-DRZ2550-08	●		25	133	79	50				+0.8				
-DRZ255510-08	●		25.5	133	79	51				+0.7				
-DRZ2652-08	●		26	135	81	52				+0.6				
-DRZ265530-08	●		26.5	135	81	53				+0.5				
S32 -DRZ2754-10	●	2	27	149	90	54	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ275550-10	●		27.5	149	90	55				+2.3				
-DRZ2856-10	●		28	151	92	56				+2.2				
-DRZ285570-10	●		28.5	151	92	57				+2.1				
-DRZ2958-10	●		29	153	94	58				+2.0				
-DRZ295590-10	●		29.5	153	94	59				+1.8				
-DRZ3060-10	●		30	154	95	60		45		+1.7				
-DRZ305610-10	●		30.5	154	95	61				+1.5				
-DRZ3162-10	●		31	155	96	62				+1.5				
-DRZ315630-10	●		31.5	155	96	63				+1.3				
-DRZ3264-10	●		32	158	99	64				+1.2				
-DRZ325650-10	●		32.5	158	99	65				+1.0				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.

Recommended Cutting Conditions ➡ K65

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K53
S40 -DRZ3366-12	●	2	33	173	104	66	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ3468-12	●		34	176	107	68				+2.7				
-DRZ3570-12	●		35	177	108	70				+2.4				
-DRZ3672-12	●		36	180	111	72				+2.2				
-DRZ3774-12	●		37	181	112	74				+1.9				
-DRZ3876-12	●		38	183	114	76				+1.7				
-DRZ3978-12	●		39	185	116	78				+1.4				
-DRZ4080-12	●		40	185	116	80				+1.2				
-DRZ4182-15	●	2	41	186	117	82	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ4284-15	●		42	188	119	84				+3.7				
-DRZ4386-15	●		43	190	121	86				+3.5				
-DRZ4488-15	●		44	192	123	88				+3.2				
-DRZ4590-15	●		45	192	123	90				+3.0				
-DRZ4692-15	●		46	198	129	92		60		+2.7				
-DRZ4794-15	●		47	201	132	94				+2.5				
-DRZ4896-15	●		48	203	134	96				+2.2				
-DRZ4998-15	●		49	204	135	98				+2.0				
-DRZ50100-15	●		50	204	135	100				+1.7				
-DRZ51102-15	●		51	205	136	102				+1.2				
-DRZ52104-15	●		52	205	136	104				+1.0				
-DRZ53106-15	●		53	208	139	106				+0.7				
-DRZ54108-20	●	2	54	214	145	108	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608
-DRZ55110-20	●		55	215	146	110				+4.7				
-DRZ56112-20	●		56	217	148	112				+4.4				
-DRZ57114-20	●		57	219	150	114				+4.1				
-DRZ58116-20	●		58	221	152	116				+3.8				
-DRZ59118-20	●		59	223	154	118				+3.5				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.

Recommended Cutting Conditions ➡ K65

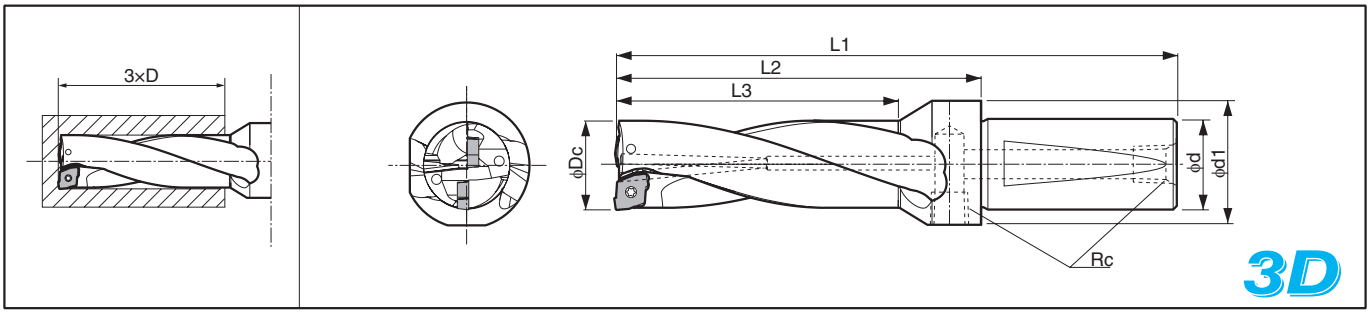
· Hole Dia. Tolerance (2D type)

Dc	Hole Dia. Tolerance (mm)
φ13~φ26.5	+ 0.20 - 0.10
φ27~φ40	+ 0.25 - 0.15
φ41~φ59	+ 0.30 - 0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRZ (Drilling Depth:3×D)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Plug	Applicable Inserts ➔ K53
S20 -DRZ1339-05	●	2	13	108	65	39	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135405-05	●		13.5	108	65	40.5				+0.5				
-DRZ1442-05	●		14	112	69	42				+0.5				
-DRZ145435-05	●		14.5	112	69	43.5				+0.5				
-DRZ1545-05	●		15	115	72	45				+0.5				
-DRZ155465-05	●		15.5	115	72	46.5				+0.5				
S25 -DRZ1648-06	●	2	16	131	77	48	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165495-06	●		16.5	131	77	49.5				+0.9				
-DRZ1751-06	●		17	133	79	51				+0.8				
-DRZ175525-06	●		17.5	133	79	52.5				+0.7				
-DRZ1854-06	●		18	136	82	54				+0.6				
-DRZ185555-06	●		18.5	136	82	55.5				+0.6				
-DRZ1957-06	●		19	139	85	57				+0.5				
-DRZ195585-06	●		19.5	139	85	58.5				+0.5				
-DRZ2060-06	●		20	143	89	60				+0.5				
-DRZ205615-06	●		20.5	146	92	61.5				+0.3				
-DRZ2163-06	●		21	146	92	63				+0.2				
-DRZ215645-08	●	2	21.5	147	93	64.5	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2266-08	●		22	147	93	66				+1.6				
-DRZ225675-08	●		22.5	147	93	67.5				+1.4				
-DRZ2369-08	●		23	150	96	69				+1.3				
-DRZ235705-08	●		23.5	150	96	70.5				+1.2				
-DRZ2472-08	●		24	152	98	72		35		+1.1				
-DRZ245735-08	●		24.5	152	98	73.5				+0.9				
-DRZ2575-08	●		25	155	101	75				+0.8				
-DRZ255765-08	●		25.5	155	101	76.5				+0.7				
-DRZ2678-08	●		26	158	104	78				+0.6				
-DRZ265795-08	●		26.5	158	104	79.5				+0.5				
S32 -DRZ2781-10	●	2	27	173	114	81	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ275825-10	●		27.5	173	114	82.5				+2.3				
-DRZ2884-10	●		28	176	117	84				+2.2				
-DRZ285855-10	●		28.5	176	117	85.5				+2.1				
-DRZ2987-10	●		29	179	120	87				+2.0				
-DRZ295885-10	●		29.5	179	120	88.5				+1.8				
-DRZ3090-10	●		30	181	122	90		45		+1.7				
-DRZ305915-10	●		30.5	181	122	91.5				+1.5				
-DRZ3193-10	●		31	183	124	93				+1.5				
-DRZ315945-10	●		31.5	183	124	94.5				+1.3				
-DRZ3296-10	●		32	187	128	96				+1.2				
-DRZ325975-10	●		32.5	187	128	97.5				+1.0				
-DRZ3399-12	●	2	33	193	134	99	32	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●		34	197	138	102				+2.7				
-DRZ35105-12	●		35	199	140	105				+2.4				
-DRZ36108-12	●		36	203	144	108				+2.2				
-DRZ37111-12	●		37	205	146	111				+1.9				
-DRZ38114-12	●		38	208	149	114				+1.7				
-DRZ39117-12	●		39	211	152	117				+1.4				
-DRZ40120-12	●		40	212	153	120				+1.2				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.

Recommended Cutting Conditions ➔ K65

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➔ K53
S40 -DRZ3399-12	●	2	33	203	134	99	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●		34	207	138	102				+2.7				
-DRZ35105-12	●		35	209	140	105				+2.4				
-DRZ36108-12	●		36	213	144	108				+2.2				
-DRZ37111-12	●		37	215	146	111				+1.9				
-DRZ38114-12	●		38	218	149	114				+1.7				
-DRZ39117-12	●		39	221	152	117				+1.4				
-DRZ40120-12	●		40	222	153	120				+1.2				
-DRZ41123-15	●	2	41	224	155	123	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42126-15	●		42	227	158	126				+3.7				
-DRZ43129-15	●		43	230	161	129				+3.5				
-DRZ44132-15	●		44	233	164	132				+3.2				
-DRZ45135-15	●		45	234	165	135				+3.0				
-DRZ46138-15	●		46	241	172	138		60		+2.7				
-DRZ47141-15	●		47	245	176	141				+2.5				
-DRZ48144-15	●		48	248	179	144				+2.2				
-DRZ49147-15	●		49	250	181	147				+2.0				
-DRZ50150-15	●		50	251	182	150				+1.7				
-DRZ51153-15	●		51	254	185	153				+1.2				
-DRZ52156-15	●		52	257	188	156				+1.0				
-DRZ53159-15	●		53	260	191	159				+0.7				
-DRZ54162-20	●	2	54	266	197	162	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608
-DRZ55165-20	●		55	269	200	165				+4.7				
-DRZ56168-20	●		56	272	203	168				+4.4				
-DRZ57171-20	●		57	275	206	171				+4.1				
-DRZ58174-20	●		58	278	209	174				+3.8				
-DRZ59177-20	●		59	281	212	177				+3.5				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.

Recommended Cutting Conditions ➔ K65

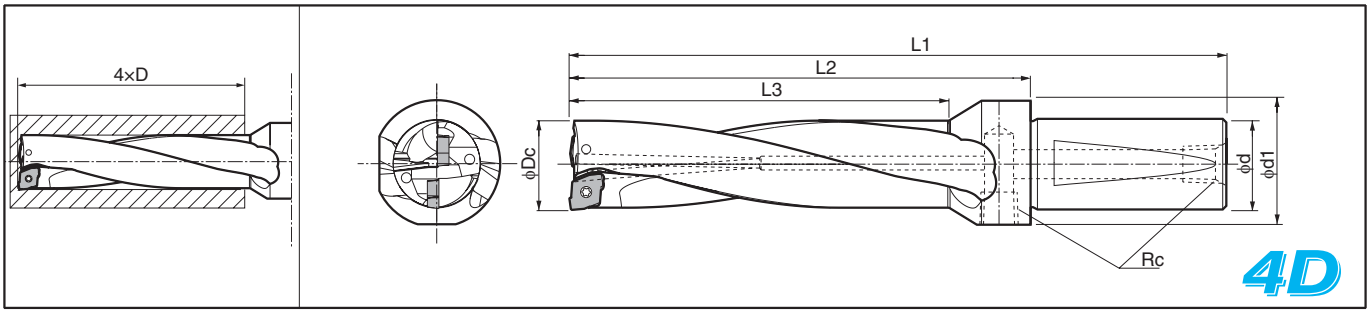
· Hole Dia. Tolerance (3D type)

Dc	Hole Dia. Tolerance (mm)
φ13~φ26.5	+ 0.20 - 0.10
φ27~φ40	+ 0.25 - 0.15
φ41~φ59	+ 0.30 - 0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRZ (Drilling Depth:4×D)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➔K53
S20 -DRZ1352-05	●	2	13	121	78	52	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135540-05	●		13.5	121	78	54				+0.5				
-DRZ1456-05	●		14	126	83	56				+0.5				
-DRZ145580-05	●		14.5	126	83	58				+0.5				
-DRZ1560-05	●		15	130	87	60				+0.5				
-DRZ155620-05	●		15.5	130	87	62				+0.5				
S25 -DRZ1664-06	●	2	16	147	93	64	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165660-06	●		16.5	147	93	66				+0.9				
-DRZ1768-06	●		17	149	95	68				+0.8				
-DRZ175700-06	●		17.5	149	95	70				+0.7				
-DRZ1872-06	●		18	153	99	72				+0.6				
-DRZ185740-06	●		18.5	153	99	74				+0.6				
-DRZ1976-06	●		19	157	103	76				+0.5				
-DRZ195780-06	●		19.5	157	103	78				+0.5				
-DRZ2080-06	●		20	156	102	80				+0.5				
-DRZ205820-06	●		20.5	161	107	82				+0.3				
-DRZ2184-06	●		21	161	107	84				+0.2				
-DRZ215860-08	●	2	21.5	169	115	86	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2288-08	●		22	169	115	88				+1.6				
-DRZ225900-08	●		22.5	169	115	90				+1.4				
-DRZ2392-08	●		23	173	119	92				+1.3				
-DRZ235940-08	●		23.5	173	119	94				+1.2				
-DRZ2496-08	●		24	176	122	96		35		+1.1				
-DRZ245980-08	●		24.5	176	122	98				+0.9				
-DRZ25100-08	●		25	180	126	100				+0.8				
-DRZ2551020-08	●		25.5	180	126	102				+0.7				
-DRZ26104-08	●		26	184	130	104				+0.6				
-DRZ2651060-08	●		26.5	184	130	106				+0.5				
S32 -DRZ27108-10	●	2	27	200	141	108	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ2751100-10	●		27.5	200	141	110				+2.3				
-DRZ28112-10	●		28	204	145	112				+2.2				
-DRZ2851140-10	●		28.5	204	145	114				+2.1				
-DRZ29116-10	●		29	208	149	116				+2.0				
-DRZ2951180-10	●		29.5	208	149	118				+1.8				
-DRZ30120-10	●		30	211	152	120		45		+1.7				
-DRZ3051220-10	●		30.5	211	152	122				+1.5				
-DRZ31124-10	●		31	214	155	124				+1.5				
-DRZ3151260-10	●		31.5	214	155	126				+1.3				
-DRZ32128-10	●		32	219	160	128				+1.2				
-DRZ3251300-10	●		32.5	219	160	130				+1.0				
-DRZ33132-12	●	2	33	226	167	132	32	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34136-12	●		34	231	172	136				+2.7				
-DRZ35140-12	●		35	234	175	140				+2.4				
-DRZ36144-12	●		36	239	180	144				+2.2				
-DRZ37148-12	●		37	242	183	148				+1.9				
-DRZ38152-12	●		38	246	187	152				+1.7				
-DRZ39156-12	●		39	250	191	156				+1.4				
-DRZ40160-12	●		40	252	193	160				+1.2				

· When offset drilling, reduce feed rate to 0.06mm/rev or less.

Recommended Cutting Conditions ➔K65

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K53
S40 -DRZ33132-12	●	2	33	236	167	132	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34136-12	●		34	241	172	136				+2.7				
-DRZ35140-12	●		35	244	175	140				+2.4				
-DRZ36144-12	●		36	249	180	144				+2.2				
-DRZ37148-12	●		37	252	183	148				+1.9				
-DRZ38152-12	●		38	256	187	152				+1.7				
-DRZ39156-12	●		39	260	191	156				+1.4				
-DRZ40160-12	●		40	262	193	160				+1.2				
-DRZ41164-15	●	2	41	265	196	164	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42168-15	●		42	269	200	168				+3.7				
-DRZ43172-15	●		43	273	204	172				+3.5				
-DRZ44176-15	●		44	277	208	176				+3.2				
-DRZ45180-15	●		45	279	210	180				+3.0				
-DRZ46184-15	●		46	287	218	184		60		+2.7				
-DRZ47188-15	●		47	292	223	188				+2.5				
-DRZ48192-15	●		48	296	227	192				+2.2				
-DRZ49196-15	●		49	300	231	196				+2.0				
-DRZ50200-15	●		50	301	232	200				+1.7				

· When offset drilling, reduce feed rate to 0.06mm/rev or less.

Recommended Cutting Conditions ➡ K65

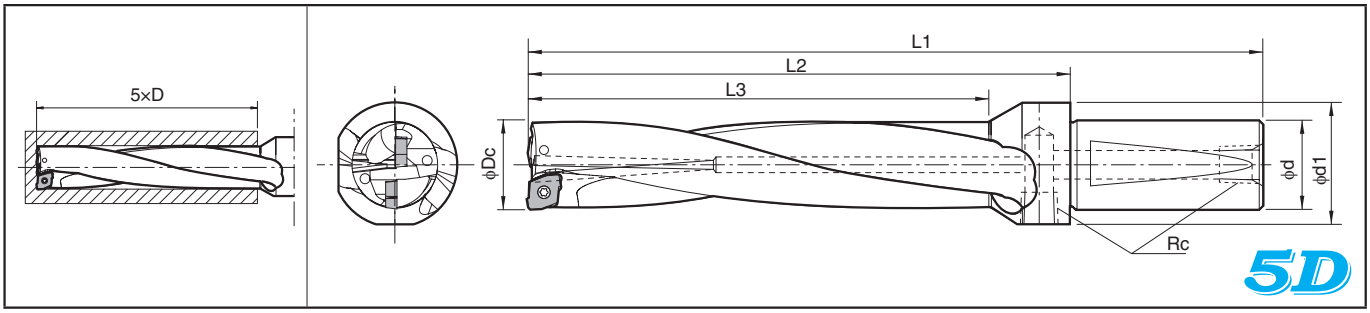
· Hole Dia. Tolerance (4D type)

Dc	Hole Dia. Tolerance (mm)
φ13~φ26.5	+ 0.25 - 0.10
φ27~φ40	+ 0.30 - 0.15
φ41~φ50	+ 0.35 - 0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRZ (Drilling Depth:5×D)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K53
S32 -DRZ27135-10	●	2	27	227	168	135	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ28140-10	●		28	232	173	140				+2.2				
-DRZ29145-10	●		29	237	178	145				+2.0				
-DRZ30150-10	●		30	241	182	150		45		+1.7				
-DRZ31155-10	●		31	245	186	155				+1.5				
-DRZ32160-10	●		32	251	192	160				+1.2				
S40 -DRZ33165-12	●	2	33	269	200	165	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34170-12	●		34	275	206	170				+2.7				
-DRZ35175-12	●		35	279	210	175				+2.4				
-DRZ36180-12	●		36	285	216	180				+2.2				
-DRZ37185-12	●		37	289	220	185				+1.9				
-DRZ38190-12	●		38	294	225	190				+1.7				
-DRZ39195-12	●		39	299	230	195				+1.4				
-DRZ40200-12	●		40	302	233	200				+1.2				
-DRZ41205-15	●	2	41	306	237	205	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42210-15	●		42	311	242	210				+3.7				
-DRZ43215-15	●		43	316	247	215				+3.5				
-DRZ44220-15	●		44	321	252	220				+3.2				
-DRZ45225-15	●		45	324	255	225				+3.0				
-DRZ46230-15	●		46	333	264	230		60		+2.7				
-DRZ47235-15	●		47	339	270	235				+2.5				
-DRZ48240-15	●		48	344	275	240				+2.2				
-DRZ49245-15	●		49	349	280	245				+2.0				
-DRZ50250-15	●		50	351	282	250				+1.7				

· When offset drilling, reduce feed rate to 0.05mm/rev or less.

Recommended Cutting Conditions ➡ K65

· Hole Dia. Tolerance (5D type)

Dc	Hole Dia. Tolerance (mm)
φ27~φ40	+ 0.35 - 0.15
φ41~φ50	+ 0.40 - 0.20

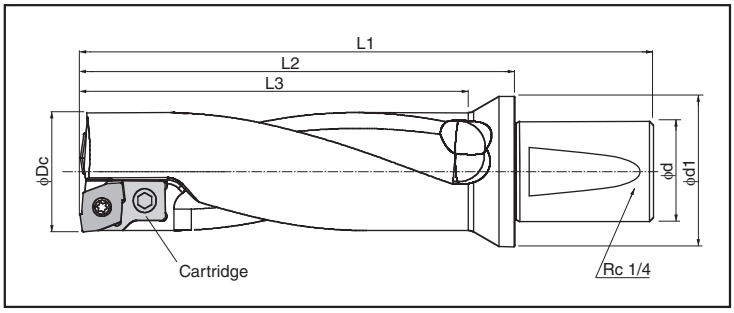
* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

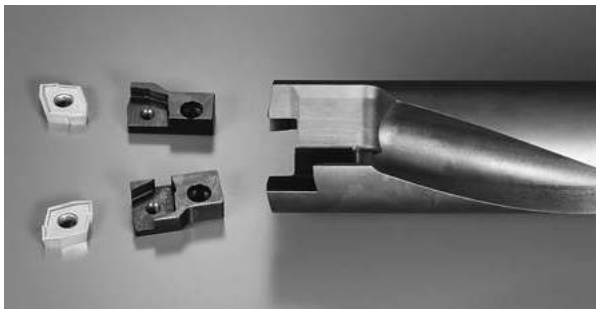
● : Std. Item

MagicDrill for Large Dia. (over φ60)

● **MagicDrill for large diameters (over φ60) are available as Custom Orders. (Ask your regional sales staff for details such as drill dia. / shank type, etc.)**

DRZ-CR (Cartridge type)





Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Cartridge For outer edge	Cartridge For inner edge	Clamp Screw	Wrench	Applicable Inserts K53
S50	-DRZ60180-20CR	MTO	2	60	286	217	195	50	75	+3.0	DR20CR-OUT (1pc)	DR20CR-IN (1pc)	SB-60120TR	DT-25	ZCMT200608
	-DRZ65195-20CR	MTO	2	65	296	227	206			+1.5					
	-DRZ70210-20CR	MTO	2	70	308	239	220			+0.2					
	-DRZ75225-12CR	MTO	4	75	330	261	225	50	80	Offset N.A.	DR12CR-OUT (2pc)	DR12CR-IN (2pc)	SB-5085TR	DT-20	ZCMT12T306 ZCMT12T304SP
	-DRZ80240-12CR	MTO	4	80	340	271	240								

· Clamp screws for cartridges are included in toolholders: HH6×12 for **DR20CR** and HH4×12 for **DR12CR**.

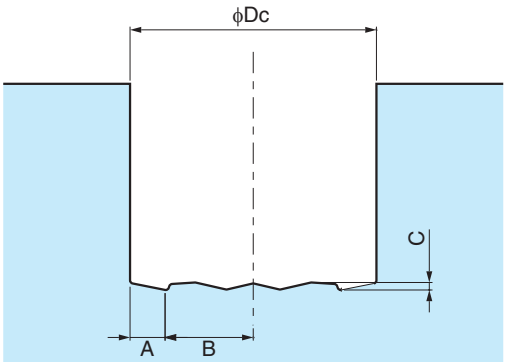
Recommended Cutting Conditions K65

MTO : Made to order

DRZ Hole Bottom Shape (Available for 2×D, 3×D, 4×D, 5×D type) (mm)

φDc	A	B	C	φDc	A	B	C	φDc	A	B	C
13.0	2.1	4.4	0.4	21.5	3.1	7.7	0.6	33.0	5.7	10.8	0.8
13.5		4.7		22.0		7.9		34.0		11.3	
14.0		4.9		22.5		8.2		35.0		11.8	
14.5		5.2	0.5	23.0		8.4		36.0		12.3	
15.0		5.4		23.5		8.7		37.0		12.8	
15.5		5.7		24.0		8.9	0.7	38.0		13.3	0.9
16.0	2.7	5.3	0.6	24.5		9.2		39.0		13.8	
16.5		5.6		25.0		9.4		40.0		14.3	
17.0		5.8		25.5		9.7		41.0	6.5	14.0	1.0
17.5		6.1		26.0		9.9		42.0		14.5	
18.0		6.3		26.5		10.2		43.0		15.0	
18.5		6.6	0.7	27.0	4.0	9.5	0.7	44.0		15.5	
19.0		6.8		27.5		9.8		45.0		16.0	
19.5		7.1		28.0		10.0		46.0		16.5	
20.0		7.3		28.5		10.3		47.0		17.0	
20.5		7.6		29.0		10.5		48.0		17.5	1.1
21.0		7.8	0.8	29.5		10.8		49.0		18.0	
				30.0		11.0		50.0		18.5	
				30.5		11.3		51.0		19.0	
				31.0		11.5	0.8	52.0		19.5	
				31.5		11.8		53.0		20.0	
				32.0		12.0		54.0	8.5	18.5	1.2
				32.5		12.3		55.0		19.0	
								56.0		19.5	
								57.0		20.0	
								58.0		20.5	
								59.0		21.0	

* Above amount is standard value
(Varies within ±0.1mm depending on workpiece materials and cutting conditions)



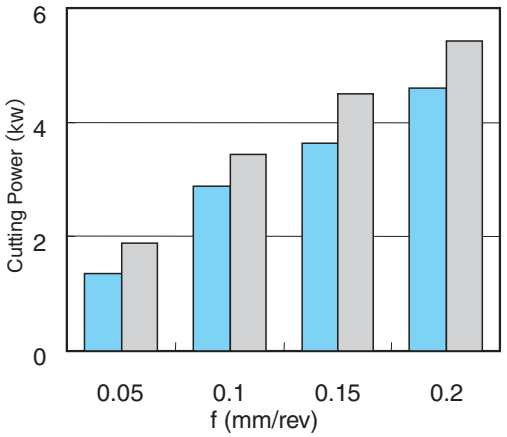
Cutting Power

φ20 Cutting Power Comparison

MagicDrill DRZ
Competitor A

Vc=100m/min, (n=1,600min^{-1})
ϕ20 Indexable Drill
SCM415 Wet (Internal coolant)

Comparison of Cutting Power



Case Study

MagicDrill Dia.		φ16	φ27		φ50	
Machine		Competitor A	Competitor B		Competitor C	Competitor D
Machine Power		AC 5.5/7.5 kW	AC 5.5/7.5 kW		AC 5.5/7.5 kW	AC 7.5/11 kW
Cutting Conditions	Vc (mm/min)	150	130	150	120	110	157
	f (mm/rev)	0.06	0.13		0.1	0.08	0.12
Workpiece Material		SS400	SCM435		SCM415	SS400	
Required Power (Load Meter Values)		60%	80%	95%	100%	60%	100%
Remarks		-	-		With conventional drill, limited up to φ40	-	

Formula for calculating required power (approximate value) R35

Recommended Cutting Conditions

DRZ Recommended Cutting Conditions (Coolant)

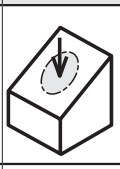
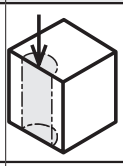
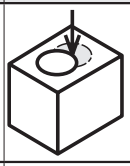
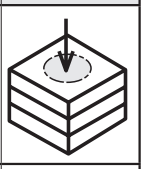
Workpiece Material	Recommended Insert Grades (Vc: m/min)						Drill Dia. φDc (mm)	Drill type (Drilling Depth)			
	MEGACOAT			PVD Coated Carbide		Carbide		2D	3D	4D	5D
	PR1230	PR1225	PR1210	PR660	PR830	KW10		f (mm/rev)			
	Standard SP SU	Standard SP SU	Standard	Standard SP SU	Standard SP	Standard SP					
Low Carbon Steel	★ 120~220	☆ 120~220	-	☆ 120~220	☆ 120~240	-	φ13~φ15.5	0.06~0.10	0.06~0.10	0.04~0.08	–
							φ16~φ26.5	0.08~0.15	0.08~0.15	0.06~0.12	–
							φ27~φ50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
							φ50~	0.08~0.18	0.08~0.15	0.06~0.12	–
Carbon Steel	★ 100~160	☆ 100~160	-	☆ 100~160	☆ 120~180	-	φ13~φ15.5	0.06~0.10	0.06~0.10	0.04~0.08	–
							φ16~φ26.5	0.08~0.15	0.08~0.15	0.06~0.12	–
							φ27~φ50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
							φ50~	0.08~0.18	0.08~0.15	0.06~0.12	–
Alloy Steel	★ 80~140	☆ 80~140	-	☆ 80~140	☆ 100~160	-	φ13~φ15.5	0.06~0.10	0.06~0.10	0.04~0.08	–
							φ16~φ26.5	0.08~0.15	0.08~0.15	0.06~0.12	–
							φ27~φ50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
							φ50~	0.08~0.18	0.08~0.15	0.06~0.12	–
Mold Steel	★ 70~130	☆ 70~130	-	☆ 70~130	☆ 80~150	-	φ13~φ15.5	0.04~0.08	0.04~0.08	0.03~0.07	–
							φ16~φ26.5	0.08~0.12	0.06~0.10	0.06~0.08	–
							φ27~φ50	0.08~0.15	0.06~0.12	0.06~0.10	0.04~0.07
							φ50~	0.08~0.15	0.06~0.12	0.06~0.10	–
Stainless Steel (Austenitic related)	☆ 60~120	★ 60~120	-	☆ 60~120	☆ 70~140	-	φ13~φ15.5	0.04~0.08	0.04~0.08	0.03~0.06	–
							φ16~φ26.5	0.06~0.10	0.06~0.10	0.04~0.08	–
							φ27~φ50	0.06~0.10	0.06~0.12	0.04~0.10	0.04~0.07
							φ50~	0.06~0.12	0.06~0.12	0.04~0.10	–
Gray Cast Iron	-	-	★ 100~150	-	-	☆ 100~120	φ13~φ15.5	0.08~0.12	0.08~0.10	0.06~0.08	–
							φ16~φ26.5	0.10~0.18	0.10~0.15	0.08~0.12	–
							φ27~φ50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
							φ50~	0.10~0.20	0.10~0.18	0.08~0.15	–
Nodular Cast Iron	-	-	★ 80~120	-	-	☆ 80~100	φ13~φ15.5	0.08~0.12	0.08~0.10	0.06~0.08	–
							φ16~φ26.5	0.10~0.18	0.10~0.15	0.08~0.12	–
							φ27~φ50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
							φ50~	0.10~0.20	0.10~0.18	0.08~0.15	–
Non-ferrous Metals	-	-	-	-	-	★ 200~600	φ13~φ15.5	0.06~0.12	0.06~0.10	0.04~0.08	–
							φ16~φ26.5	0.08~0.18	0.08~0.15	0.06~0.15	–
							φ27~φ50	0.08~0.20	0.08~0.18	0.06~0.15	0.05~0.10
							φ50~	0.08~0.20	0.08~0.18	0.06~0.15	–
Titanium Alloys	-	-	-	-	-	★ 40~70	φ13~φ15.5	0.05~0.06	0.05~0.06	0.05~0.06	–
							φ16~φ26.5	0.05~0.07	0.05~0.07	0.05~0.07	–
							φ27~φ50	0.06~0.08	0.06~0.08	0.06~0.08	0.04~0.05
							φ50~	0.06~0.08	0.06~0.08	0.06~0.08	–

· Apply a sufficient amount of coolant.

★:1st Recommendation ☆:2nd Recommendation

Cutting Conditions by Application

[Workpiece Material: S50C]

Applications		Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole	Stacked Plates
Shape of Workpiece								
DRZ	Vc (m/min)	120	120	120	120	120	120	Not Available
DRZ	f (mm/rev)	0.1	0.05	0.05	0.05	Concave Surface 0.05 Continuous Part 0.1	*0.05	Not Available
Coolant (Internal)		Yes	Yes	Yes	Yes	Yes	Yes	Not Available

* Cutting width (Torus-shaped part) when drilling cored hole. (Same as when using a Boring Bar).

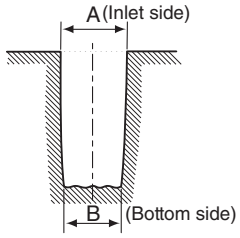
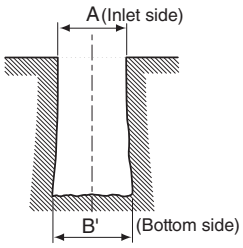
Drill type	2D~3D type	4D~5D type
Cutting width (Torus-shaped part)	0.1×Dc or less	Not recommended

e.g.) In case of drilling using DRZ3090-10 (3×D type)
(1) For milling, pre-drilled hole should be cut bigger than φ24 (φ30-0.1x30x2)
(2) For turning, ap should be set under ap = 3mm (0.1x30)

Max. Depth for Drilling with External Coolant

In case of using external coolant system, chip evacuation will be bad.
Therefore ap should be measured within 1.5 times (1.5xDc) of drill diameter (φDc).

Trouble shooting (DRS / DRX / DRZ)

Trouble condition	Condition		Cause	Countermeasures
Hole diameter is small (at hole bottom)		There is no problem for inlet, however gradually hole diameter is getting smaller at the bottom. A>B	Chip jam (External or Internal edge chip stuck)	Change the cutting conditions · Increase the cutting speed · Lower the feed rate Ref. to page, **K48,K54** or **K65** for "Recommended Cutting Conditions".
Hole diameter becomes larger (at hole bottom)		There is no problem for inlet, however gradually hole diameter is getting larger at the bottom. A<B'	Internal edge chip jam.	Change the cutting conditions · Increase the cutting speed · Lower the feed rate Ref. to page, **K48,K54** or **K65** for "Recommended Cutting Conditions". · Check the core height Ref. to page **K50~K51**
Hole diameter is small (from the hole inlet)		Hole diameter is small from inlet. (At turning moment)	Inappropriate adjustment of hole diameter.	In case of using lathe machine, use X-axis and adjustment hole diameter. Ref. to page **K50**
			No core at internal edge. (No core remains)	Adjust the center height. Ref. to page **K50~K51**

Indication of tool life of MagicDrill (DRS / DRX / DRZ)

How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	• When an insert is new, The toolholder is slightly bent to the side during drilling. (therefore, the drill diameter is slightly bigger during drilling.) Once drilling is finished, the toolholder will return back to normal size. No tool marks will appear on the finished surface. (although this depends on workpiece and cutting condition: during external drilling slight tool mark might appear.) • When an insert is at the end of its tool life, Gradually the external corner part gets worn out, the toolholder dose not bend slightly outwards, it starts to bend inwards. After the drilling is finished, the toolholder returns to the normal position. When taking off a toolholder under this condition the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking hole diameter	When hole diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause.
Checking the surface on the outlet side	If insert wear progresses, the burrs of penetrated hole entrance becomes bigger. This is a clear indication that the tool must be exchanged.
Variation of drilling noise	DRX / DRZ → Light drilling noise at the beginning turns to brady noise which contains vibration noise. DRS → Light drilling noise at the beginning turns to whir noise. Although, it is difficult to recognize DRX / DRZ type's smaller drill diameter or DRS type's variation of drilling noise because of main motor noise or projection of coolant.
Variation of vibration	As the end of tool life is getting closer, there is more vibration and the drilling noise changes. However, when drilling smaller diameters these factors are difficult to detect.

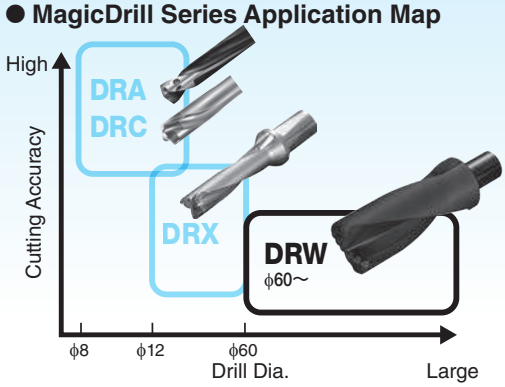
Large Diameter MagicDrill DRW

Features

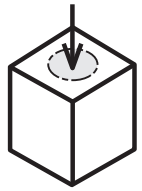
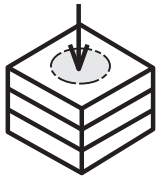
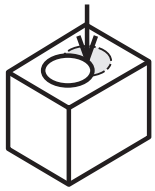
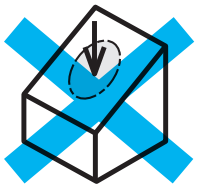
- Sharp cutting
- Enhanced chip evacuation
- Superior fracture resistance and long tool life with MEGACOAT NANO PR1535 grade

Applicable diameter: φ60 to φ100 (Max. φ200 is possible)
Drilling Depth:1D, 2D, 3D (Max. 5D is possible)
Use single type of insert.

● MagicDrill Series Application Map



Applicable workpiece

Plain Surface	Stacked Plates	Hole Expansion	Slant Surface
			

* Hole expansion: Overlap amount of through hole must be 1/5D (0.2xφDc) or less.
Expansion of blind holes is not possible because chips are built up in the next hole and will cause chip biting.

● Toolholder Identification System

S50	-	DRW	0600M	-	1	-	06
Straight Shank ϕ50		Type	Drill Dia.(mm) 0600M : ϕ60		Drilling Depth 1 : 1xD		Insert Size

DRW

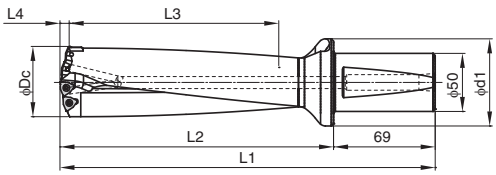
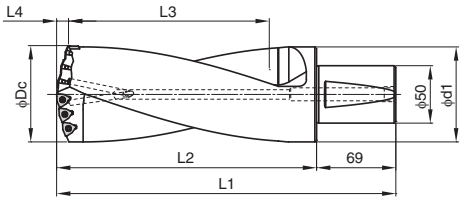


Fig.1



φDc=φ65~φ74 (4 inserts)
φDc=φ75~φ100 (6 inserts)

Fig.2

● Toolholder Dimensions (Drilling Depth: 1×D) 1D

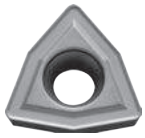
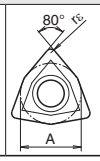
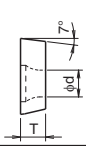
Description		Std.	No. of Inserts	Dimension (mm)						Drawing
				φDc	L1	L2	L3	L4	φd1	
S50-	DRW0600M-1-06	MTO	4	60	175	106	60	7.6	63	Fig.1
	DRW0610M-1-06	MTO		61	176	107	61	7.7	63	
	DRW0620M-1-06	MTO		62	178	109	62	7.8	63	
	DRW0630M-1-06	MTO		63	179	110	63	7.9	63	
	DRW0640M-1-06	MTO		64	182	113	64	8.0	63	
	DRW0650M-1-06	MTO		65	184	115	65	8.2	63	Fig.2
	DRW0660M-1-06	MTO		66	185	116	66	8.3	64	
	DRW0670M-1-06	MTO		67	187	118	67	8.4	65	
	DRW0680M-1-06	MTO		68	189	120	68	8.5	66	
	DRW0690M-1-06	MTO		69	190	121	69	8.6	67	
	DRW0700M-1-06	MTO		70	192	123	70	8.7	68	
	DRW0710M-1-06	MTO		71	193	124	71	8.8	69	
	DRW0720M-1-06	MTO		72	195	126	72	9.0	70	
	DRW0730M-1-06	MTO		73	198	129	73	9.1	71	
	DRW0740M-1-06	MTO		74	199	130	74	9.2	72	
S50-	DRW0750M-1-06	MTO	6	75	201	132	75	9.3	73	Fig.2
	DRW0760M-1-06	MTO		76	203	134	76	9.4	74	
	DRW0770M-1-06	MTO		77	204	135	77	9.5	75	
	DRW0780M-1-06	MTO		78	206	137	78	9.7	76	
	DRW0790M-1-06	MTO		79	207	138	79	9.8	77	
	DRW0800M-1-06	MTO		80	207	138	80	9.9	78	
	DRW0810M-1-06	MTO		81	208	139	81	9.9	79	
	DRW0820M-1-06	MTO		82	210	141	82	9.9	80	
	DRW0830M-1-06	MTO		83	210	141	83	9.9	81	
	DRW0840M-1-06	MTO		84	210	141	84	9.9	82	
	DRW0850M-1-06	MTO		85	211	142	85	10.5	83	
	DRW0860M-1-06	MTO		86	213	144	86	10.5	84	
	DRW0870M-1-06	MTO		87	215	146	87	10.5	85	
	DRW0880M-1-06	MTO		88	216	147	88	10.5	86	
	DRW0890M-1-06	MTO		89	218	149	89	10.5	87	
	DRW0900M-1-06	MTO		90	219	150	90	11.0	88	
	DRW0910M-1-06	MTO		91	220	151	91	11.0	89	
	DRW0920M-1-06	MTO		92	222	153	92	11.0	90	
	DRW0930M-1-06	MTO		93	223	154	93	11.0	91	
	DRW0940M-1-06	MTO		94	225	156	94	11.0	92	
	DRW0950M-1-06	MTO		95	226	157	95	11.6	93	
	DRW0960M-1-06	MTO		96	228	159	96	11.6	94	
	DRW0970M-1-06	MTO		97	228	159	97	11.6	95	
	DRW0980M-1-06	MTO		98	230	161	98	11.6	96	
	DRW0990M-1-06	MTO		99	231	162	99	11.6	97	
	DRW1000M-1-06	MTO		100	232	163	100	12.2	98	

● Toolholder Dimensions (Drilling Depth:2×D) 2D

Description		Std.	No. of Inserts	Dimension (mm)						Drawing
				φDc	L1	L2	L3	L4	φd1	
S50-	DRW0600M-2-06	●	4	60	235	166	120	7.6	63	Fig.1
	DRW0610M-2-06	MTO		61	237	168	122	7.7	63	
	DRW0620M-2-06	MTO		62	240	171	124	7.8	63	
	DRW0630M-2-06	MTO		63	242	173	126	7.9	63	
	DRW0640M-2-06	MTO		64	246	177	128	8.0	63	
	DRW0650M-2-06	●		65	249	180	130	8.2	63	Fig.2
	DRW0660M-2-06	MTO		66	251	182	132	8.3	64	
	DRW0670M-2-06	MTO		67	254	185	134	8.4	65	
	DRW0680M-2-06	MTO		68	257	188	136	8.5	66	
	DRW0690M-2-06	MTO		69	259	190	138	8.6	67	
	DRW0700M-2-06	●		70	262	193	140	8.7	68	
	DRW0710M-2-06	MTO		71	264	195	142	8.8	69	
	DRW0720M-2-06	MTO		72	267	198	144	9.0	70	
	DRW0730M-2-06	MTO		73	271	202	146	9.1	71	
	DRW0740M-2-06	●		74	273	204	148	9.2	72	
S50-	DRW0750M-2-06	●	6	75	276	207	150	9.3	73	Fig.2
	DRW0760M-2-06	MTO		76	279	210	152	9.4	74	
	DRW0770M-2-06	MTO		77	281	212	154	9.5	75	
	DRW0780M-2-06	MTO		78	284	215	156	9.7	76	
	DRW0790M-2-06	MTO		79	286	217	158	9.8	77	
	DRW0800M-2-06	●		80	287	218	160	9.9	78	
	DRW0810M-2-06	MTO		81	289	220	162	9.9	79	
	DRW0820M-2-06	MTO		82	292	223	164	9.9	80	
	DRW0830M-2-06	MTO		83	293	224	166	9.9	81	
	DRW0840M-2-06	MTO		84	294	225	168	9.9	82	
	DRW0850M-2-06	●		85	296	227	170	10.5	83	
	DRW0860M-2-06	MTO		86	299	230	172	10.5	84	
	DRW0870M-2-06	MTO		87	302	233	174	10.5	85	
	DRW0880M-2-06	MTO		88	304	235	176	10.5	86	
	DRW0890M-2-06	MTO		89	307	238	178	10.5	87	
	DRW0900M-2-06	●		90	309	240	180	11.0	88	
	DRW0910M-2-06	MTO		91	311	242	182	11.0	89	
	DRW0920M-2-06	MTO		92	314	245	184	11.0	90	
	DRW0930M-2-06	MTO		93	316	247	186	11.0	91	
	DRW0940M-2-06	●		94	319	250	188	11.0	92	
	DRW0950M-2-06	●		95	321	252	190	11.6	93	
	DRW0960M-2-06	MTO		96	324	255	192	11.6	94	
	DRW0970M-2-06	MTO		97	325	256	194	11.6	95	
	DRW0980M-2-06	MTO		98	328	259	196	11.6	96	
	DRW0990M-2-06	MTO		99	330	261	198	11.6	97	
	DRW1000M-2-06	●		100	332	263	200	12.2	98	

● : Std. Item
MTO : Made to order

Applicable Inserts

Insert			Description	Dimension (mm)				Angle	MEGACOAT	MEGACOAT NANO	CVD Coated Carbide	Applicable Toolholders
				A	T	φd	rε	α	PR1230	PR1535	CA6535	
			WCMT06T308	9.525	3.97	3.7	0.8	7°	●	●	●	S50-DRW…-06
			WCMT050308	7.94	3.18	3.2			●			(Custom-order toolholder)

* WCMT050308 is for custom-order (φ22 or larger).

● Toolholder Dimensions (Drilling Depth:3×D) 3D

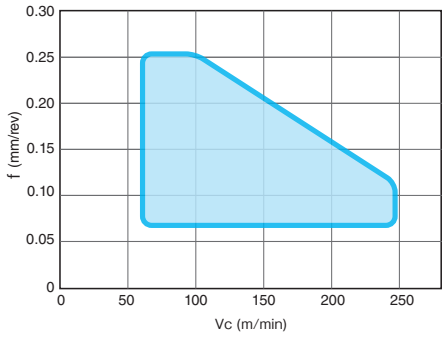
Description		Std.	No. of Inserts	Dimension (mm)						Drawing
				φDc	L1	L2	L3	L4	φd1	
S50-	DRW0600M-3-06	●	4	60	295	226	180	7.6	63	Fig.1
	DRW0610M-3-06	MTO		61	298	229	183	7.7	63	
	DRW0620M-3-06	MTO		62	302	233	186	7.8	63	
	DRW0630M-3-06	MTO		63	305	236	189	7.9	63	
	DRW0640M-3-06	MTO		64	310	241	192	8.0	63	
	DRW0650M-3-06	●		65	314	245	195	8.2	63	Fig.2
	DRW0660M-3-06	MTO		66	317	248	198	8.3	64	
	DRW0670M-3-06	MTO		67	321	252	201	8.4	65	
	DRW0680M-3-06	MTO		68	325	256	204	8.5	66	
	DRW0690M-3-06	MTO		69	328	259	207	8.6	67	
	DRW0700M-3-06	●		70	332	263	210	8.7	68	
	DRW0710M-3-06	MTO		71	335	266	213	8.9	69	
	DRW0720M-3-06	MTO		72	339	270	216	9.0	70	
	DRW0730M-3-06	MTO		73	344	275	219	9.1	71	
	DRW0740M-3-06	●		74	347	278	222	9.2	72	
S50-	DRW0750M-3-06	●	6	75	351	282	225	9.3	73	Fig.2
	DRW0760M-3-06	MTO		76	355	286	228	9.4	74	
	DRW0770M-3-06	MTO		77	358	289	231	9.5	75	
	DRW0780M-3-06	MTO		78	362	293	234	9.7	76	
	DRW0790M-3-06	MTO		79	365	296	237	9.8	77	
	DRW0800M-3-06	●		80	367	298	240	9.9	78	
	DRW0810M-3-06	MTO		81	370	301	243	9.9	79	
	DRW0820M-3-06	MTO		82	374	305	246	9.9	80	
	DRW0830M-3-06	MTO		83	376	307	249	9.9	81	
	DRW0840M-3-06	MTO		84	378	309	252	9.9	82	
	DRW0850M-3-06	●		85	381	312	255	10.5	83	
	DRW0860M-3-06	MTO		86	385	316	258	10.5	84	
	DRW0870M-3-06	MTO		87	389	320	261	10.5	85	
	DRW0880M-3-06	MTO		88	392	323	264	10.5	86	
	DRW0890M-3-06	MTO		89	396	327	267	10.5	87	
	DRW0900M-3-06	●		90	399	330	270	11.0	88	
	DRW0910M-3-06	MTO		91	402	333	273	11.0	89	
	DRW0920M-3-06	MTO		92	406	337	276	11.0	90	
	DRW0930M-3-06	MTO		93	409	340	279	11.0	91	
	DRW0940M-3-06	●		94	413	344	282	11.0	92	
	DRW0950M-3-06	●		95	416	347	285	11.6	93	
	DRW0960M-3-06	MTO		96	420	351	288	11.6	94	
	DRW0970M-3-06	MTO		97	422	353	291	11.6	95	
	DRW0980M-3-06	MTO		98	426	357	294	11.6	96	
	DRW0990M-3-06	MTO		99	429	360	297	11.6	97	
	DRW1000M-3-06	●		100	432	363	300	12.2	98	

◆ Recommended Cutting Conditions

Workpiece Material	Vc (m/min)	f (mm/rev)
Carbon Steel	80~200	0.07~0.25
Alloy Steel	80~160	0.07~0.25
Mold Steel	70~150	0.06~0.20
Gray Cast Iron	100~240	0.07~0.30
Nodular Cast Iron	80~150	0.07~0.25

· Apply enough amount of coolant (internal supply).
· Feed rate should be calculated as single insert.

Application Map (Carbon Steel / Alloy Steel)



● Spare Parts

Description	Clamp Screw	Wrench
S50-DRW…-06	SB-3592TR	DT-10

● Hole Dia. Tolerance

Dc	Hole Dia. Tolerance (mm)
φ60~φ100	0~+0.4

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

• Offset Drilling

Offset for DRW type should be 0 to +0.15 mm in radius
(0 to +0.3 mm in diameter).
Do not set it to a negative value to make the diameter smaller.

● : Std. Item
MTO : Made to order

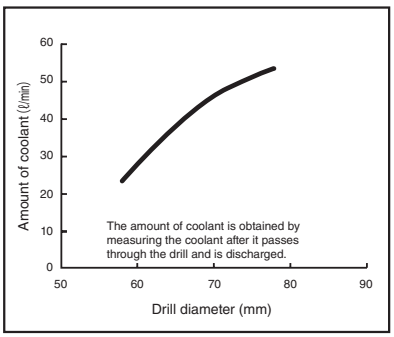
Inserts are sold in 10 piece boxes

Q&A

Q-1 Is it possible to use external coolant?

A-1 External coolant is not recommended because the amount of chips will be enormous.
Use internal coolant.
Ref. to the graph of "Drill diameter and coolant amount".

◆ **Drill diameter and coolant amount**



Q-2 What level of spindle output is required?

A-2 Higher output is preferable.
What is important is enough torque rather than high spindle rate.
Ref. to the examples of required power as below.

Drill Dia.	Workpiece Material	Machine	Cutting Conditions	Spindle Power	*Required Power
φ75 (2D)	SCM415	M/C	Vc=130m/min (n=550min^{-1}) f=0.12mm/rev (Vf=66mm/min)	22kW	60%
φ85 (2D)	SCM	M/C	Vc=150m/min (n=560min^{-1}) f=0.1mm/rev (Vf=56mm/min)	30kW	85%
φ94 (2D)	S45C	NC Lathe	Vc=120m/min (n=410min^{-1}) f=0.1mm/rev (Vf=41mm/min)	20kW	100%
φ94 (2D)	SUS304	NC Lathe	Vc=80m/min (n=270min^{-1}) f=0.2mm/rev (Vf=54mm/min)	20kW	40%

* The required power was read on the load meter.

Q-3 The workpiece material is elastic and the chips are stretched and tangled. Is there any countermeasure?

A-3 When chips of elastic material are stretched and tangled, try "low rate + large feed", "high rate + small feed" or other settings. Chips are usually stretched well between the inlet and 10mm inside, and not any more stretched further inside. Therefore charging the condition of entrance only will also be effective.

· [Low cutting speed + Large feed]
This setting makes the chips thicker so that they easily break off.
E.g. Vc=80 m/min, f=0.2 to 0.25 mm/rev

· [High cutting speed + Small feed]
This setting makes the chips thinner and uses centrifugal force to cut them off.
E.g. Vc=200m/min, f=0.07 to 0.09mm/rev

· [Step machining at inlet]
E.g. Inlet to 10 mm deep: 1 mm step drilling
E.g. 10 mm deep or more: Vc=150 m/min, f=0.15 mm/rev (Continuous drilling)

Q-4 Chattering occurs. Is there any countermeasure?

A-4 Chattering usually occurs during chamfering and when the feed rate per revolution is not high enough.
Try changing the cutting conditions as follows.

· Increase the feed rate if it is small.
If the feed rate is f=0.06 mm/rev, for example, increase it to f=0.08 to 0.12 mm/rev.
Increasing the feed rate will improve chamfering and thus prevent chattering.

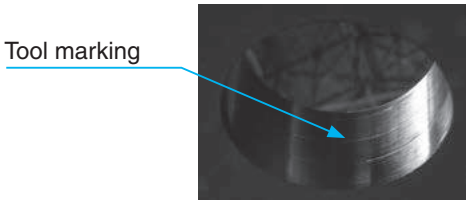
· If the cutting speed is too high, lower it to Vc=100 to 150 m/min.

· If the chamfering point and pass-through point are not plain, or if the workpiece clamping rigidity is low, lower the feed rate to f=0.07 to 0.08 mm/rev.

· If chattering occurs on the full contact surface (e.g. during step drilling), make adjustments by increasing the feed rate during chamfering or lowering the cutting speed.
Once chattering occurs during chamfering, it will continue through drilling.

Q-5 Tool markings are made on the finished surface. Is there any countermeasure?

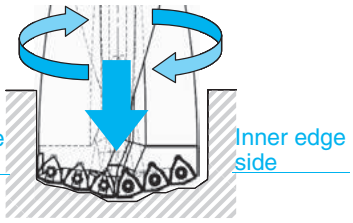
A-5 During processing, force of deflection is applied to the center of the drill.
If the drill is just pulled out from the position where processing is finished, tool markings will be made.
To prevent tool markings, perform offset before pulling out the drill.



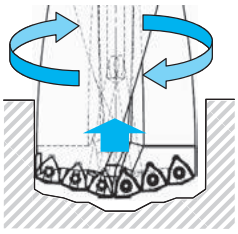
Example of tool marking

· **How to prevent tool markings**

(1) Drilling the hole. (The spindle revolves.)



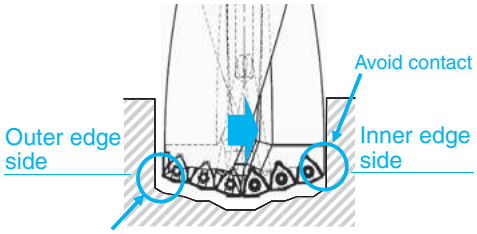
(2) Turn back approximately 0.5 mm. (The spindle revolves.)



Chips are adhering to the bottom when drilling stops.

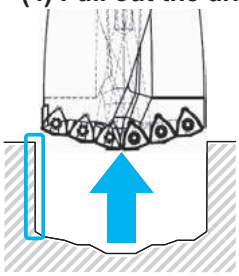
· Without turning back, chips remains adhering to the bottom.
· If offset (3) is performed without turning back, the bottom of drill contacts with the inner surface of hole.
· Turning back is necessary for blind holes but not for through holes.

(3) Stop revolution and perform offset. (The spindle stops.)



Make a clearance to prevent the tool from contacting when pulling out. (Approximately 0.1 to 0.2 mm)

(4) Pull out the drill



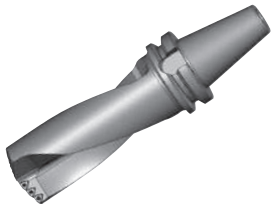
Example of drilling program

```
G90G54G0G43X0Y0Z100.0H10
S477M03
Z2.5M8
G01Z-80.0F48
Z-79.5M19   ← The spindle stops at the specified position
X0.2Y0.2
Z100.0M9
```

* The M code and X and Y moving directions are unique to the equipment.

Tool markings are not made (or are only slight even if made).

DRW custom-order item Applicable drill dia.: φ22~φ200

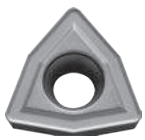
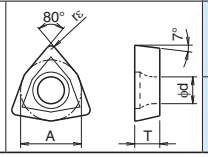

BT shank integral type is also applicable

Max. φ200 is applicable

<Standard item>

Straight Shank (1D~3D)

Applicable Inserts

Insert		Description	Dimension (mm)				Angle	MEGACOAT	MEGACOAT NANO	CVD Coated Carbide	Applicable Toolholders
			A	T	φd	rε	α	PR1230	PR1535	CA6535	
		WCMT06T308	9.525	3.97	3.7	0.8	7°	●	●	●	S50-DRW…-06
		WCMT050308	7.94	3.18	3.2			●			(Custom-order toolholder)

* WCMT050308 is for custom-order (φ22 or larger).

Solid End Mill

Carbide Substrate

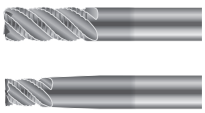
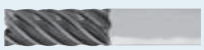
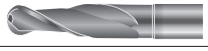
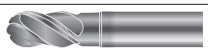
L

L1~L71

Tool Selection Guide		**L2~L9**
Application and selection		L2
Solid End Mill Identification System / Icon Glossary		L4
Case Studies		L9
Surface finish oriented		**L10~L14**
Square		L10
For Automatic Lathes (Overall length 35mm / 45mm)	FESW	L14
Multi-purpose		**L15~L17**
High efficiency chip evacuation		**L18~L27**
Multi-functional, High efficiency	3ZFK	L18
High feed rate, High efficiency	4MFK/4MFR	L20
Difficult-to-cut Materials, High efficiency	4TKF/4TKR	L22
Varied interval flute design		L24
Roughing		L26
High efficiency , High feed rate , Finishing	**6/8PFK**	**L28~L29**
Ball-nose End Mill		**L30~L35**
Ball-nose		L30
Special corner-R shaped (For High Feed Rate)	6PDRS	L34
Superalloy	**4JER**	**L36~L37**
Hard materials		**L38~L39**
Aluminum & Non-ferrous Metals		**L40~L46**
High efficiency, High-precision	3AFK	L40
Square (Varied interval flute design with wiper edge)	3NESM	L44
Roughing		L46
Counterboring	**2ZDK**	**L47~L51**
Recommended Cutting Conditions		**L52~L71**

For Superalloy Machining
4JER

Application and selection

Ref. to Page	Applications	Description	Features	Shape	Coating	No. of Flutes	Helix Angle	Outside Dia. ϕDc(mm)
L10	Surface finish oriented	2FESS	2 flutes, Sharp corner edge		MEGACOAT	2	30°	ϕ1~ϕ16
		2FESM				2		ϕ0.2~ϕ16
L11		2FESL				2		ϕ1~ϕ16
L12		2FEKS	2 flutes, Tough corner edge			2		ϕ3~ϕ16
		2FEKM				2		
L13		4FESM	4 flutes, Sharp corner edge			4		ϕ1~ϕ16
		4FEKM	4 flutes, Tough corner edge			4		ϕ3~ϕ16
L14		2FESW	For Automatic Lathes (Overall length 35mm / 45mm)			2	35°	ϕ3~ϕ13
		3FESW				3		
		4FESW				4		
L15	Multi-purpose	3UFSM	3 flutes, Multi-purpose		TiAlN	3	45°	ϕ1~ϕ20
L16		4PGSS	Multi-edge type Slotting, Shouldering Multi-purpose High feed rate finishing			4	50°	ϕ3~ϕ25
		5PGSS				5		
		4PGSM				4		ϕ6~ϕ25
		5PGSM				5		
		6PGSM				6		
		4PGSL				4		ϕ6~ϕ25
		5PGSL				5		
		6PGSL				6		
L17		4PGRM				4		ϕ3~ϕ20
L19	High efficiency chip evacuation	3ZFKS	Multi-functional, High efficiency		MEGACOAT	3	40°	ϕ6~ϕ12
		3ZFKM				3		ϕ3~ϕ16
L21		4MFK	NEW 4 flutes High feed rate, High efficiency		MEGACOAT NANO	4	Variable Lead 42°,44°	ϕ3~ϕ16
		4MFR				4		
L23		4TFK	NEW 4 flutes Difficult-to-cut Materials, High efficiency		MEGACOAT NANO	4	Variable Lead 42°,44°	ϕ3~ϕ20
		4TFR				4		
L24		4YEKM	4/5 flutes, High efficiency Steel and Difficult-to-cut Materials Varied interval flute design		TiAlN	4	38°	ϕ4~ϕ25
		4YECM				4		
		4YERM				4		
L25		5DEKM			AlTiN	5		ϕ4~ϕ25
		5DERM				5		
		4YFSM	Steel and Difficult-to-cut Materials Finishing		TiAlN	4	45°	ϕ4~ϕ20
		6YFSM				6		
L26		3RDSM	Roughing, Serrated edge		TiAlN	3	20°	ϕ4~ϕ25
		4RDSM				4		
		5RDSM				5		
		3RDSL				3		ϕ6~ϕ25
		4RDSL				4		
		5RDSL				5		
L27		4RFSM	Roughing, Notched edge			4	45°	ϕ6~ϕ25
		6RFSM				6		
		3RFRS				3		ϕ4~ϕ12
		4RFRS				4		
L29	High efficiency High feed rate Finishing	6PFK	6/8 flutes Shouldering, High feed rate, Finishing		MEGACOAT NANO	6	Variable Lead 42°~44°	ϕ6~ϕ25
		8PFK				8		
L31	Ball-nose	2SEB	NEW High efficiency Ball-nose End Mill with 2 flutes		MEGACOAT NANO	2	30°	ϕ2~ϕ16
L32		2UEBS	Ball-nose End Mill with 2 flutes		TiAlN	2	30°	ϕ1~ϕ20
		3UEBS	Ball-nose End Mill with 3 flutes			3	30°	ϕ3~ϕ12
L33		4YEBM	Ball-nose End Mill with 4 flutes			4	38°	ϕ5~ϕ20
L34	Special corner-R shaped	6PDRS	6 flutes, High feed rate		AlTiN	6	20°	ϕ6~ϕ12
L37	Superalloy	4JER	NEW 4 flutes, High efficiency, Stable milling		MEGACOAT HARD	4	Variable Lead 32°,35°	ϕ6~ϕ20

Carbide Substrate

Substrate of all solid end mills is carbide.

Workpiece Material										Description	Ref. to Page
	Steel		Heat Treated Steel		Stainless Steel	Titanium Alloys	Heat-resistant Alloys	Cast Iron	Aluminum & Non-ferrous Metals		
	~30HRC P ~30HRC	~40HRC P 30~40HRC	~55HRC H ~55HRC	~68HRC H ~68HRC	M Stainless steel	S Titanium Alloy	S Heat-resistant Alloy	K Cast Iron	N Aluminum & Non Ferrous Material		
	◎	○	○		◎			○	○	2FESS 2FESM	L10
										2FESL	L11
										2FEKS 2FEKM	L12
										4FESM 4FEKM	L13
										2FESW 3FESW 4FESW	L14
	◎	◎	○		◎	○		◎	○	3UFSM	L15
	◎	◎	○					○		4PGSS 5PGSS 4PGSM 5PGSM 6PGSM 4PGSL 5PGSL 6PGSL	L16
	◎	◎	○					○		4PGRM	L17
	◎	○			◎	○		○	○	3ZFKS 3ZFKM	L19
	◎	○	○		○	○		○	○	4MFK 4MFR	L21
	◎	◎			◎	◎	○	○		4TFK 4TFR	L23
	◎	◎			◎	◎	◎	○		4YEKM 4YECM 4YERM	L24
	◎	◎			◎	◎	◎	○		5DEKM 5DERM	L25
	◎	◎			◎	◎	◎	○		4YFSM 6YFSM	
	◎	◎			○			◎		3RDSM 4RDSM 5RDSM 3RDSL 4RDSL 5RDSL	L26
	○	◎	◎	○	○	◎	○	○		4RFSM 6RFSM	L27
	○	◎	◎	○	○	◎	○	○		3RFRS 4RFRS	
	◎	○	○		◎	◎		○	○	6PFK 8PFK	L29
	◎	◎	◎	○	○			○		2SEB	L31
	◎	◎						◎		2UEBS	L32
	◎	◎			○	○		◎	○	3UEBS	
	◎	○			◎	◎	○	○		4YEBM	L33
	◎	◎	◎	◎						6PDRS	L34
	◎	◎			○	○	◎			4JER	L37

◎ : 1st Choice ○ : 2nd Choice

Application and selection

Ref. to Page	Applications	Description	Features	Shape	Coating	No. of Flutes	Helix Angle	Outside Dia. ϕDc(mm)
L38	Hard materials	4HFSS	Multi-edge type Negative rake angle Hard Materials Finishing		MEGACOAT HARD	4	45°	ϕ1~ϕ12
		5HFSS				5		
		6HFSS				6		
		7HFSS				7		
		4HFSM				4		ϕ1~ϕ25
		5HFSM				5		
		6HFSM				6		
		7HFSM				7		
		8HFSM				8		
L39		4UGSM			TiAlN	4	50°	ϕ3~ϕ16
		6UGSM				6		
L40	Aluminum & Non-ferrous Metals	3AFK	NEW High efficiency, High-precision		-	3	45°	ϕ3~ϕ16
L44		3NESM	Varied interval flute design with wiper edge			3	38°	ϕ3~ϕ20
L45		2NFSM	Sharpness oriented, Smooth chip evacuation			2	45°	ϕ1~ϕ20
		3NFSM				3		ϕ3~ϕ20
		3NFSL				3		ϕ3~ϕ20
L46		3AESM	Roughing			3	30°	ϕ6~ϕ25
		3AESL				3		ϕ6~ϕ25
L47	Counterboring	2ZDK	NEW 2 flutes, Counterboring		MEGACOAT NANO	2	20°	ϕ3~ϕ12

Solid End Mill Identification System (except 4MFK/R, 4TFK/R, 6/8PFK, 2SEB, 4JER, 3AFK and 2ZDK)

2 F E S M 020 - 060 - 04 XXXXXXXX
(1) (2) (3) (4) (5) (6) (7) (8) (9)

(1)No. of Flutes	(2)Applications	(3)Helix Angle	(4)Serise	(5)Length of cut	(6)Outside Dia.	(7)Length of cut	(8)Shank Dia.	(9)Others
2 3 4 5 6 7 8	F : Surface finish oriented U (UF) /P (PG) : Multi-purpose Z : Multi-functional, High efficiency Y/D : High efficiency (Difficult-to-cut Materials) R : Roughing H/U (UG) : Hard materials N/A : Aluminum & Non-ferrous Metals	D : 20-29° E : 30-39° F : 40-49° G : 50-59°	S : Sharp corner edge B : Ball-nose R : Radius K : Tough corner edge C : With corner chamfering	S : Short M: Medium L : Long W: For Automatic Lathes	020 ↓ 2.0mm	060 ↓ 6.0mm	04 ↓ 4.0mm	Corner-R, C width etc …

Solid End Mill Identification System (4MFK/R,4TFK/R,6/8PFK,4JER,3AFK) NEW

4 T F R 030 - 080 - R02
(1) (2) (3) (4) (5) (6) (7)

(1)No. of Flutes	(2)Application	(3)Helix Angle	(4)Serise	(5)Outside Dia.	(6)Length of cut	(7)Others
3 4 6 8	M: High feed rate, High efficiency P: Shouldering, High feed rate, Finishing T: High efficiency (Difficult-to-cut Materials) J: Superalloy A: Aluminum & Non-ferrous Metals	E : 30-39° F : 40-49°	K : Tough corner edge R : Radius	030 ↓ 3.0mm	080 ↓ 8.0mm	R02: Corner-R 0.2mm 090 : Under Neck Length 9mm

Solid End Mill Identification System (2ZDK) NEW

2 Z D K 030 S
(1) (2) (3) (4) (5) (6)

(1)No. of Flutes	(2)Application	(3)Helix Angle	(4)Serise	(5)Outside Dia.	(6)Others
2	Z: Counterboring	D: 20°	K : Tough corner edge	030 ↓ 3.0mm	S:Short type

Solid End Mill Identification System (2SEB) NEW

2 S E B 020 - 050 - R10
(1) (2) (3) (4) (5) (6) (7)

(1)No. of Flutes	(2)Application	(3)Helix Angle	(4)Serise	(5)Outside Dia.	(6)Length of cut	(7)Radius of Ball Nose
2	S: High efficiency	E : 30-39°	B: Ball-nose	020 ↓ 2.0mm	050 ↓ 5.0mm	R10 ↓ R1.0mm

Carbide Substrate Substrate of all solid end mills is carbide.

Workpiece Material										Description	Ref. to Page
Steel		Heat Treated Steel		Stainless Steel	Titanium Alloys	Heat-resistant Alloys	Cast Iron	Aluminum & Non-ferrous Metals			
~30HRC	~40HRC	~55HRC	~68HRC								
P ~30HRC	P 30~40HRC	H ~55HRC	H ~68HRC	M Stainless steel	S Titanium Alloy	S Heat-resistant Alloy	K Cast Iron	N Aluminum & Non Ferrous Material			
◎	◎	◎	◎							4HFSS 5HFSS 6HFSS 7HFSS 4HFSM 5HFSM 6HFSM 7HFSM 8HFSM	L38
		◎	◎							4UGSM 6UGSM	L39
								◎		3AFK	L40
										3NESM	L44
								◎		2NFSM 3NFSM 3NFSL	L45
										3AESM 3AESL	L46
	◎	◎						◎	◎	2ZDK	L47

◎ : 1st Choice ○ : 2nd Choice

Icon Glossary

Coating

- MEGACOAT NANO — MEGACOAT NANO
- MEGACOAT HARD — MEGACOAT HARD
- MEGACOAT — MEGACOAT
- TiAlN — TiAlN Coating
- AlCrN — TiAlN Coating
- Uncoated — Uncoated

Corner Form

- Radius R — Radius
- Sharp — Sharp corner edge
- Land — With corner land
- C — With corner chamfering

Shank Dia. Tolerance

- h5 Shank Dia. — Shank Dia. Tolerance is h5.
- h6 Shank Dia. — Shank Dia. Tolerance is h6.

Corner Radius Tolerance

0~-0.02 mm R — Corner Radius Tolerance is 0/-0.02mm.

Ball-nose radius Tolerance

0~-0.02 mm R — The R tolerance of balll-nose end mill is 0/-0.02mm.

No. of Flutes

3 — 3 flutes design

Helix Angle

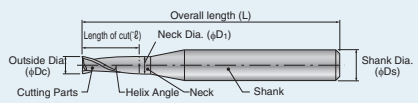
30° — Helix Angle 30°

Cutting edge shape

Cutting edge shape — Roughing

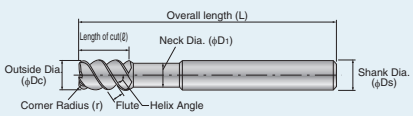
Name of parts

● Square Type

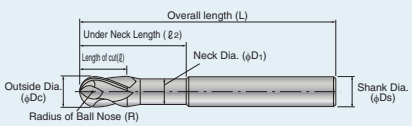


*For 2ZDK, length of cut (ℓ) is same as flute length

● Radius Type

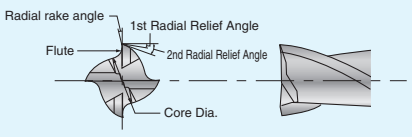


● Ball-nose Type



Edge Shape

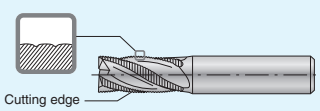
● Cutting edge shape



*Square 4 flutes

● Core Dia. Ratio (%)=(Core Dia. / Outside Dia.) ×100

● Cutting edge shape



● With Chamfered Edge

● Tough corner edge (with corner land)

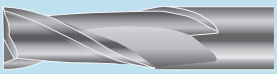
Introduction

Surface finish oriented

L10~L14

F Series

MEGACOAT is applied



(FES)

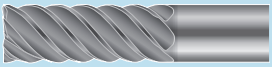
MEGACOAT and sharp cutting edge enable high precision finishing owing to excellent wear and heat resistance.
Overall lengths 35mm and 45mm are available for automatic lathes.

L10~L14

Multi-purpose

L15~L17

P Series (PGS)



(PGS)

Multi-purpose end mill for slotting and shouldering.
Core diameter ratio is 60% for 1D distance from the bottom edge, and 80% for the longer distance. Smooth chip evacuation and high rigidity.

L16

High efficiency chip evacuation

L18~L27

Z Series

MEGACOAT is applied

(3ZFKS)

Multi-functional, high efficiency End Mill
Applicable for plunge milling, slotting and finishing with one end mill.
Smooth chip evacuation because sub-groove on gash breaks chips during plunge milling.

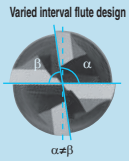
L18

M Series

MEGACOAT NANO is applied

(4MFK)

Superior anti vibration performance due to Kyocera's unique varied interval flute design and variable lead.
Achieves high rigidity and stable chip evacuation due to new special flute design.
Achieves high feed rate, high efficiency machining



L20

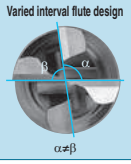
NEW

T Series

MEGACOAT NANO is applied

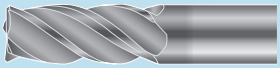
(4TFK)

High efficiency end mill for difficult-to-cut materials (stainless steel, titanium alloys and heat-resistant alloys)
Varied interval flute design / Variable Lead



L22

Y Series

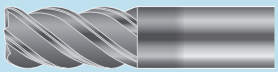


(4YEKM, 4YECM, 4YERM)

Varied interval flute design reduces vibration and improve efficiency at slotting and shouldering.
Applicable for stainless steel and heat resistant steel with 3 types of cutting edge. (corner land, chamfered, radius)

L24

D Series

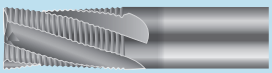


(5DEKM, 5DERM)

Varied interval flute design with 5 flutes. For high efficiency slotting and shouldering.
Applicable for difficult-to-cut materials like stainless steel and heat resistant steel.

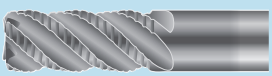
L25

R Series



(RDS)

RDS type is for general use with large flat surface edge with a 20° helix angle.



(RFS)

RFS has notched surface edge of 45° helix angle.
It is applicable for hard materials and titanium alloys due to strong cutting edge.

L26~L27

High efficiency , High feed rate , Finishing

L28~L29

PFK

MEGACOAT NANO is applied

(6PFK)

High feed rate and high efficiency shouldering with Multi-edge design (6 flutes / 8 flutes)
Varied interval flute design and variable lead to minimize chattering

L28

Superalloy

L36~L37

NEW **J Series**

MEGACOAT HARD is applied

(4JER)

High efficiency and stable machining for Heat Resistant Alloys such as Inconel®.
Long tool life machining with MEGACOAT HARD for excellent thermal resistance.

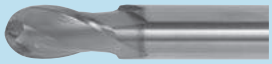
L37

Ball-nose End Mill

L30~L35

NEW **S Series**

MEGACOAT NANO is applied

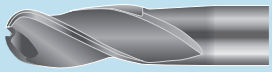


(2SEB)

High efficiency Ball-nose End Mill with 2 flutes
Sharp cutting due to special nose geometry
Close tolerance edge diameter (R±0.005mm, ϕ16 excluded)
Stable chip evacuation by a large chip pocket design

L30~L31

U Series, Y Series (UEB,YEB)

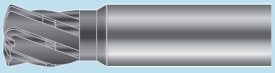


(3UEBS)

Boll-nose End Mill with 2/3/4 flutes

L32~L33

P Series (PDR)



(6PDRS)

High efficiency radius. Enables large cutting volume and high efficiency machining with special corner-R shaped.
Ramping and arc cutting are possible.

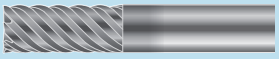
L34

Hard materials

L38~L39

H Series

MEGACOAT HARD is applied



(HFS)

PVD coating "MEGACOAT HARD" for hard materials is applied.
Large core diameter and negative rake angle improves edge strength.
Helix angle is 45°
High efficiency machining and long tool life with wide range of 4, 5, 6, 7 and 8 flutes types.

L38

U Series (UGS)

(UGS)

For hard materials with negative rake angle.
Helix angle is 50°

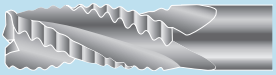
L39

Aluminum & Non-ferrous Metals

L40~L46

NEW **A Series**

(3AFK)



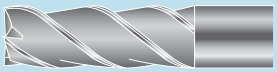
(3AESM)

3-flute End Mill for high efficiency and precision
Sharp cutting edge and excellent anti-chattering performance.
Delivers high stability in diverse machining situations

Roughing end mill for high efficiency machining of aluminum and non-ferrous metals.

L40 ~L43
L46

N Series (NES,NFS)



(3NESM)

(3NFSM)

NES type realizes good surface finish with wiper cutting edge.
Varied interval flute design prevents chattering and improves machining efficiency and surface finish quality of side wall of workpiece.

NFS type improves chip evacuation owing to special rake face design and 45° helix angle.

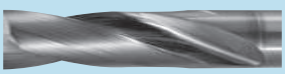
L44~L45

Counterboring

L47~L51

NEW **2ZDK**

MEGACOAT NANO is applied



Edge ends have 180 ° flat and are applicable to various applications including counterboring on slant surface.
Smooth chip control and high rigidity due to the special flute design

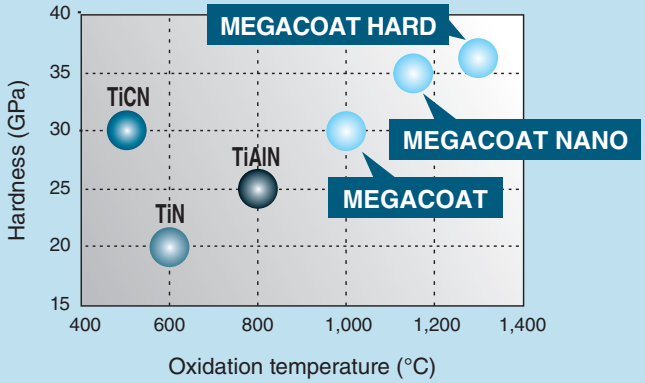
L47

New PVD technology, MEGACOAT

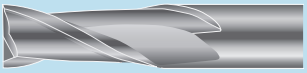
Superior wear and oxidation resistant MEGACOAT

MEGACOAT for Solid End Mill

1. For General Milling .....MEGACOAT
2. For High Efficiency Milling.....MEGACOAT NANO
3. For Superalloy
   Hard materials.....MEGACOAT HARD

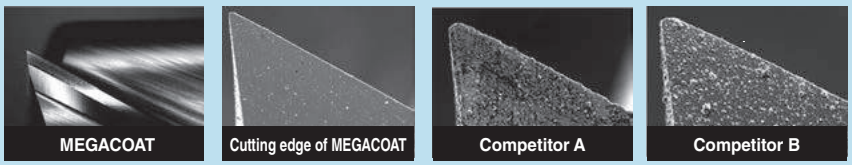


1. MEGACOAT for general milling



F Series
L10~L14

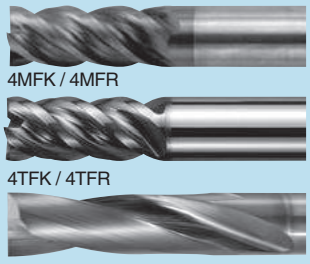
MEGACOAT extend tool life for roughing to finishing of various kinds of material, due to superior wear resistance and high oxidation resistance.



(Internal evaluation)

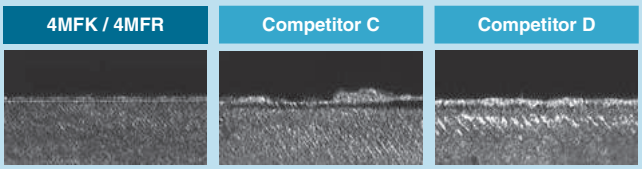
NEW

2. MEGACOAT NANO with special multilayer nano coating for high efficiency machining



・Long Tool Life with "MEGACOAT NANO". Doubled Wear Resistance compared to the Competitor's!

Edge Conditions after 140m Machining



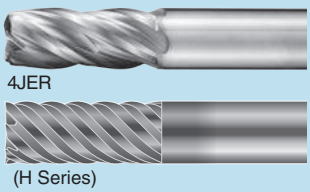
〔Cutting Conditions: n=6,000min^{-1}, Vf=1,100mm/min, ap×ae=5.0×0.8mm, ϕ8, SCM440, Shouldering〕

4MFK / 4MFR
L20
4TFK / 4TFR
L22
2ZDK
L47

(Internal evaluation)

The special Multilayer Nano Coating realizes superior wear resistance due to high hardness and anti-chipping performance.
Suitable for high feed rate machining

3. MEGACOAT HARD for machining of superalloy and hard materials



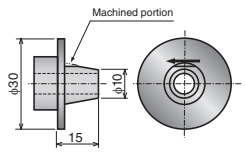
4JER
L36
H Series
L38

The special multilayer coating provides high hardness and excellent oxidation resistance.
Longer tool life and stability at machining of heat-resistant alloys and hard materials

Case Studies

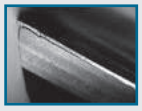
SUM24L

·OA parts
·n=3,500min^{-1} (Vc=88m/min)
·ap=0.5mm
·Vf=3,200mm/min (fz=0.23mm/t)
·Wet
·4FESM080-190-08 (ϕ8·4 flutes)



4FESM080-190-08	230 pcs
Competitor Coated Carbide E	100 pcs

・Kyocera showed 2.3 times longer tool life than Competitor E.
・Kyocera's new coating technology resolved edge fracturing and provided stability compared with Competitor E.
・Kyocera showed superior finished surface compared with Competitor E.



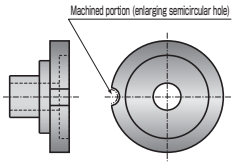
MEGACOAT
(Number of workpiece processed: 230 pcs)

Competitor Coated Carbide E
(Number of workpiece processed: 100 pcs)

(Evaluation by the user)

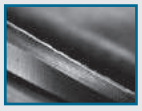
SCr420

·Automotive parts
·n=3,200min^{-1} (Vc=40m/min)
·ap=0.1mm
·Vf=70mm/min (fz=0.01mm/t)
·Wet
·2FESM040-110-06 (ϕ4·2 flutes)



2FESM040-110-06	700 pcs
Competitor Coated Carbide F	350 pcs

・Kyocera processed twice as many workpieces compared to Competitor F.
・Competitor F is limited to 350 workpieces due to excessive wear.
・Kyocera prevents chipping there by enabling long-life and stabilized machining.



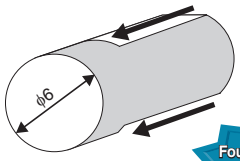
MEGACOAT
(Number of workpiece processed: 700 pcs)

Competitor Coated Carbide F
(Number of workpiece processed: 350 pcs)

(Evaluation by the user)

S45C

·Machine parts
·n=3,980min^{-1} (Vc=100m/min)
·ap=0.45mm
·Vf=800mm/min (fz=0.05mm/t)
·Wet
·Tool life 4,000 pcs
·4FESW080-080-08 (ϕ8·4 flutes)



Four times the productivity!

4FESW080-080-08	Table feed rate Vf=800mm/min
Competitor Coated Carbide G	Table feed rate Vf=200mm/min

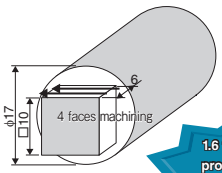
[Competitor Coated Carbide G]
ϕ8·4 flutes
n=2,508min^{-1} (Vc=63m/min)
ap=0.45mm
Tool life 4,000 pcs
Vf=200mm/min (fz=0.02mm/t)

User comments:
・Was able to increase both cutting speed and table feed rate.
・Despite the increase in cutting conditions, burr formation decreased.

(Evaluation by the user)

SUM

·Machine parts
·n=3,200min^{-1} (Vc=100m/min)
·ap×ae=3.5×3.0mm
·Vf=640mm/min (fz=0.05mm/t)
·Wet
·4FESW100-080-10 (ϕ10·4 flutes)



1.6 times the productivity!
Five times the tool life!

4FESW100-080-10	Table feed rate Vf=640mm/min
Competitor Coated Carbide H	Table feed rate Vf=400mm/min

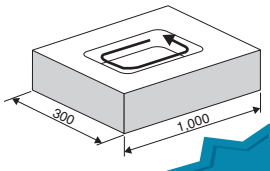
【Competitor Coated Carbide H】
ϕ7·4 flutes
n=2,000min^{-1} (Vc=44m/min)
ap×ae=3.5×3.0mm
Vf=400mm/min (fz=0.05mm/t)

User comments:
・General purpose end mills for Automatic Lathes have a shorter edge length with improved rigidity, which enabled an increase from conventional ϕ7 to ϕ10, thus improving cutting conditions.
・Compared to conventional tools, tool life improved five times.

(Evaluation by the user)

Heat Treated Steel (60HRC)

·Mold
·n=1,194min^{-1} (Vc=60m/min)
·ap×ae=40×0.3mm
·Vf=400mm/min (fz=0.056mm/t)
·6HFSM160-420-16 (ϕ16·6 flutes)



Double the amount of chip evacuation!

6HFSM160-420-16	Amount of chip evacuation 4.8cc/min Tool life: 10pcs
Competitor Coated Carbide I	Amount of chip evacuation 2.4cc/min Tool life: 5pcs

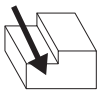
【Competitor Coated Carbide I】
ϕ16·6 flutes
n=597min^{-1} (Vc=30m/min)
ap×ae=40×0.3mm
Vf=200mm/min (fz=0.056mm/t)

User comments:
The cutting speed and table feed rate is doubled compared to competitor's coated carbide product I. The cutting edge conditions are excellent and the tool life is also doubled.

(Evaluation by the user)

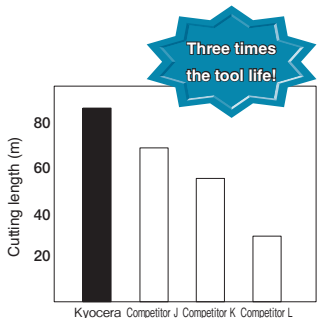
SKD11 (63HRC)

·Block
·n=3,700min^{-1} (Vc=70m/min)
·ap×ae=3×0.12mm
·Vf=800mm/min (fz=0.04mm/t)
·Dry
·6HFSM060-170-06 (ϕ6·6 flutes)



Shouldering

6HFSM060-170-06
Competitor Coating J,K,L



【Competitor Coating J,K,L】
ϕ6·6 flutes
n=3,700min^{-1} (Vc=70m/min)
ap×ae=3×0.12mm
Vf=800mm/min (fz=0.04mm/t)

Compared to competitor's coated carbide products, the 6HFSM has three times longer tool life.

(Internal evaluation)

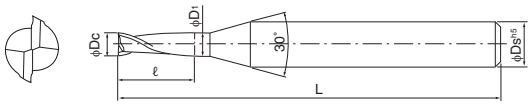
No. of Flutes: 2

2FESS, 2FESM, 2FESL

2

MEGACOAT is applied

Workpiece Materials ★ 1st Choice



2FESS (Short)

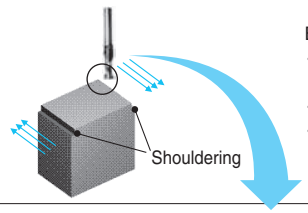
Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FESS010-015-04	●	1.0	0 -0.015	1.5	1.1	4	45	2
2FESS015-023-04	●	1.5	0 -0.015	2.3	1.6	4	45	2
2FESS020-030-04	●	2.0	0 -0.015	3.0	2.1	4	45	2
2FESS025-037-04	●	2.5	0 -0.015	3.7	2.6	4	45	2
2FESS030-045-06	●	3.0	0 -0.015	4.5	3.2	6	50	2
2FESS035-052-06	●	3.5	0 -0.015	5.2	3.7	6	50	2
2FESS040-060-06	●	4.0	0 -0.015	6.0	4.2	6	50	2
2FESS045-067-06	●	4.5	0 -0.015	6.7	4.7	6	50	2
2FESS050-075-06	●	5.0	0 -0.015	7.5	5.2	6	50	2
2FESS055-082-06	●	5.5	0 -0.015	8.2	5.7	6	50	2
2FESS060-090-06	●	6.0	0 -0.020	9.0	-	6	50	2
2FESS070-105-08	●	7.0	0 -0.020	10.5	7.2	8	60	2
2FESS080-120-08	●	8.0	-0.005 -0.025	12.0	-	8	60	2
2FESS090-135-10	●	9.0	-0.005 -0.025	13.5	9.2	10	70	2
2FESS100-150-10	●	10.0	-0.005 -0.025	15.0	-	10	70	2
2FESS120-180-12	●	12.0	-0.010 -0.030	18.0	-	12	75	2
2FESS140-210-16	●	14.0	-0.010 -0.030	21.0	14.2	16	75	2
2FESS150-230-16	●	15.0	-0.010 -0.030	23.0	15.2	16	90	2
2FESS160-240-16	●	16.0	-0.010 -0.030	24.0	-	16	90	2

Sharp Cutting Edge Reduced Burrs

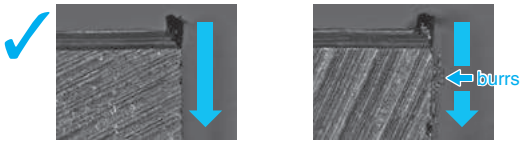
SUS304



Block
- Vc=70m/min (n=2,230min^{-1})
- ap×ae=5.0mm×1.0mm
- fz=0.03mm/t (Vf=134mm/min)

Upper workpiece area

2FESM100-220-10 | Competitor Coated Carbide A



(Internal evaluation)

2FESM (Medium)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FESM002-004-04	●	0.2	0 -0.015	0.4	0.22	4	45	2
2FESM003-006-04	●	0.3	0 -0.015	0.6	0.32	4	45	2
2FESM004-008-04	●	0.4	0 -0.015	0.8	0.42	4	45	2
2FESM005-010-04	●	0.5	0 -0.015	1.0	0.53	4	45	2
2FESM006-012-04	●	0.6	0 -0.015	1.2	0.63	4	45	2
2FESM007-014-04	●	0.7	0 -0.015	1.4	0.74	4	45	2
2FESM008-016-04	●	0.8	0 -0.015	1.6	0.84	4	45	2
2FESM009-020-04	●	0.9	0 -0.015	2.0	0.95	4	45	2
2FESM010-025-04	●	1.0	0 -0.015	2.5	1.1	4	45	2
2FESM011-025-04	●	1.1	0 -0.015	2.5	1.2	4	45	2
2FESM012-040-04	●	1.2	0 -0.015	4.0	1.3	4	45	2
2FESM013-040-04	●	1.3	0 -0.015	4.0	1.4	4	45	2
2FESM014-040-04	●	1.4	0 -0.015	4.0	1.5	4	45	2
2FESM015-040-04	●	1.5	0 -0.015	4.0	1.6	4	45	2
2FESM016-050-04	●	1.6	0 -0.015	5.0	1.7	4	45	2
2FESM017-050-04	●	1.7	0 -0.015	5.0	1.8	4	45	2
2FESM018-050-04	●	1.8	0 -0.015	5.0	1.9	4	45	2
2FESM019-050-04	●	1.9	0 -0.015	5.0	2.0	4	45	2
2FESM020-060-04	●	2.0	0 -0.015	6.0	2.1	4	45	2
2FESM021-060-04	●	2.1	0 -0.015	6.0	2.2	4	45	2
2FESM022-060-04	●	2.2	0 -0.015	6.0	2.3	4	45	2
2FESM023-060-04	●	2.3	0 -0.015	6.0	2.4	4	45	2
2FESM024-080-04	●	2.4	0 -0.015	8.0	2.5	4	45	2
2FESM025-080-04	●	2.5	0 -0.015	8.0	2.6	4	45	2
2FESM026-080-04	●	2.6	0 -0.015	8.0	2.7	4	45	2
2FESM027-080-04	●	2.7	0 -0.015	8.0	2.8	4	45	2
2FESM028-080-04	●	2.8	0 -0.015	8.0	2.9	4	45	2
2FESM029-080-04	●	2.9	0 -0.015	8.0	3.1	4	45	2
2FESM030-100-06	●	3.0	0 -0.015	10.0	3.2	6	50	2
2FESM031-100-06	●	3.1	0 -0.015	10.0	3.3	6	50	2
2FESM032-100-06	●	3.2	0 -0.015	10.0	3.4	6	50	2
2FESM033-100-06	●	3.3	0 -0.015	10.0	3.5	6	50	2

Recommended Cutting Conditions L52

● : Std. Item

2FESM (Medium)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FESM034-100-06	●	3.4	0 -0.015	10.0	3.6	6	50	2
2FESM035-100-06	●	3.5	0 -0.015	10.0	3.7	6	50	2
2FESM036-100-06	●	3.6	0 -0.015	10.0	3.8	6	50	2
2FESM037-100-06	●	3.7	0 -0.015	10.0	3.9	6	50	2
2FESM038-110-06	●	3.8	0 -0.015	11.0	4.0	6	50	2
2FESM039-110-06	●	3.9	0 -0.015	11.0	4.1	6	50	2
2FESM040-110-06	●	4.0	0 -0.015	11.0	4.2	6	50	2
2FESM041-110-06	●	4.1	0 -0.015	11.0	4.3	6	50	2
2FESM042-110-06	●	4.2	0 -0.015	11.0	4.4	6	50	2
2FESM043-110-06	●	4.3	0 -0.015	11.0	4.5	6	50	2
2FESM044-110-06	●	4.4	0 -0.015	11.0	4.6	6	50	2
2FESM045-110-06	●	4.5	0 -0.015	11.0	4.7	6	50	2
2FESM046-110-06	●	4.6	0 -0.015	11.0	4.8	6	50	2
2FESM047-110-06	●	4.7	0 -0.015	11.0	4.9	6	50	2
2FESM048-130-06	●	4.8	0 -0.015	13.0	5.0	6	50	2
2FESM049-130-06	●	4.9	0 -0.015	13.0	5.1	6	50	2
2FESM050-130-06	●	5.0	0 -0.015	13.0	5.2	6	50	2
2FESM051-130-06	●	5.1	0 -0.015	13.0	5.3	6	50	2
2FESM052-130-06	●	5.2	0 -0.015	13.0	5.4	6	50	2
2FESM053-130-06	●	5.3	0 -0.015	13.0	5.5	6	50	2
2FESM054-130-06	●	5.4	0 -0.015	13.0	5.6	6	50	2
2FESM055-130-06	●	5.5	0 -0.015	13.0	5.7	6	50	2
2FESM056-130-06	●	5.6	0 -0.015	13.0	5.8	6	50	2
2FESM057-130-06	●	5.7	0 -0.015	13.0	-	6	50	2
2FESM058-130-06	●	5.8	0 -0.015	13.0	-	6	50	2
2FESM059-130-06	●	5.9	0 -0.015	13.0	-	6	50	2
2FESM060-130-06	●	6.0	0 -0.020	13.0	-	6	50	2
2FESM060-150-06	●	6.0	0 -0.020	15.0	-	6	50	2
2FESM061-160-08	●	6.1	0 -0.020	16.0	6.3	8	60	2
2FESM062-160-08	●	6.2	0 -0.020	16.0	6.4	8	60	2
2FESM063-160-08	●	6.3	0 -0.020	16.0	6.5	8	60	2
2FESM064-160-08	●	6.4	0 -0.020	16.0	6.6	8	60	2
2FESM065-160-08	●	6.5	0 -0.020	16.0	6.7	8	60	2
2FESM066-160-08	●	6.6	0 -0.020	16.0	6.8	8	60	2
2FESM067-160-08	●	6.7	0 -0.020	16.0	6.9	8	60	2
2FESM068-160-08	●	6.8	0 -0.020	16.0	7.0	8	60	2
2FESM069-160-08	●	6.9	0 -0.020	16.0	7.1	8	60	2
2FESM070-160-08	●	7.0	0 -0.020	16.0	7.2	8	60	2
2FESM071-160-08	●	7.1	0 -0.020	16.0	7.3	8	60	2
2FESM072-160-08	●	7.2	0 -0.020	16.0	7.4	8	60	2
2FESM073-160-08	●	7.3	0 -0.020	16.0	7.5	8	60	2
2FESM074-160-08	●	7.4	0 -0.020	16.0	7.6	8	60	2
2FESM075-190-08	●	7.5	0 -0.020	19.0	7.7	8	60	2
2FESM076-190-08	●	7.6	0 -0.020	19.0	-	8	60	2
2FESM077-190-08	●	7.7	0 -0.020	19.0	-	8	60	2
2FESM078-190-08	●	7.8	0 -0.020	19.0	-	8	60	2
2FESM079-190-08	●	7.9	0 -0.020	19.0	-	8	60	2

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FESM080-190-08	●	8.0	-0.005 -0.025	19.0	-	8	60	2
2FESM080-200-08	●	8.0	-0.005 -0.025	20.0	-	8	60	2
2FESM081-190-10	●	8.1	-0.005 -0.025	19.0	8.3	10	70	2
2FESM082-190-10	●	8.2	-0.005 -0.025	19.0	8.4	10	70	2
2FESM083-190-10	●	8.3	-0.005 -0.025	19.0	8.5	10	70	2
2FESM084-190-10	●	8.4	-0.005 -0.025	19.0	8.6	10	70	2
2FESM085-190-10	●	8.5	-0.005 -0.025	19.0	8.7	10	70	2
2FESM086-190-10	●	8.6	-0.005 -0.025	19.0	8.8	10	70	2
2FESM087-190-10	●	8.7	-0.005 -0.025	19.0	8.9	10	70	2
2FESM088-190-10	●	8.8	-0.005 -0.025	19.0	9.0	10	70	2
2FESM089-190-10	●	8.9	-0.005 -0.025	19.0	9.1	10	70	2
2FESM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	10	70	2
2FESM091-190-10	●	9.1	-0.005 -0.025	19.0	9.3	10	70	2
2FESM092-190-10	●	9.2	-0.005 -0.025	19.0	9.4	10	70	2
2FESM093-190-10	●	9.3	-0.005 -0.025	19.0	9.5	10	70	2
2FESM094-190-10	●	9.4	-0.005 -0.025	19.0	9.6	10	70	2
2FESM095-190-10	●	9.5	-0.005 -0.025	19.0	9.7	10	70	2
2FESM096-220-10	●	9.6	-0.005 -0.025	22.0	-	10	70	2
2FESM097-220-10	●	9.7	-0.005 -0.025	22.0	-	10	70	2
2FESM098-220-10	●	9.8	-0.005 -0.025	22.0	-	10	70	2
2FESM099-220-10	●	9.9	-0.005 -0.025	22.0	-	10	70	2
2FESM100-220-10	●	10.0	-0.005 -0.025	22.0	-	10	70	2
2FESM100-250-10	●	10.0	-0.005 -0.025	25.0	-	10	70	2
2FESM105-220-12	●	10.5	-0.005 -0.025	22.0	10.7	12	75	2
2FESM110-220-12	●	11.0	-0.005 -0.025	22.0	11.2	12	75	2
2FESM115-220-12	●	11.5	-0.005 -0.025	22.0	11.7	12	75	2
2FESM120-260-12	●	12.0	-0.010 -0.030	26.0	-	12	75	2
2FESM130-260-16	●	13.0	-0.010 -0.030	26.0	13.2	16	75	2
2FESM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	16	75	2
2FESM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	16	90	2
2FESM160-320-16	●	16.0	-0.010 -0.030	32.0	-	16	90	2

2FESL (Long)

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FESL010-040-04	●	1.0	0 -0.015	4.0	1.1	4	45	2
2FESL015-060-04	●	1.5	0 -0.015	6.0	1.6	4	45	2
2FESL020-090-04	●	2.0	0 -0.015	9.0	2.1	4	45	2
2FESL025-120-04	●	2.5	0 -0.015	12.0	2.6	4	45	2
2FESL030-140-06	●	3.0	0 -0.015	14.0	3.2	6	50	2
2FESL040-170-06	●	4.0	0 -0.015	17.0	4.2	6	50	2
2FESL050-200-06	●	5.0	0 -0.015	20.0	5.2	6	60	2
2FESL060-240-06	●	6.0	-0.005 -0.025	24.0	-	6	60	2
2FESL080-280-08	●	8.0	-0.005 -0.025	28.0	-	8	70	2
2FESL100-340-10	●	10.0	-0.005 -0.025	34.0	-	10	90	2
2FESL120-400-12	●	12.0	-0.010 -0.030	40.0	-	12	90	2
2FESL160-480-16	●	16.0	-0.010 -0.030	48.0	-	16	115	2

● : Std. Item

Recommended Cutting Conditions ➡ L52~L53

Surface finish oriented, 2 Flutes, Tough corner edge

No. of Flutes: 2

2FEKS, 2FEKM

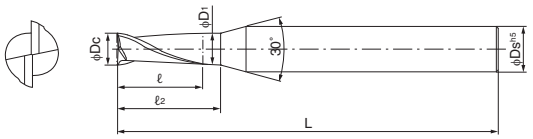
2

MEGACOAT is applied

Workpiece Materials ★1st Choice

★P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Land | h5 Shank Dia. | 30°



2FEKS (Short)

Shouldering | Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FEKS030-045-06	●	3.0	0 -0.015	4.5	3.15	6.5	6	50	2
2FEKS035-052-06	●	3.5	0 -0.015	5.2	3.68	7.2	6	50	2
2FEKS040-060-06	●	4.0	0 -0.015	6.0	4.2	8.2	6	50	2
2FEKS045-067-06	●	4.5	0 -0.015	6.7	4.7	8.9	6	50	2
2FEKS050-075-06	●	5.0	0 -0.015	7.5	5.2	10.1	6	50	2
2FEKS055-082-06	●	5.5	0 -0.015	8.2	5.7	10.8	6	50	2
2FEKS060-090-06	●	6.0	0 -0.020	9.0	-	-	6	50	2
2FEKS080-120-08	●	8.0	-0.005 -0.025	12.0	-	-	8	60	2
2FEKS100-150-10	●	10.0	-0.005 -0.025	15.0	-	-	10	70	2
2FEKS120-180-12	●	12.0	-0.010 -0.030	18.0	-	-	12	75	2
2FEKS140-210-16	●	14.0	-0.010 -0.030	21.0	14.2	31.4	16	75	2
2FEKS150-230-16	●	15.0	-0.010 -0.030	23.0	15.2	35	16	90	2
2FEKS160-240-16	●	16.0	-0.010 -0.030	24.0	-	-	16	90	2

2FEKM (Medium)

Shouldering | Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FEKM030-100-06	●	3.0	0 -0.015	10.0	3.15	12.0	6	50	2
2FEKM035-100-06	●	3.5	0 -0.015	10.0	3.68	12.0	6	50	2
2FEKM040-110-06	●	4.0	0 -0.015	11.0	4.2	13.2	6	50	2
2FEKM045-110-06	●	4.5	0 -0.015	11.0	4.7	13.2	6	50	2
2FEKM050-130-06	●	5.0	0 -0.015	13.0	5.2	15.6	6	50	2
2FEKM055-130-06	●	5.5	0 -0.015	13.0	5.7	15.6	6	50	2
2FEKM060-130-06	●	6.0	0 -0.020	13.0	-	-	6	50	2
2FEKM065-160-08	●	6.5	0 -0.020	16.0	6.7	22.4	8	60	2
2FEKM070-160-08	●	7.0	0 -0.020	16.0	7.2	22.4	8	60	2
2FEKM075-190-08	●	7.5	0 -0.020	19.0	7.7	26.6	8	60	2
2FEKM080-190-08	●	8.0	-0.005 -0.025	19.0	-	-	8	60	2
2FEKM085-190-10	●	8.5	-0.005 -0.025	19.0	8.7	26.6	10	70	2
2FEKM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	26.6	10	70	2
2FEKM095-190-10	●	9.5	-0.005 -0.025	19.0	9.7	26.6	10	70	2
2FEKM100-220-10	●	10.0	-0.005 -0.025	22.0	-	-	10	70	2
2FEKM110-220-12	●	11.0	-0.005 -0.025	22.0	11.2	30.8	12	75	2
2FEKM120-260-12	●	12.0	-0.010 -0.030	26.0	-	-	12	75	2
2FEKM130-260-16	●	13.0	-0.010 -0.030	26.0	13.2	36.4	16	75	2
2FEKM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	36.4	16	75	2
2FEKM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	42.0	16	90	2
2FEKM160-320-16	●	16.0	-0.010 -0.030	32.0	-	-	16	90	2

● MEGACOAT and sharp cutting edge enable high precision finishing owing to excellent wear and heat resistance.

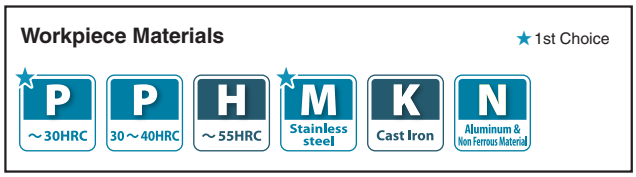
Recommended Cutting Conditions ➔ L53

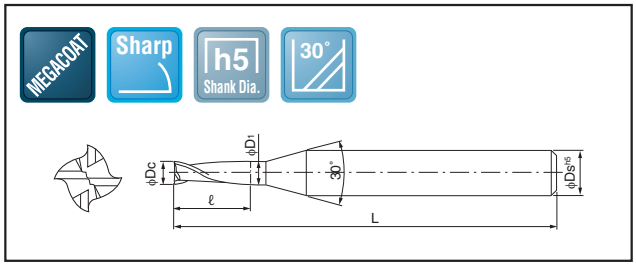
● : Std. Item

No. of Flutes : 4

4 flutes, Sharp corner edge

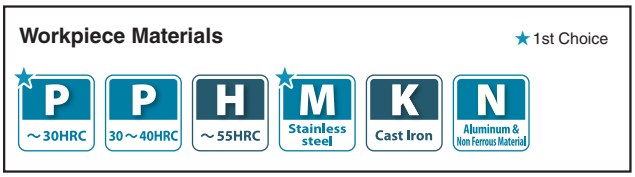
4FESM

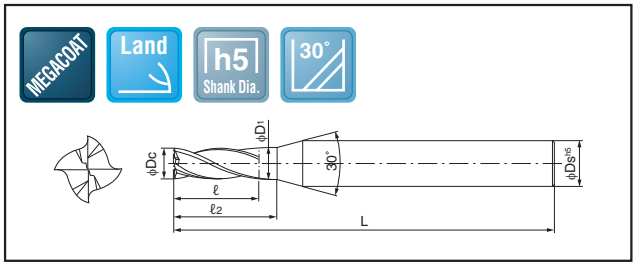




4 flutes, Tough corner edge

4FEKM





4FESM

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4FESM010-025-04	●	1.0	0 -0.015	2.5	1.1	4	45	4
4FESM015-040-04	●	1.5	0 -0.015	4.0	1.6	4	45	4
4FESM020-060-04	●	2.0	0 -0.015	6.0	2.1	4	45	4
4FESM025-080-04	●	2.5	0 -0.015	8.0	2.6	4	45	4
4FESM030-100-06	●	3.0	0 -0.015	10.0	3.2	6	50	4
4FESM035-100-06	●	3.5	0 -0.015	10.0	3.7	6	50	4
4FESM040-110-06	●	4.0	0 -0.015	11.0	4.2	6	50	4
4FESM045-110-06	●	4.5	0 -0.015	11.0	4.7	6	50	4
4FESM050-130-06	●	5.0	0 -0.015	13.0	5.2	6	50	4
4FESM055-130-06	●	5.5	0 -0.015	13.0	5.7	6	50	4
4FESM060-130-06	●	6.0	0 -0.020	13.0	-	6	50	4
4FESM060-150-06	●	6.0	0 -0.020	15.0	-	6	50	4
4FESM070-160-08	●	7.0	0 -0.020	16.0	7.2	8	60	4
4FESM080-190-08	●	8.0	-0.005 -0.025	19.0	-	8	60	4
4FESM080-200-08	●	8.0	-0.005 -0.025	20.0	-	8	60	4
4FESM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	10	70	4
4FESM100-220-10	●	10.0	-0.005 -0.025	22.0	-	10	70	4
4FESM100-250-10	●	10.0	-0.005 -0.025	25.0	-	10	70	4
4FESM120-260-12	●	12.0	-0.010 -0.030	26.0	-	12	75	4
4FESM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	16	75	4
4FESM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	16	90	4
4FESM160-320-16	●	16.0	-0.010 -0.030	32.0	-	16	90	4

● : Std. Item

4FEKM

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4FEKM030-100-06	●	3.0	0 -0.015	10.0	3.15	12	6	50	4
4FEKM035-100-06	●	3.5	0 -0.015	10.0	3.68	12	6	50	4
4FEKM040-110-06	●	4.0	0 -0.015	11.0	4.2	13.2	6	50	4
4FEKM045-110-06	●	4.5	0 -0.015	11.0	4.7	13.2	6	50	4
4FEKM050-130-06	●	5.0	0 -0.015	13.0	5.2	15.6	6	50	4
4FEKM055-130-06	●	5.5	0 -0.015	13.0	5.7	15.6	6	50	4
4FEKM060-130-06	●	6.0	0 -0.020	13.0	-	-	6	50	4
4FEKM080-190-08	●	8.0	-0.005 -0.025	19.0	-	-	8	60	4
4FEKM100-220-10	●	10.0	-0.005 -0.025	22.0	-	-	10	70	4
4FEKM120-260-12	●	12.0	-0.010 -0.030	26.0	-	-	12	75	4
4FEKM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	36.4	16	75	4
4FEKM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	42	16	90	4
4FEKM160-320-16	●	16.0	-0.010 -0.030	32.0	-	-	16	90	4

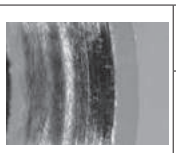
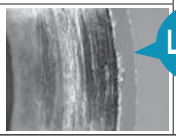
Recommended Cutting Conditions L54

Surface finish oriented, For Automatic Lathes

No. of Flutes: 2, 3, 4

2FESW, 3FESW, 4FESW
(Overall length 35mm / 45mm)

(2FESW)

Workpiece Material: Ni-Co alloy		
2FES (ϕ3·2flutes) Excellent surface finish.		Facing of machine parts ·Vc=20m/min (n=2,150min^{-1}) ·fz=0.023mm/t (Vf=100mm/min)
Competitor A (ϕ3·2flutes) Large burrs	 Large burrs	(Internal evaluation)

Comparison with competitor's end mill after 600 passes

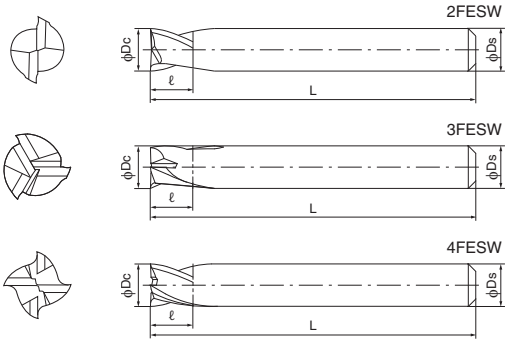
2 3 4

MEGACOAT is applied

Workpiece Materials ★1st Choice

★P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Sharp | h6 Shank Dia. | 35°



Sharp Cutting Edge Reduced Burrs

2FESW

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2FESW050-050-05A	●	5	0 -0.020	5	5	35	2
2FESW060-060-05A	●	6	0 -0.020	6	5	35	2
2FESW030-030-04	●	3	0 -0.020	3	4	45	2
2FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	2
2FESW040-040-04	●	4	0 -0.020	4	4	45	2
2FESW050-050-06	●	5	0 -0.020	5	6	45	2
2FESW060-060-06	●	6	0 -0.020	6	6	45	2
2FESW070-070-07	●	7	0 -0.025	7	7	45	2
2FESW080-080-07	●	8	0 -0.025	8	7	45	2
2FESW080-080-08	●	8	0 -0.025	8	8	45	2
2FESW100-080-07	●	10	0 -0.025	8	7	45	2
2FESW100-080-10	●	10	0 -0.025	8	10	45	2
2FESW120-080-10	●	12	0 -0.025	8	10	45	2
2FESW120-080-12	●	12	0 -0.030	8	12	45	2
2FESW130-080-13	●	13	0 -0.030	8	13	45	2

3FESW

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
3FESW050-050-05A	●	5	0 -0.020	5	5	35	3
3FESW060-060-05A	●	6	0 -0.020	6	5	35	3
3FESW030-030-04	●	3	0 -0.020	3	4	45	3
3FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	3
3FESW040-040-04	●	4	0 -0.020	4	4	45	3
3FESW050-050-06	●	5	0 -0.020	5	6	45	3
3FESW060-060-06	●	6	0 -0.020	6	6	45	3
3FESW070-070-07	●	7	0 -0.025	7	7	45	3
3FESW080-080-07	●	8	0 -0.025	8	7	45	3
3FESW080-080-08	●	8	0 -0.025	8	8	45	3
3FESW100-080-07	●	10	0 -0.025	8	7	45	3
3FESW100-080-10	●	10	0 -0.025	8	10	45	3
3FESW120-080-10	●	12	0 -0.025	8	10	45	3
3FESW120-080-12	●	12	0 -0.030	8	12	45	3
3FESW130-080-13	●	13	0 -0.030	8	13	45	3

4FESW

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4FESW030-030-04	●	3	0 -0.020	3	4	45	4
4FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	4
4FESW040-040-04	●	4	0 -0.020	4	4	45	4
4FESW050-050-06	●	5	0 -0.020	5	6	45	4
4FESW060-060-06	●	6	0 -0.020	6	6	45	4
4FESW070-070-07	●	7	0 -0.025	7	7	45	4
4FESW080-080-07	●	8	0 -0.025	8	7	45	4

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4FESW080-080-08	●	8	0 -0.025	8	8	45	4
4FESW100-080-07	●	10	0 -0.025	8	7	45	4
4FESW100-080-10	●	10	0 -0.025	8	10	45	4
4FESW120-080-10	●	12	0 -0.025	8	10	45	4
4FESW120-080-12	●	12	0 -0.030	8	12	45	4
4FESW130-080-13	●	13	0 -0.030	8	13	45	4

Recommended Cutting Conditions ➔ L55~L56

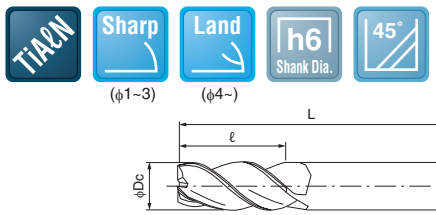
● : Std. Item

3 flutes, Multi-purpose

No. of Flutes : 3

3UFSM

Workpiece Materials ★1st Choice



3UFSM

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia.	Mill Dia. tolerance	Length of cut	Shank Dia.	Overall length	No. of Flutes
		ϕDc		ℓ	ϕDs	L	Z
3UFSM010-030-04	●	1	-0.014 -0.028	3	4	50	3
3UFSM015-030-04	●	1.5	-0.014 -0.028	3	4	50	3
3UFSM020-030-04	●	2	-0.014 -0.028	3	4	50	3
3UFSM025-040-04	●	2.5	-0.014 -0.028	4	4	50	3
3UFSM030-080-06	●	3	-0.014 -0.028	8	6	50	3
3UFSM040-120-06	●	4	-0.020 -0.038	12	6	50	3
3UFSM050-140-06	●	5	-0.020 -0.038	14	6	50	3
3UFSM060-160-06	●	6	-0.020 -0.038	16	6	50	3
3UFSM080-200-08	●	8	-0.025 -0.047	20	8	63	3
3UFSM100-220-10	●	10	-0.025 -0.047	22	10	76	3
3UFSM120-250-12	●	12	-0.032 -0.059	25	12	76	3
3UFSM160-320-16	●	16	-0.032 -0.059	32	16	89	3
3UFSM200-380-20	●	20	-0.040 -0.073	38	20	104	3

● Products emphasizing high efficiency machining, three flutes type for general semi finishing. It is available for slotting and shouldering of wide range of workpiece materials.

Recommended Cutting Conditions L56

● : Std. Item

Multi-edge for Slotting / Shouldering, Multi-purpose (High feed rate finishing)

No. of Flutes : 4, 5, 6

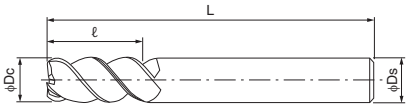
4PGS, 5PGS, 6PGS

4 5 6

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | H ~55HRC | K Cast Iron

TiAlN | Land | h6 Shank Dia. | 50°



4PGSS, 5PGSS (Short)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4PGSS030-045-06	○	3	-0.014 -0.028	4.5	6	57	4
4PGSS040-060-06	○	4	-0.020 -0.038	6	6	57	4
4PGSS050-075-06	○	5	-0.020 -0.038	7.5	6	76	4
4PGSS060-090-06	○	6	-0.020 -0.038	9	6	76	4
4PGSS080-120-08	○	8	-0.025 -0.047	12	8	100	4
4PGSS100-150-10	○	10	-0.025 -0.047	15	10	100	4
4PGSS120-180-12	○	12	-0.032 -0.059	18	12	125	4
4PGSS160-240-16	○	16	-0.032 -0.059	24	16	125	4
4PGSS200-300-20	○	20	-0.040 -0.073	30	20	150	4
5PGSS250-380-25	○	25	-0.040 -0.073	38	25	150	5

4PGSM, 5PGSM, 6PGSM (Medium)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4PGSM060-150-06	○	6	-0.020 -0.038	15	6	76	4
4PGSM080-200-08	○	8	-0.025 -0.047	20	8	100	4
5PGSM100-250-10	○	10	-0.025 -0.047	25	10	100	5
6PGSM120-300-12	○	12	-0.032 -0.059	30	12	125	6
6PGSM160-400-16	○	16	-0.032 -0.059	40	16	125	6
6PGSM200-500-20	○	20	-0.040 -0.073	50	20	150	6
6PGSM250-630-25	○	25	-0.040 -0.073	63	25	150	6

4PGSL, 5PGSL, 6PGSL (Long)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4PGSL060-210-06	○	6	-0.020 -0.038	21	6	76	4
4PGSL080-280-08	○	8	-0.025 -0.047	28	8	100	4
5PGSL100-350-10	○	10	-0.025 -0.047	35	10	100	5
6PGSL120-420-12	○	12	-0.032 -0.059	42	12	125	6
6PGSL160-560-16	○	16	-0.032 -0.059	56	16	125	6
6PGSL200-700-20	○	20	-0.040 -0.073	70	20	150	6
6PGSL250-880-25	○	25	-0.040 -0.073	88	25	150	6

- Core Diameter Ratio is 60% between the cutting edge and 1Dc and 80% for the rest.
  Good chip evacuation and high rigidity with corner land.

Recommended Cutting Conditions ➔ L57~L58

○ : Check Availability

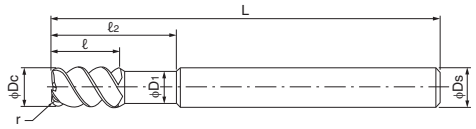
No. of Flutes : 4

4PGRM

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | H ~55HRC | K Cast Iron

TiAlN | Radius R | ±0.02 mm R | h6 Shank Dia. | 50°



4PGRM

Shouldering | Slotting

(Unit: mm)

Description	Std.	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	Spec of Corners
		ϕDc		ℓ	ϕD1	ℓ2	ϕDs	L	r
4PGRM030-045-06-R025	○	3	-0.014 -0.028	4.5	2.7	9	6	57	R0.25
4PGRM030-045-06-R050	○	3	-0.014 -0.028	4.5	2.7	9	6	57	R0.5
4PGRM040-060-06-R025	○	4	-0.020 -0.038	6	3.7	12	6	57	R0.25
4PGRM040-060-06-R050	○	4	-0.020 -0.038	6	3.7	12	6	57	R0.5
4PGRM050-075-06-R025	○	5	-0.020 -0.038	7.5	4.6	15	6	76	R0.25
4PGRM050-075-06-R050	○	5	-0.020 -0.038	7.5	4.6	15	6	76	R0.5
4PGRM060-090-06-R025	○	6	-0.020 -0.038	9	5.5	18	6	76	R0.25
4PGRM060-090-06-R050	○	6	-0.020 -0.038	9	5.5	18	6	76	R0.5
4PGRM060-090-06-R075	○	6	-0.020 -0.038	9	5.5	18	6	76	R0.75
4PGRM060-090-06-R100	○	6	-0.020 -0.038	9	5.5	18	6	76	R1.0
4PGRM080-120-08-R050	○	8	-0.025 -0.047	12	7.4	24	8	100	R0.5
4PGRM080-120-08-R100	○	8	-0.025 -0.047	12	7.4	24	8	100	R1.0
4PGRM080-120-08-R150	○	8	-0.025 -0.047	12	7.4	24	8	100	R1.5
4PGRM080-120-08-R200	○	8	-0.025 -0.047	12	7.4	24	8	100	R2.0
4PGRM100-150-10-R050	○	10	-0.025 -0.047	15	9.2	30	10	100	R0.5
4PGRM100-150-10-R100	○	10	-0.025 -0.047	15	9.2	30	10	100	R1.0
4PGRM100-150-10-R150	○	10	-0.025 -0.047	15	9.2	30	10	100	R1.5
4PGRM100-150-10-R200	○	10	-0.025 -0.047	15	9.2	30	10	100	R2.0
4PGRM120-180-12-R050	○	12	-0.032 -0.059	18	11	36	12	125	R0.5
4PGRM120-180-12-R100	○	12	-0.032 -0.059	18	11	36	12	125	R1.0
4PGRM120-180-12-R150	○	12	-0.032 -0.059	18	11	36	12	125	R1.5
4PGRM120-180-12-R200	○	12	-0.032 -0.059	18	11	36	12	125	R2.0
4PGRM160-240-16-R050	○	16	-0.032 -0.059	24	15	48	16	125	R0.5
4PGRM160-240-16-R150	○	16	-0.032 -0.059	24	15	48	16	125	R1.5
4PGRM200-300-20-R050	○	20	-0.040 -0.073	30	19	60	20	150	R0.5
4PGRM200-300-20-R200	○	20	-0.040 -0.073	30	19	60	20	150	R2.0

No. of Flutes Z=4

- Radius type with 4 flutes. The diameter of the neck portion (ϕD1) is thinner than the cutting diameter (ϕDc) and it is suitable for deep slotting. Due to the corner-R on the cutting edge, it is applicable for finishing of sloped workpiece.

Recommended Cutting Conditions L58

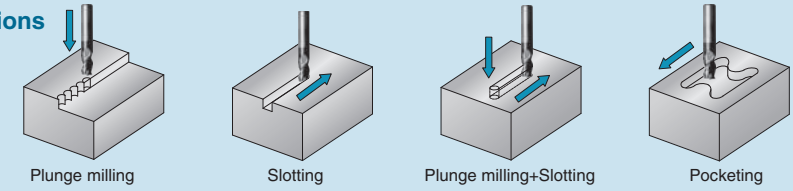
○ : Check Availability

3ZFK

Triple functions

Applicable for plunge milling, slotting and finishing with one end mill

● Applications

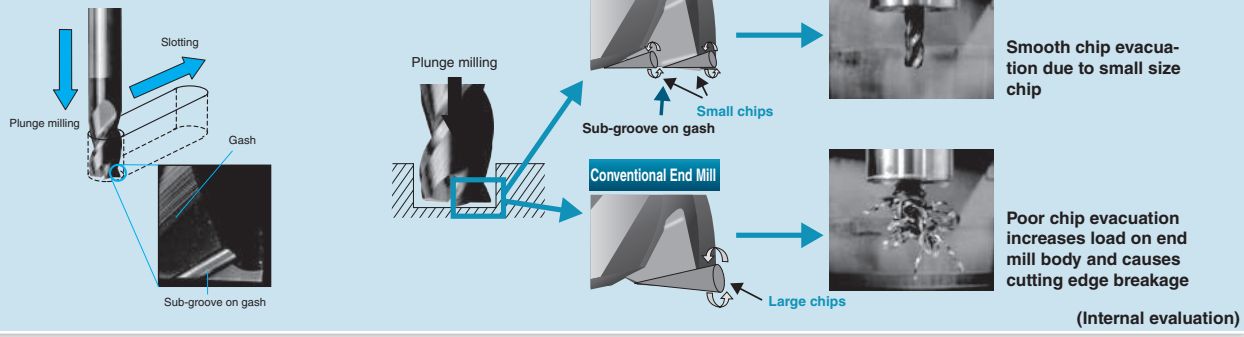


Triple Performances

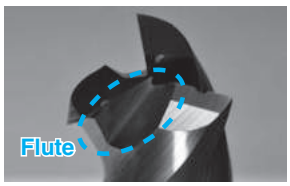
1. High efficiency machining due to new design

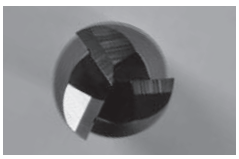
· Smooth chip evacuation because sub-groove on gash breaks chips during plunge milling

● Effect of sub-groove on gash

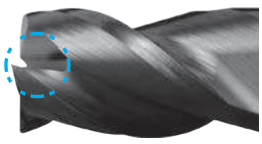


· Prevents chip clogging owing to deep flute and gash design.

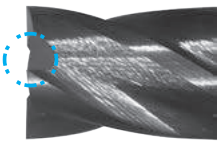




Bottom surface of 3ZFK cutting edge



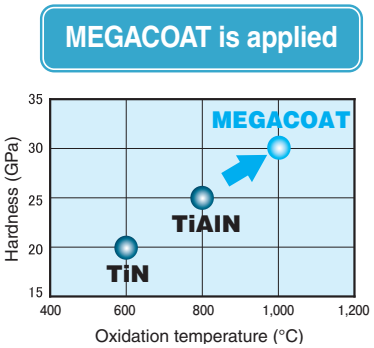
3ZFK



Conventional End Mill

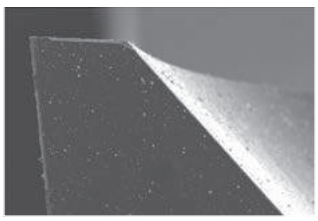
2. Longer tool life with MEGACOAT

· Excellent wear resistance and heat-resistance



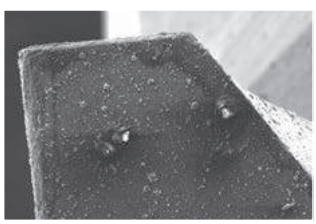
3. Better surface finish owing to sharp cutting edge quality

· Smooth and sharp to the tip of the cutting edge
· Controls burr formation. Better surface roughness



MEGACOAT

Smooth and sharp to the tip of the cutting edge
Longer tool life and improved surface finish



Competitor Coating A

Rough coating surface and round blunt cutting edge

(Internal evaluation)

No. of Flutes : 3

3ZFKS, 3ZFKM

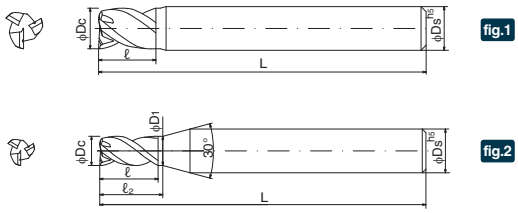
3

MEGACOAT is applied

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel ★ | S Titanium Alloy | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Land | h5 Shank Dia. | 40°



3ZFKS (Short)

Shouldering | Slotting | Plunge milling

(Unit: mm)

Description	Std.	Outside Dia. φDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. φD1	Under Neck Length ℓ2	Shank Dia. φDs	Overall length L	No. of Flutes Z
3ZFKS060-090-06 fig.1	●	6.0	0 -0.02	9.0	-	-	6	50	3
3ZFKS070-105-08 fig.2	●	7.0	0 -0.02	10.5	7.2	11.3	8	60	3
3ZFKS080-120-08 fig.1	●	8.0	-0.005 -0.025	12.0	-	-	8	60	3
3ZFKS100-150-10 fig.1	●	10.0	-0.005 -0.025	15.0	-	-	10	70	3
3ZFKS120-180-12 fig.1	●	12.0	-0.01 -0.03	18.0	-	-	12	75	3

3ZFKM (Medium)

Shouldering | Slotting | Plunge milling

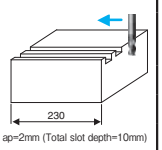
(Unit: mm)

Description	Std.	Outside Dia. φDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. φD1	Under Neck Length ℓ2	Shank Dia. φDs	Overall length L	No. of Flutes Z
3ZFKM030-060-06 fig.2	●	3.0	0 -0.015	6.0	3.2	6.5	6	50	3
3ZFKM030-080-06 fig.2	●	3.0	0 -0.015	8.0	3.2	8.6	6	50	3
3ZFKM040-080-06 fig.2	●	4.0	0 -0.015	8.0	4.2	8.6	6	50	3
3ZFKM040-120-06 fig.2	●	4.0	0 -0.015	12.0	4.2	13.0	6	50	3
3ZFKM050-100-06 fig.2	●	5.0	0 -0.015	10.0	5.2	10.8	6	50	3
3ZFKM050-130-06 fig.2	●	5.0	0 -0.015	13.0	5.2	14.0	6	50	3
3ZFKM060-130-06 fig.1	●	6.0	0 -0.02	13.0	-	-	6	50	3
3ZFKM070-160-08 fig.2	●	7.0	0 -0.02	16.0	7.2	17.3	8	60	3
3ZFKM080-190-08 fig.1	●	8.0	-0.005 -0.025	19.0	-	-	8	60	3
3ZFKM100-220-10 fig.1	●	10.0	-0.005 -0.025	22.0	-	-	10	70	3
3ZFKM120-260-12 fig.1	●	12.0	-0.01 -0.03	26.0	-	-	12	75	3
3ZFKM160-350-16 fig.1	●	16.0	-0.010 -0.030	35.0	-	-	16	90	3

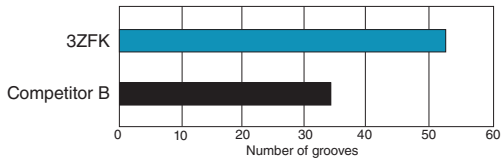
Case Studies

● Slotting of Titanium Alloy

Outside Dia.	ϕ10
Workpiece Material	Ti-6Al-4V
Spindle Revolution	3ZFK: n=1,700min^{-1}
	Competitor B: n=1,300min^{-1}
Feed Rate	Vf=460mm/min
Depth of Cut	ap×ae=2×10mm



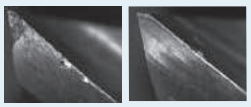
(Wet)



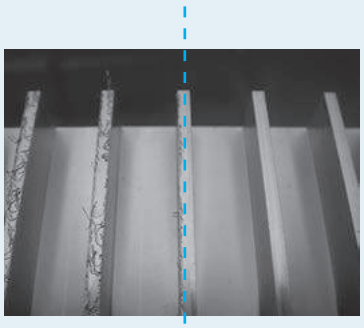
(Internal evaluation)

- Better surface finish and longer tool life with 3ZFK.
- Compared to competitor's coated products, the 3ZFK has a 1.4 times longer tool life.
- 3ZFK prevents burr formation due to sharp cutting edge.

◆ Cutting edge after 35 passes



Competitor B 3ZFK



Competitor B 3ZFK

(Internal evaluation)

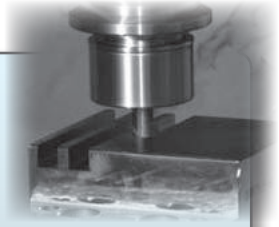
Recommended Cutting Conditions L59

● : Std. Item

4MFK / 4MFR

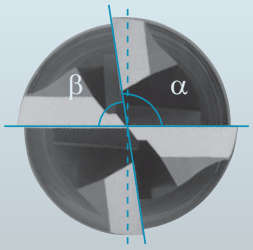
Innovative design for high efficiency stable milling

Varied interval flute design / Variable lead



Superior anti vibration performance due to Kyocera's unique varied interval flute design / variable lead

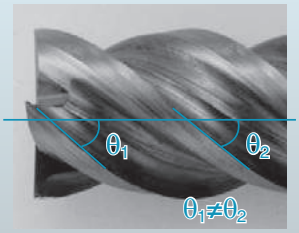
Varied interval flute design



Cutting force varies due to varied flute width, which prevents periodical vibration during milling.

$\alpha \neq \beta$

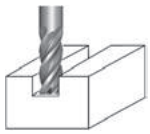
Variable Lead



Every flute has its optimum Helix Angle (Lead Angle θ), which enables excellent anti vibration effect. Prevents chattering, and superior surface finish.

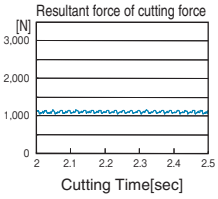
Helix Angle : θ_1=42°, θ_2=44°

Variable Lead: Prevents chattering

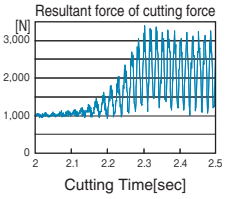


Workpiece Material	SCM440
End Mill Dia.	ϕ8
Spindle Revolution	n=2,650min^{-1}
Table feed rate	Vf=300mm/min
Depth of Cut	ap×ae=10×8mm

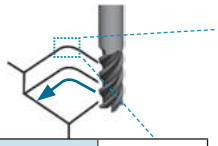
4MFK080-190



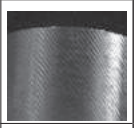
Competitor A (Equal lead angle)



Superior surface finish, compared to Competitor B (variable lead angle)



Workpiece Material	S45C
End Mill Dia.	ϕ8
Spindle Revolution	n=6,000min^{-1}
Table feed rate	Vf=1,500mm/min
Depth of Cut	ap×ae=8×2mm

4MFK080-190	Competitor B Variable Lead End Mill
	
Prevents chattering	Chattering occurred

Minimum vibration when shouldering. Excellent surface finish.

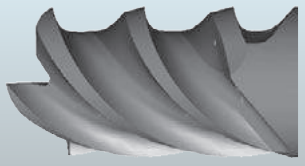
(Internal evaluation)

Special Flute Design

Stable Chip Evacuation due to New Special Flute Design

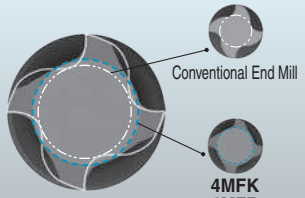
Wide Chip Pocket

Wide Chip Pocket Effects: Excellent chip evacuation at high feed rate machining.



High rigidity due to increased core diameter

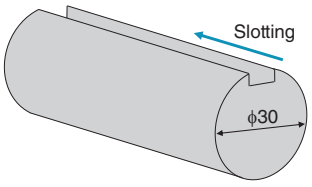
Core diameter improves the rigidity, preventing vibration and inclination of tool during machining.



Case Studies

S45C

·Automotive parts
·n=3,500min^{-1} (Vc=77m/min)
·ap×ae=5×7mm
·Vf=1,000mm/min (fz=0.071mm/t)
·Wet



4MFK070-160	255 pcs
Competitor Coated Carbide C	50 pcs

6.6 times the productivity
5 times the tool life

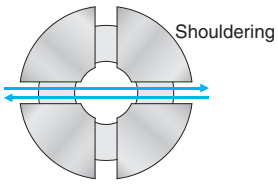
【Competitor Coated Carbide C】
7-4 flutes
n=2,000min^{-1} (Vc=44m/min)
ap×ae=5×7mm
Vf=150mm/min (fz=0.019mm/t)
Wet

- 4MFK showed 5 times longer tool life than Competitor C.
- Compared to Competitor C, 4MFK increased the feed rate by 6.6 times.
- No vibration occurred. Stable machining.

(Evaluation by the user)

SCM415H

·Automotive parts
·n=5,300min^{-1} (Vc=100m/min)
·ap×ae=3.5×0.9mm
·Vf=500mm/min (0.09mm/t)
·Wet



4MFR060-130-R10	1,000 pcs
Competitor Coated Carbide D	500 pcs Chipping

【Competitor Coated Carbide D】
Cutting conditions are same as above.

·4MFR End Mill machined 1,000 pieces and was available for further machining, while Competitor D could not continue machining because of chipping after processing 500 pieces.

(Evaluation by the user)

4MFK, 4MFR NEW

No. of Flutes : 4

Workpiece Materials ★1st Choice

★ P ~30HRC | P 30~40HRC | H ~55HRC | M Stainless steel | S Titanium Alloy | K Cast Iron | N Aluminum & Non Ferrous Material

4

MEGACOAT NANO is applied

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land | Radius R

4MFK 4MFR

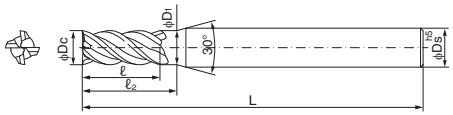


fig.1

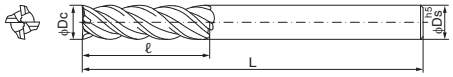


fig.2

4MFK (With corner land)

(Unit: mm)

Description	Std.	Outside Dia. φDc	Mill Dia. tolerance	Length of cut ℓ	*Cutting edge length	Neck Dia. φD1	Under Neck Length ℓ2	Shank Dia. φDs	Overall length L	No. of Flutes Z
4MFK030-045 fig.1	●	3.0	0 -0.015	4.5	S	3.15	5.4	6	60	4
4MFK030-080 fig.1	●			8	M		9.6			
4MFK030-120 fig.1	●			12	L		14.4			
4MFK040-060 fig.1	●	4.0	0 -0.015	6	S	4.2	7.2	6	60	4
4MFK040-110 fig.1	●			11	M		13.2			
4MFK040-120 fig.1	●			12	M(3D)		14.4			
4MFK040-160 fig.1	●			16	L		19.2			
4MFK050-075 fig.1	●	5.0	0 -0.015	7.5	S	5.2	9.0	6	60	4
4MFK050-130 fig.1	●			13	M		15.6			
4MFK050-200 fig.1	●			20	L		24.0			
4MFK060-090 fig.2	●	6.0	0 -0.020	9	S	-	-	6	60	4
4MFK060-130 fig.2	●			13	M					
4MFK060-150 fig.2	●			15	M(2.5D)					
4MFK060-220 fig.2	●			22	L					
4MFK070-105 fig.1	●	7.0	0 -0.020	10.5	S	7.2	12.6	8	70	4
4MFK070-160 fig.1	●			16	M		19.2			
4MFK070-250 fig.1	●			25	L		30.0			
4MFK080-120 fig.2	●	8.0	-0.005 -0.025	12	S	-	-	8	70	4
4MFK080-190 fig.2	●			19	M					
4MFK080-200 fig.2	●			20	M(2.5D)					
4MFK080-280 fig.2	●			28	L					
4MFK090-135 fig.1	●	9.0	-0.005 -0.025	13.5	S	9.2	16.2	10	80	4
4MFK090-205 fig.1	●			20.5	M		24.6			
4MFK100-150 fig.2	●	10.0	-0.005 -0.025	15	S	-	-	10	80	4
4MFK100-220 fig.2	●			22	M					
4MFK100-250 fig.2	●			25	M(2.5D)					
4MFK100-330 fig.2	●			33	L					
4MFK120-180 fig.2	●	12.0	-0.010 -0.030	18	S	-	-	12	100	4
4MFK120-260 fig.2	●			26	M					
4MFK120-360 fig.2	●			36	L					
4MFK160-240 fig.2	●	16.0	-0.010 -0.030	24	S	-	-	16	110	4
4MFK160-350 fig.2	●			35	M					
4MFK160-480 fig.2	●			48	L					

*Applications for each cutting edge length

S : Short, M : Medium } · · · Shouldering Slotting

L : Long · · · · · · Shouldering

4MFR (Radius)

(Unit: mm)

Description	Std.	Outside Dia. φDc	Mill Dia. tolerance	Corner Radius r	Length of cut ℓ	Neck Dia. φD1	Under Neck Length ℓ2	Shank Dia. φDs	Overall length L	No. of Flutes Z
4MFR030-080-R02 fig.1	●	3.0	0 -0.015	0.2	8	3.15	9.6	6	60	4
4MFR030-080-R03 fig.1	●			0.3						
4MFR030-080-R05 fig.1	●			0.5						
4MFR040-110-R02 fig.1	●	4.0	0 -0.015	0.2	11	4.2	13.2	6	60	4
4MFR040-110-R03 fig.1	●			0.3						
4MFR040-110-R05 fig.1	●			0.5						
4MFR040-110-R10 fig.1	●			1.0						
4MFR050-130-R02 fig.1	●	5.0	0 -0.015	0.2	13	5.2	15.6	6	60	4
4MFR050-130-R03 fig.1	●			0.3						
4MFR050-130-R05 fig.1	●			0.5						
4MFR050-130-R10 fig.1	●			1.0						
4MFR060-130-R03 fig.2	●	6.0	0 -0.020	0.3	13	-	-	6	60	4
4MFR060-130-R05 fig.2	●			0.5						
4MFR060-130-R10 fig.2	●			1.0						
4MFR060-130-R15 fig.2	●			1.5						
4MFR080-190-R03 fig.2	●	8.0	-0.005 -0.025	0.3	19	-	-	8	70	4
4MFR080-190-R05 fig.2	●			0.5						
4MFR080-190-R10 fig.2	●			1.0						
4MFR080-190-R15 fig.2	●			1.5						
4MFR080-190-R20 fig.2	●			2.0						
4MFR080-190-R30 fig.2	●			3.0						
4MFR100-220-R03 fig.2	●	10.0	-0.005 -0.025	0.3	22	-	-	10	80	4
4MFR100-220-R05 fig.2	●			0.5						
4MFR100-220-R10 fig.2	●			1.0						
4MFR100-220-R15 fig.2	●			1.5						
4MFR100-220-R20 fig.2	●			2.0						
4MFR100-220-R30 fig.2	●			3.0						
4MFR120-260-R05 fig.2	●	12.0	-0.010 -0.030	0.5	26	-	-	12	100	4
4MFR120-260-R10 fig.2	●			1.0						
4MFR120-260-R15 fig.2	●			1.5						
4MFR120-260-R20 fig.2	●			2.0						
4MFR120-260-R30 fig.2	●			3.0						
4MFR160-350-R10 fig.2	●	16.0	-0.010 -0.030	1.0	35	-	-	16	110	4
4MFR160-350-R15 fig.2	●			1.5						
4MFR160-350-R20 fig.2	●			2.0						
4MFR160-350-R30 fig.2	●			3.0						

Recommended Cutting Conditions ➔ L60

● : Std. Item

4TFK / 4TFR

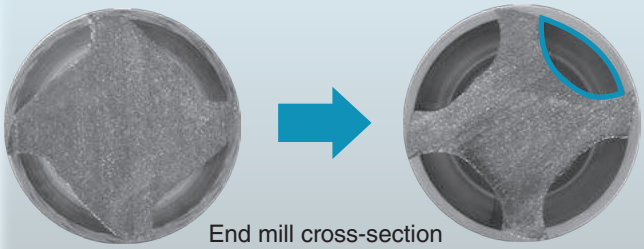
■ High efficiency end mill for high efficiency machining of difficult-to-cut materials (stainless steel, titanium alloys and heat-resistant alloys)

● Optimum edge shape for high efficiency machining

Better chip evacuation at high feed rate machining
Low cutting force and burr prevention by large rake angle and helix angle

Conventional End Mill

4TFK / 4TFR



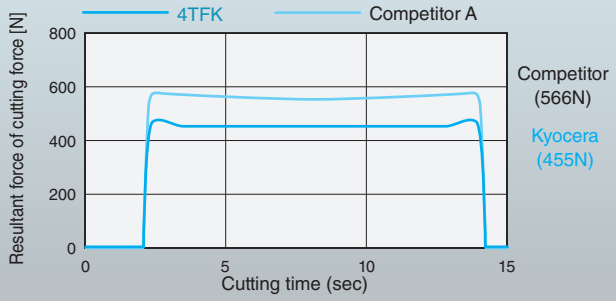
End mill cross-section

Optimum edge shape for high efficiency machining

Excellent chip evacuation at high feed rate by wide chip pocket and large rake angle

■ 20% reduction of cutting force at slotting

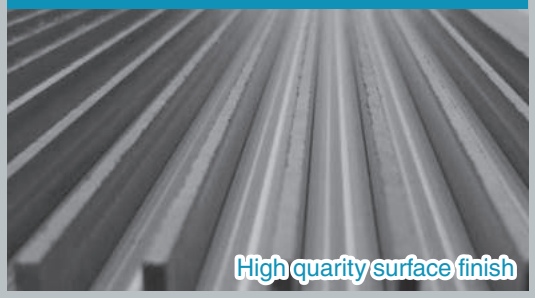
● Cutting force at machining 100mm



Cutting Conditions Workpiece Material : SCM440
End Mill Dia. ϕ6 Dry n=4,800min^{-1}
Vf=500mm/min ap=6mm

Deep slotting (1xD) by low cutting force design and good chip evacuation

4TFK



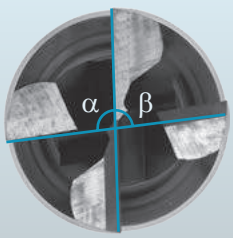
Competitor B

Cutting Conditions Workpiece Material : SUS304 End Mill Dia. ϕ6 Slotting Wet n=3,200min^{-1} Vf=150mm/min ap=6mm

● Varied interval flute design / Variable lead

Superior anti vibration performance due to Kyocera's unique varied interval flute design / variable lead

Varied interval flute design



$\alpha \neq \beta$

Cutting force varies due to varied interval flute, which prevents periodical vibration during machining

Variable Lead

$\theta_1 \neq \theta_2$

Every flute has its optimum helix angle (lead angle θ), which enables excellent and anti vibration effect and good surface finish

4TFK, 4TFR NEW

4

MEGACOAT NANO is applied

Workpiece Materials ★1st Choice

P ~30HRC	P 30~40HRC	H ~55HRC	M Stainless steel	S Titanium Alloy	K Cast Iron	N Aluminum & Non Ferrous Material
★			★	★		

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land (4TFK) | Radius R (4TFR)

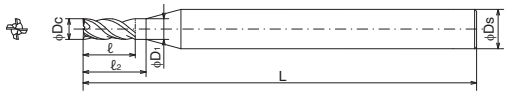


fig.1

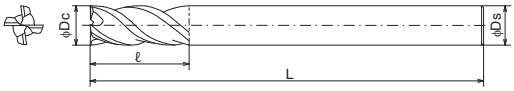


fig.2

4TFK (With corner land)

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	*Cutting edge length	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4TFK030-045 fig.1	●	3.0	0 -0.015	4.5	S	3.15	5.4	6	60	4
4TFK030-080 fig.1	●			8	M		9.6			
4TFK030-120 fig.1	●			12	L		14.4			
4TFK040-060 fig.1	●	4.0	0 -0.015	6	S	4.2	7.2	6	60	4
4TFK040-120 fig.1	●			12	M		14.4			
4TFK040-160 fig.1	●			16	L		19.2			
4TFK050-075 fig.1	●	5.0	0 -0.015	7.5	S	5.2	9	6	60	4
4TFK050-130 fig.1	●			13	M		15.6			
4TFK050-200 fig.1	●			20	L		24			
4TFK060-090 fig.2	●	6.0	0 -0.020	9	S	-	-	6	60	4
4TFK060-150 fig.2	●			15	M					
4TFK060-220 fig.2	●			22	L					
4TFK070-105 fig.1	●	7.0	0 -0.020	10.5	S	7.2	12.6	8	70	4
4TFK070-160 fig.1	●			16	M		19.2			
4TFK070-250 fig.1	●			25	L		30			
4TFK080-120 fig.2	●	8.0	-0.005 -0.025	12	S	-	-	8	70	4
4TFK080-200 fig.2	●			20	M					
4TFK080-280 fig.2	●			28	L					
4TFK090-135 fig.1	●	9.0	-0.005 -0.025	13.5	S	9.2	16.2	10	80	4
4TFK090-205 fig.1	●			20.5	M		24.6			
4TFK100-150 fig.2	●	10.0	-0.005 -0.025	15	S	-	-	10	80	4
4TFK100-250 fig.2	●			25	M					
4TFK100-330 fig.2	●			33	L					
4TFK120-180 fig.2	●	12.0	-0.010 -0.030	18	S	-	-	12	100	4
4TFK120-260 fig.2	●			26	M					
4TFK120-360 fig.2	●			36	L					
4TFK160-240 fig.2	●	16.0	-0.010 -0.030	24	S	-	-	16	110	4
4TFK160-350 fig.2	●			35	M					
4TFK160-480 fig.2	●			48	L					
4TFK200-300 fig.2	●	20.0	-0.010 -0.030	30	S	-	-	20	125	4
4TFK200-450 fig.2	●			45	M					

*Applications for each cutting edge length

S : Short, M : Medium } . . . Shouldering Slotting

L : Long . . . . . Shouldering

4TFR (Radius)

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. t olerance	Corner Radius r	Length of cut ℓ	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4TFR030-080-R02 fig.1	●	3.0	0 -0.015	0.2	8	3.15	9.6	6	60	4
4TFR030-080-R05 fig.1	●			0.5						
4TFR040-120-R02 fig.1	●	4.0	0 -0.015	0.2	12	4.2	14.4	6	60	4
4TFR040-120-R05 fig.1	●			0.5						
4TFR050-130-R02 fig.1	●	5.0	0 -0.015	0.2	13	5.2	15.6	6	60	4
4TFR050-130-R05 fig.1	●			0.5						
4TFR050-130-R10 fig.1	●			1.0						
4TFR060-150-R03 fig.2	●	6.0	0 -0.020	0.3	15	-	-	6	60	4
4TFR060-150-R05 fig.2	●			0.5						
4TFR060-150-R10 fig.2	●			1.0						
4TFR080-200-R03 fig.2	●	8.0	-0.005 -0.025	0.3	20	-	-	8	70	4
4TFR080-200-R05 fig.2	●			0.5						
4TFR080-200-R10 fig.2	●			1.0						
4TFR080-200-R20 fig.2	●			2.0						
4TFR100-250-R03 fig.2	●	10.0	-0.005 -0.025	0.3	25	-	-	10	80	4
4TFR100-250-R05 fig.2	●			0.5						
4TFR100-250-R10 fig.2	●			1.0						
4TFR100-250-R15 fig.2	●			1.5						
4TFR100-250-R20 fig.2	●			2.0						
4TFR100-250-R30 fig.2	●			3.0						
4TFR120-260-R05 fig.2	●	12.0	-0.010 -0.030	0.5	26	-	-	12	100	4
4TFR120-260-R10 fig.2	●			1.0						
4TFR120-260-R15 fig.2	●			1.5						
4TFR120-260-R20 fig.2	●			2.0						
4TFR120-260-R30 fig.2	●			3.0						
4TFR160-350-R10 fig.2	●	16.0	-0.010 -0.030	1.0	35	-	-	16	110	4
4TFR160-350-R20 fig.2	●			2.0						
4TFR160-350-R30 fig.2	●			3.0						
4TFR200-450-R10 fig.2	●	20.0	-0.010 -0.030	1.0	45	-	-	20	125	4
4TFR200-450-R20 fig.2	●			2.0						
4TFR200-450-R30 fig.2	●			3.0						

Recommended Cutting Conditions L61

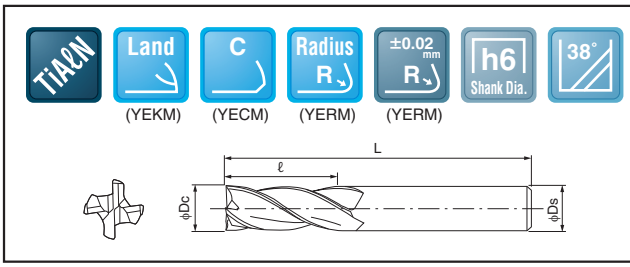
● : Std. Item

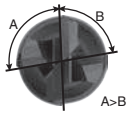
High efficiency chip evacuation for Steel and Difficult-to-cut materials, Varied interval flute design

No. of Flutes : 4

4YEKM, 4YECM, 4YERM

Workpiece Materials ★1st Choice





4YECM's Varied interval flute design

4YEKM (With corner land)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners	No. of Flutes Z
4YEKM040-120-06	○	4	-0.020 -0.038	12	6	55	-	4
4YEKM050-130-06	○	5	-0.020 -0.038	13	6	57	-	4
4YEKM060-130-06	○	6	-0.020 -0.038	13	6	57	-	4
4YEKM080-160-08	○	8	-0.025 -0.047	16	8	63	-	4
4YEKM090-190-10	○	9	-0.025 -0.047	19	10	72	-	4
4YEKM100-220-10	○	10	-0.025 -0.047	22	10	72	-	4
4YEKM120-260-12	○	12	-0.032 -0.059	26	12	83	-	4
4YEKM160-320-16	○	16	-0.032 -0.059	32	16	92	-	4
4YEKM200-380-20	○	20	-0.040 -0.073	38	20	104	-	4
4YEKM250-450-25	○	25	-0.040 -0.073	45	25	121	-	4

4YECM (With corner chamfering)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners	No. of Flutes Z
4YECM040-120-06-C04	○	4	-0.020 -0.038	12	6	55	C0.4	4
4YECM050-130-06-C04	○	5	-0.020 -0.038	13	6	57	C0.4	4
4YECM060-130-06-C04	○	6	-0.020 -0.038	13	6	57	C0.4	4
4YECM080-160-08-C04	○	8	-0.025 -0.047	16	8	63	C0.4	4
4YECM090-190-10-C05	○	9	-0.025 -0.047	19	10	72	C0.5	4
4YECM100-220-10-C05	○	10	-0.025 -0.047	22	10	72	C0.5	4
4YECM120-260-12-C05	○	12	-0.032 -0.059	26	12	83	C0.5	4
4YECM160-320-16-C05	○	16	-0.032 -0.059	32	16	92	C0.5	4
4YECM200-380-20-C05	○	20	-0.040 -0.073	38	20	104	C0.5	4
4YECM250-450-25-C05	○	25	-0.040 -0.073	45	25	121	C0.5	4

4YERM (Radius)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners	No. of Flutes Z
4YERM040-120-06-R020	○	4	-0.020 -0.038	12	6	55	R0.2	4
4YERM050-130-06-R020	○	5	-0.020 -0.038	13	6	57	R0.2	4
4YERM060-130-06-R020	○	6	-0.020 -0.038	13	6	57	R0.2	4
4YERM080-160-08-R020	○	8	-0.025 -0.047	16	8	63	R0.2	4
4YERM090-190-10-R020	○	9	-0.025 -0.047	19	10	72	R0.2	4
4YERM100-220-10-R030	○	10	-0.025 -0.047	22	10	72	R0.3	4
4YERM120-260-12-R030	○	12	-0.032 -0.059	26	12	83	R0.3	4
4YERM160-320-16-R030	○	16	-0.032 -0.059	32	16	92	R0.3	4
4YERM200-380-20-R030	○	20	-0.040 -0.073	38	20	104	R0.3	4
4YERM250-450-25-R030	○	25	-0.040 -0.073	45	25	121	R0.3	4

- Varied interval flute design prevents vibration and reduces cutting force at slotting.
  This has led to the high speed and high feed rate machining.
  We provide three types of edge shape for different application; Radius, Corner Land and Corner Chamfered type.
  There is Maximum 0.01mm back taper.

Recommended Cutting Conditions ➔ L61

○ : Check Availability

High efficiency chip evacuation for Steel and Difficult-to-cut materials, Varied interval flute design

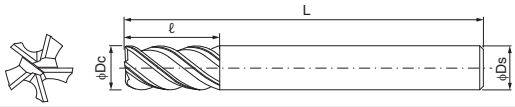
No. of Flutes : 5

5DEKM, 5DERM

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel ★ | S Titanium Alloy ★ | S Heat-resistant Alloy ★ | K Cast Iron

ACTiN | Land (DEKM) | Radius R (DERM) | ±0.05 mm R (DERM) | h6 Shank Dia. | 38°



5

5DEKM (With corner land)

Shouldering | Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
5DEKM040-120-06	●	4	-0.020 -0.038	12	6	55	5
5DEKM050-130-06	●	5	-0.020 -0.038	13	6	57	5
5DEKM060-130-06	●	6	-0.020 -0.038	13	6	57	5
5DEKM080-160-08	●	8	-0.025 -0.047	16	8	63	5
5DEKM090-190-10	●	9	-0.025 -0.047	19	10	72	5
5DEKM100-220-10	●	10	-0.025 -0.047	22	10	72	5
5DEKM120-260-12	●	12	-0.032 -0.059	26	12	83	5
5DEKM160-320-16	●	16	-0.032 -0.059	32	16	92	5
5DEKM200-380-20	●	20	-0.040 -0.073	38	20	104	5
5DEKM250-450-25	●	25	-0.040 -0.073	45	25	121	5

5DERM (Radius)

Shouldering | Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners	No. of Flutes Z
5DERM040-120-06-R025	●	4	-0.020 -0.038	12	6	55	R0.25	5
5DERM050-130-06-R025	●	5	-0.020 -0.038	13	6	57	R0.25	5
5DERM060-130-06-R040	●	6	-0.020 -0.038	13	6	57	R0.4	5
5DERM080-160-08-R050	●	8	-0.025 -0.047	16	8	63	R0.5	5
5DERM090-190-10-R050	●	9	-0.025 -0.047	19	10	72	R0.5	5
5DERM100-220-10-R050	●	10	-0.025 -0.047	22	10	72	R0.5	5
5DERM120-260-12-R075	●	12	-0.032 -0.059	26	12	83	R0.75	5
5DERM160-320-16-R075	●	16	-0.032 -0.059	32	16	92	R0.75	5
5DERM200-380-20-R075	●	20	-0.040 -0.073	38	20	104	R0.75	5
5DERM250-450-25-R075	●	25	-0.040 -0.073	45	25	121	R0.75	5

● 5 flutes design enables high feed rate machining. Varied intervals prevent vibration. 5DERM is suitable for 0.8Dc slotting.

Recommended Cutting Conditions ➔ L62

Steel and Difficult-to-cut materials, Finishing

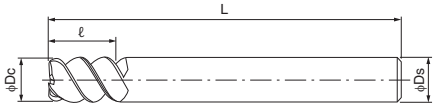
No. of Flutes : 4, 6

4YFSM, 6YFSM

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel ★ | S Titanium Alloy ★ | S Heat-resistant Alloy ★ | K Cast Iron

TiAlN | Sharp | h6 Shank Dia. | 45°



4 6

4YFSM

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4YFSM040-130-06	○	4	-0.020 -0.038	13	6	50	4
4YFSM050-130-06	○	5	-0.020 -0.038	13	6	50	4

6YFSM

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
6YFSM060-130-06	○	6	-0.020 -0.038	13	6	50	6
6YFSM080-190-08	○	8	-0.025 -0.047	19	8	63	6
6YFSM100-220-10	○	10	-0.025 -0.047	22	10	76	6
6YFSM120-260-12	○	12	-0.032 -0.059	26	12	76	6
6YFSM160-320-16	○	16	-0.032 -0.059	32	16	89	6
6YFSM200-380-20	○	20	-0.040 -0.073	38	20	104	6

● Multi-edge type with excellent chip evacuation. (Core Diameter Ratio: 60%) It has positive type rake angle and suitable for semi-finishing of difficult-to-cut materials such as stainless steel and Ni-base heat-resistant alloys.

Recommended Cutting Conditions ➔ L63

● : Std. Item
○ : Check Availability

No. of Flutes : 3, 4, 5

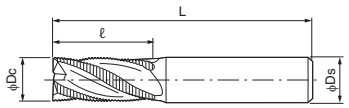
3RDS, 4RDS, 5RDS

3 4 5

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel | K Cast Iron ★

TiAlN | Cutting edge shape | C | h6 Shank Dia. | 20°



3RDSM, 4RDSM, 5RDSM (Medium)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners C	No. of Flutes Z
3RDSM040-110-06	●	4	-0.030 -0.105	11	6	55	0.3	3
3RDSM050-130-06	●	5	-0.030 -0.105	13	6	57	0.3	3
3RDSM060-130-06	●	6	-0.030 -0.105	13	6	57	0.3	3
3RDSM080-160-08	●	8	-0.040 -0.130	16	8	63	0.3	3
4RDSM100-220-10	●	10	-0.040 -0.130	22	10	72	0.5	4
4RDSM120-260-12	●	12	-0.050 -0.160	26	12	83	0.5	4
4RDSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.5	4
4RDSM200-380-20	●	20	-0.065 -0.195	38	20	104	0.5	4
5RDSM250-450-25	●	25	-0.065 -0.195	45	25	121	0.5	5

3RDSL, 4RDSL, 5RDSL (Long)

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners C	No. of Flutes Z
3RDSL060-240-06	●	6	-0.030 -0.105	24	6	76	0.3	3
3RDSL080-280-08	●	8	-0.040 -0.130	28	8	76	0.3	3
4RDSL100-340-10	●	10	-0.040 -0.130	34	10	89	0.5	4
4RDSL120-450-12	●	12	-0.050 -0.160	45	12	100	0.5	4
4RDSL160-560-16	●	16	-0.050 -0.160	56	16	125	0.5	4
4RDSL200-600-20	●	20	-0.065 -0.195	60	20	125	0.5	4
5RDSL250-800-25	●	25	-0.065 -0.195	80	25	150	0.5	5

● Three, four and five flutes types are available for roughing. They reduce cutting force due to the edge design with sine-curve pattern.

Recommended Cutting Conditions ➔ L63~L64

● : Std. Item

High efficiency chip evacuation, Roughing, Notched edge

No. of Flutes : 4, 6

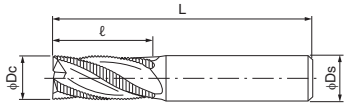
4RFSM, 6RFSM

4 6

Workpiece Materials ★1st Choice

P ~30HRC	P 30~40HRC	H ~55HRC	H ~68HRC	M Stainless steel	S Titanium Alloy	S Heat-resistant Alloy	K Cast Iron
	★	★			★		

TiAlN | Cutting edge shape: C | h6 Shank Dia. | 45°



4RFSM

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners C	No. of Flutes Z
4RFSM060-130-06	●	6	-0.030 -0.105	13	6	57	0.3	4
4RFSM080-160-08	●	8	-0.040 -0.130	16	8	63	0.4	4
4RFSM100-220-10	●	10	-0.040 -0.130	22	10	72	0.5	4
4RFSM120-260-12	●	12	-0.050 -0.160	26	12	83	0.6	4
4RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.6	4
4RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	1.0	4

6RFSM

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners C	No. of Flutes Z
6RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.6	6
6RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	1.0	6
6RFSM250-450-25	●	25	-0.065 -0.195	45	25	121	1.1	6

Recommended Cutting Conditions L64

● RFS has notched surface edge of 45° helix angle. It is applicable for hard materials and titanium alloys due to strong cutting edge.

High efficiency chip evacuation, Roughing, Notched edge, Radius

No. of Flutes : 3, 4

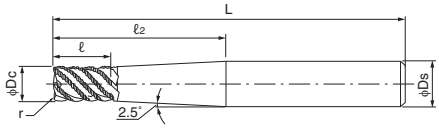
3RFRS, 4RFRS

3 4

Workpiece Materials ★1st Choice

P ~30HRC	P 30~40HRC	H ~55HRC	H ~68HRC	M Stainless steel	S Titanium Alloy	S Heat-resistant Alloy	K Cast Iron
	★	★			★		

TiAlN | Cutting edge shape: Radius R | ±0.05 mm R | h6 Shank Dia. | 45°



3RFRS (Radius)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners r	Under Neck Length ℓ2	No. of Flutes Z
3RFRS040-040-06-R075	●	4	-0.030 -0.105	4	6	75	R0.75	27.5	3
3RFRS050-050-06-R075	●	5	-0.030 -0.105	5	6	75	R0.75	17	3

4RFRS (Radius)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners r	Under Neck Length ℓ2	No. of Flutes Z
4RFRS060-060-10-R075	●	6	-0.030 -0.105	6	10	100	R0.75	52.5	4
4RFRS080-080-10-R075	●	8	-0.040 -0.130	8	10	100	R0.75	31.5	4
4RFRS100-100-12-R075	●	10	-0.040 -0.130	10	12	125	R0.75	33.5	4
4RFRS120-120-16-R100	●	12	-0.050 -0.160	12	16	125	R1.0	58.5	4

● Due to the strong cutting edge with large flat surface, it is suitable for hard materials and titanium alloys.
It can provide good surface roughness of 2.5 to 4.9 μmRa.

Recommended Cutting Conditions L65

● : Std. Item

6PFK / 8PFK

High efficiency machining and superior surface finish due to new special flute design

Varied interval flute design / Variable lead

Superior anti vibration performance due to Kyocera's unique varied interval flute design / variable lead

Varied interval flute design

$\alpha \neq \beta \neq \gamma$

Cutting force varies due to varied interval flute, which prevents periodical vibration during machining

Variable Lead

$\theta_1 \neq \theta_2 \neq \theta_3$

Every flute has its optimum helix angle (lead angle θ), which enables excellent and anti vibration effect and good surface finish

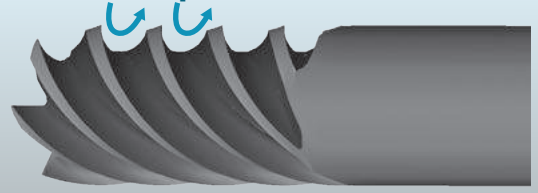
Surface finish comparison (side surface) End Mill Dia.ϕ12

Workpiece Material	SCM440	SUS304	Ti-6Al-4V
Cutting Conditions	n=3,300min^{-1} (Vc=124m/min) Vf=2,000mm/min (fz=0.1mm/t) ap×ae=30×1.5mm	n=2,500min^{-1} (Vc=94m/min) Vf=1,130mm/min (fz=0.08mm/t) ap×ae=30×0.6mm	n=2,500min^{-1} (Vc=94m/min) Vf=1,130mm/min (fz=0.08mm/t) ap×ae=30×0.6mm
Results	6PFK ✓	6PFK ✓	6PFK ✓
	Competitor A Chattering occurred	Competitor A Chattering occurred	Competitor A Dull surface due to poor approach

High feed rate and high efficiency shouldering with Multi-edge design (6 flutes /8 flutes)
Good surface finish

Special Flute Design

Stable Chip Evacuation due to New Special Flute Design



Good chip evacuation with wide chip pocket
Good performance at high feed rate machining

No. of Flutes : 6, 8

6PFK, 8PFK

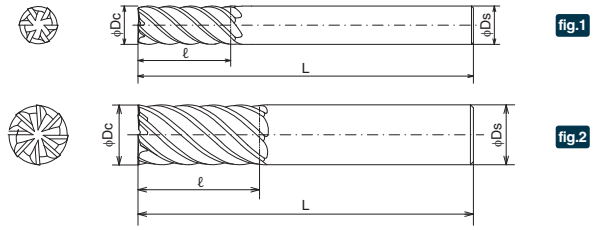
6 8

MEGACOAT NANO is applied

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | H ~55HRC | M Stainless steel ★ | S Titanium Alloy ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land



6PFK, 8PFK (Medium)

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
6PFK060-150 fig.1	●	6.0	0 -0.020	15	6	60	6
6PFK080-200 fig.1	●	8.0	-0.005 -0.025	20	8	70	6
6PFK100-250 fig.1	●	10.0	-0.005 -0.025	25	10	80	6
6PFK120-300 fig.1	●	12.0	-0.010 -0.030	30	12	100	6
6PFK160-400 fig.1	●	16.0	-0.010 -0.030	40	16	110	6
6PFK200-450 fig.1	●	20.0	-0.010 -0.030	45	20	125	6
8PFK250-500 fig.2	●	25.0	-0.010 -0.030	50	25	140	8

6PFK, 8PFK (Long)

Shouldering

(Unit: mm)

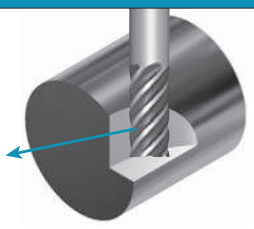
Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
6PFK060-250 fig.1	●	6.0	0 -0.020	25	6	70	6
6PFK080-350 fig.1	●	8.0	-0.005 -0.025	35	8	90	6
6PFK100-450 fig.1	●	10.0	-0.005 -0.025	45	10	100	6
6PFK120-550 fig.1	●	12.0	-0.010 -0.030	55	12	120	6
6PFK160-650 fig.1	●	16.0	-0.010 -0.030	65	16	135	6
6PFK200-750 fig.1	●	20.0	-0.010 -0.030	75	20	155	6
6PFK200-1000 fig.1	●	20.0	-0.010 -0.030	100	20	180	6
8PFK250-1000 fig.2	●	25.0	-0.010 -0.030	100	25	180	8

Recommended Cutting Conditions ➔ L65

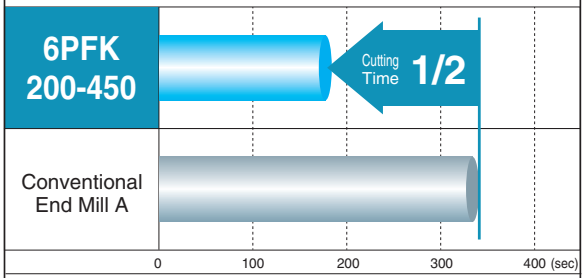
Case Studies

SCM440

- Machine parts
- Vc=150m/min (n=2,400min^{-1})
- fz=0.12mm/t (Vf=1,710mm/min)
- ap=18mm, ae=1.0mm
- Shouldering



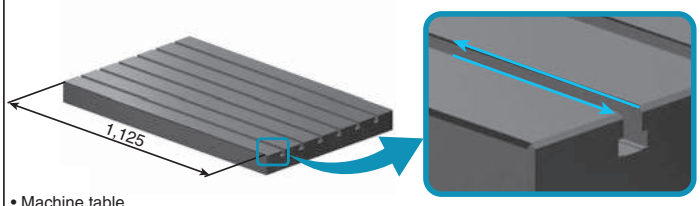
Cycle time for a set of workpiece (setup time included)



- Cycle time greatly reduced compared with the conventional End Mill A
- No heavy wear after machining 100 workpieces and still possible to continue machining

(Evaluation by the user)

FC250



- Machine table

6PFK200-450

● **Finishing** (1 pass)
- n=2,500min^{-1} (Vc=157m/min)
- apxae=35x1.2mm
- Vf=3,500mm/min (fz=0.23mm/t)

Cutting Time 1/8

Cutting Time 10min. (1,125mm x 24 slots)

Competitor Coated Carbide B

● **Semi finishing**
- n=2,500min^{-1} (Vc=157m/min)
- apxae=35x1.0mm
- Vf=1,500mm/min (fz=0.1mm/t)

● **Finishing**
- n=2,000min^{-1} (Vc=125m/min)
- apxae=35x0.2mm
- Vf=1,000mm/min (fz=0.1mm/t)

Cutting Time 80 min. (1,125mm x 24 slots) 2 passes

- Competitor B machined the workpiece with 2 passes due to chattering.
- 6PFK machined the workpiece with 1 pass without chattering. Productivity has greatly improved by increasing cutting conditions.

(Evaluation by the user)

● : Std. Item

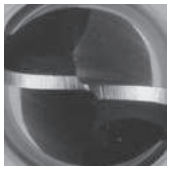
2SEB

Special cutting edge concept and nano layer coating realized high precision and long tool life machining

Point 1 Sharp cutting due to special nose geometry

Arc-like cutting edge distributes the cutting force and controls wear progress

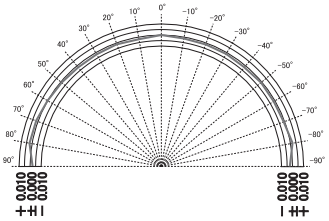
2SEB

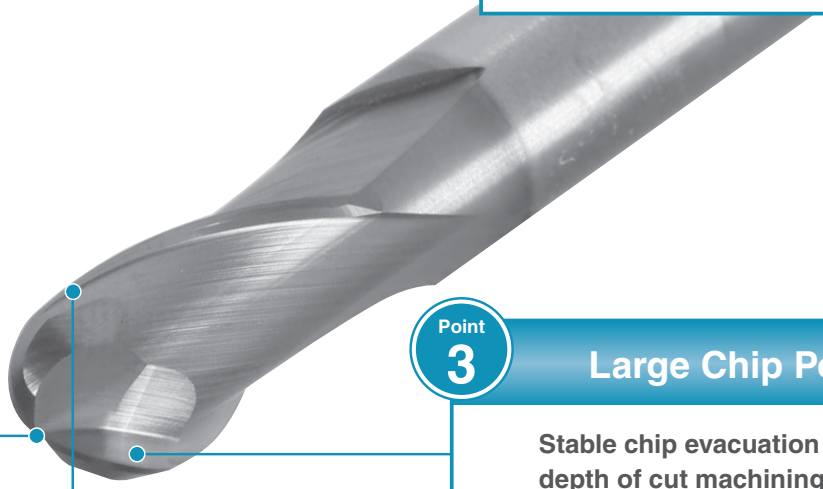


Conventional End Mill
(Internal evaluation)

Point 2 R0.005mm close tolerance edge diameter (ϕ16 excluded)

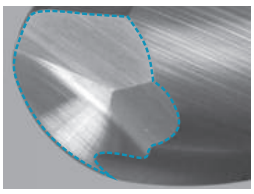
Excellent surface finish quality when using entire cutting edge in machining of the mold's draft angle or profiling



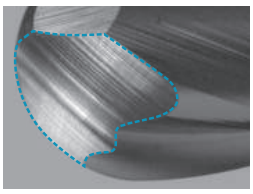


Point 3 Large Chip Pocket

Stable chip evacuation at large depth of cut machining

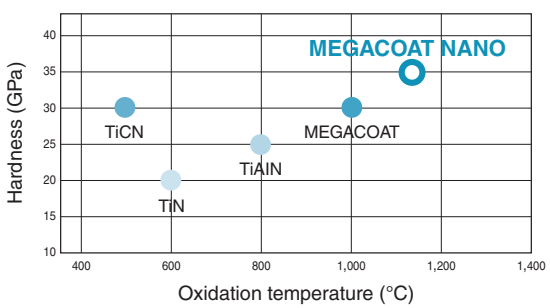


2SEB

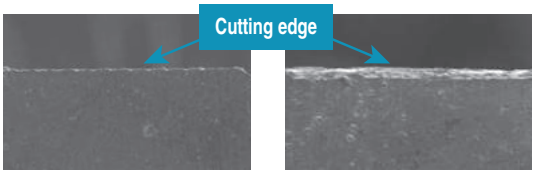


Conventional End Mill
(Internal evaluation)

Point 4 High quality cutting edge by MEGACOAT NANO



Smooth and sharp cutting edge with superior wear resistance and adhesion resistance



2SEB

Competitor A
(Internal evaluation)

Ball-nose End Mill (Copying)

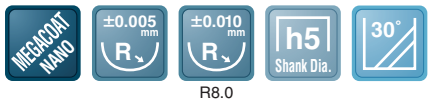
No. of Flutes: 2

2SEB NEW

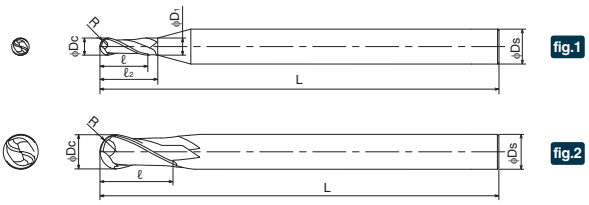
2

MEGACOAT NANO is applied

Workpiece Materials ★1st Choice



R8.0



2SEB (Ball-nose End Mill with 2 Flutes)

Copying

(Unit: mm)

Description	Std.	Radius of Ball Nose	Radius of Ball Nose Tolerance	Outside Dia.	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes
		R		φDc	ℓ	φD1	ℓ2	φDs	L	Z
2SEB020-050-R10 fig.1	●	1.0	±0.005	2.0	5	2.10	6.6	6	50	2
2SEB030-080-R15 fig.1	●	1.5	±0.005	3.0	8	3.15	9.8	6	70	2
2SEB040-080-R20 fig.1	●	2.0	±0.005	4.0	8	4.2	10.0	6	70	2
2SEB050-100-R25 fig.1	●	2.5	±0.005	5.0	10	5.2	12.4	6	80	2
2SEB060-120-R30 fig.2	●	3.0	±0.005	6.0	12	-	-	6	90	2
2SEB080-140-R40 fig.2	●	4.0	±0.005	8.0	14	-	-	8	100	2
2SEB100-180-R50 fig.2	●	5.0	±0.005	10.0	18	-	-	10	100	2
2SEB120-220-R60 fig.2	●	6.0	±0.005	12.0	22	-	-	12	110	2
2SEB160-300-R80 fig.2	●	8.0	±0.010	16.0	30	-	-	16	140	2

Solid End Mill Identification System (2SEB)

2 S E B 020 - 050 - R10

(1) (2) (3) (4) (5) (6) (7)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Outside Dia.	(6) Length of cut	(7) Radius of Ball Nose
2	S: High efficiency	E: 30-39°	B: Ball-nose	020 ↓ 2.0mm	050 ↓ 5.0mm	R10 ↓ R1.0mm

Recommended Cutting Conditions L66

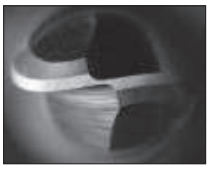
● : Std. Item

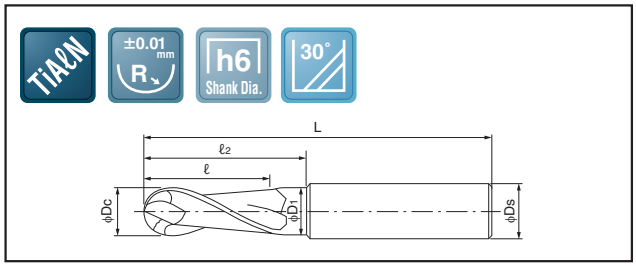
Ball-nose End Mill (Copying)

No. of Flutes: 2, 3

2UEBS (Ball-nose End Mill with 2 Flutes)

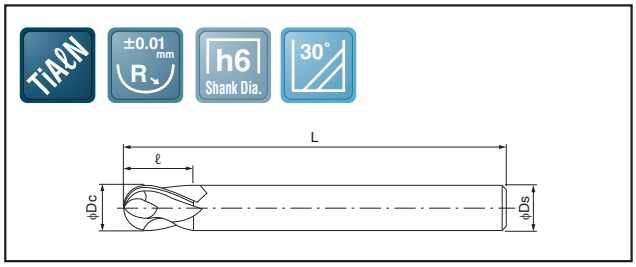
Workpiece Materials ★1st Choice





3UEBS (Ball-nose End Mill with 3 Flutes)

Workpiece Materials ★1st Choice



2UEBS (Ball-nose End Mill with 2 Flutes) Copying

(Unit: mm)

Description	Std.	*Radius of Ball Nose	Outside Dia.	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length
		R	ϕDc	ℓ	ϕD1	ℓ2	ϕDs	L
2UEBS010-030-04	●	R0.5	1	3	-	-	4	50
2UEBS020-030-04	●	R1	2	3	-	-	4	50
2UEBS030-095-06	●	R1.5	3	9.5	-	-	6	58
2UEBS040-120-06	●	R2	4	12	-	-	6	76
2UEBS050-140-06	●	R2.5	5	14	-	-	6	76
2UEBS060-160-06	●	R3	6	16	5.5	40	6	100
2UEBS080-200-08	●	R4	8	20	7.5	40	8	100
2UEBS100-220-10	●	R5	10	22	9.5	35	10	100
2UEBS120-250-12	●	R6	12	25	11.5	50	12	125
2UEBS160-320-16	●	R8	16	32	15.5	60	16	150
2UEBS200-380-20	●	R10	20	38	19.5	60	20	150

* Actual ball-nose radius will be half of actual measurement of outside diameter.

3UEBS (Ball-nose End Mill with 3 Flutes) Copying

(Unit: mm)

Description	Std.	*Radius of Ball Nose	Outside Dia.	Length of cut	Shank Dia.	Overall length
		R	ϕDc	ℓ	ϕDs	L
3UEBS030-070-06	●	R1.5	3	7	6	57
3UEBS040-080-06	●	R2	4	8	6	57
3UEBS050-100-06	●	R2.5	5	10	6	57
3UEBS060-100-06	●	R3	6	10	6	57
3UEBS080-160-08	●	R4	8	16	8	63
3UEBS100-190-10	●	R5	10	19	10	72
3UEBS120-220-12	●	R6	12	22	12	83

● Ball-nose end mill with three flutes for machining of difficult-to-cut materials.

Recommended Cutting Conditions L66

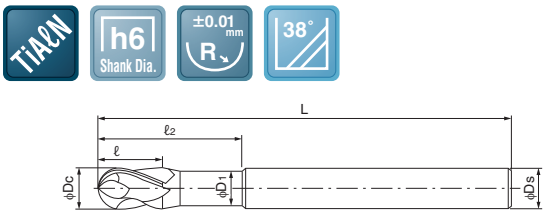
● : Std. Item

Ball-nose End Mill with 4 Flutes

No. of Flutes : 4

4YEBM

Workpiece Materials ★1st Choice



4YEBM (Ball-nose End Mill with 4 Flutes)

Shouldering Slotting

(Unit: mm)

Description	Std.	*Radius of Ball Nose	Outside Dia.	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length
		R	ϕDc	ℓ	ϕD1	ℓ2	ϕDs	L
4YEBM050-090-06	●	R2.5	5	9	4.5	15	6	57
4YEBM060-100-06	●	R3	6	10	5.5	15	6	57
4YEBM080-120-08	●	R4	8	12	7.4	20	8	63
4YEBM100-140-10	●	R5	10	14	9.2	25	10	72
4YEBM120-160-12	●	R6	12	16	11	30	12	83
4YEBM160-220-16	●	R8	16	22	15	38	16	92
4YEBM200-260-20	●	R10	20	26	19	50	20	104

No. of Flutes Z=4

* Actual ball-nose radius will be half of actual measurement of outside diameter.

● Ball-nose end mill for semi-finishing of difficult-to-cut materials.

Recommended Cutting Conditions L67

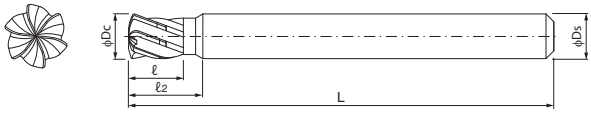
● : Std. Item

Special corner-R shaped, 6 flutes, High feed rate

No. of Flutes : 6

6PDRS

Workpiece Materials ★1st Choice

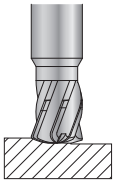


6PDRS

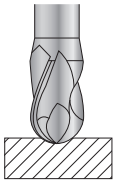
(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
6PDRS060-045-06	●	6	-0.020 -0.038	4.5	9	6	57	6
6PDRS080-060-08	●	8	-0.025 -0.047	6	12	8	63	6
6PDRS100-075-10	●	10	-0.025 -0.047	7.5	15	10	72	6
6PDRS120-090-12	●	12	-0.032 -0.059	9	18	12	83	6

- Increased rigidity with large core diameter.
  6 flutes design enables high feed rate machining.
  Achieves large cutting allowance and high efficiency machining with special corner-R shaped.
  Ramping and arc cutting are possible.

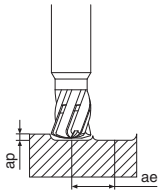


PDR



General Purpose Ball-nose End Mill

Recommended Cutting Conditions



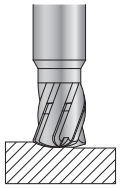
Copying

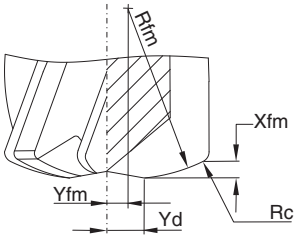
Workpiece Material		Depth of Cut (ap×ae) (mm)	Outside Dia.Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12
Pre-hardened steel	52HRC	ϕ6 : 0.32×3.3mm (0.32×0.55Dc) ϕ8 : 0.42×4.4mm (0.42×0.55Dc) ϕ10: 0.53×5.5mm (0.53×0.55Dc) ϕ12: 0.63×6.6mm (0.63×0.55Dc)	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200
			Feed Rate (mm/min)	7,600	7,200	6,900	7,600
Carbon Steel / Alloy Steel	< 45HRC		Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200
			Feed Rate (mm/min)	15,300	15,300	15,300	12,700

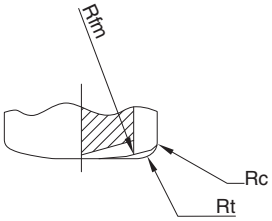
● : Std. Item

6PDRS Ramping / Arc cutting

Details of 6PDRS cutting edge shape







Xfm : Maximum Depth of Cut
Yfm : Distance between the center line of tool and the center of Rfm
Yd : Distance between the center line of tool and the start position of cutting edge
Rfm : Radius of tool tip
Rc : Corner-R
Rt : Virtual radius in program

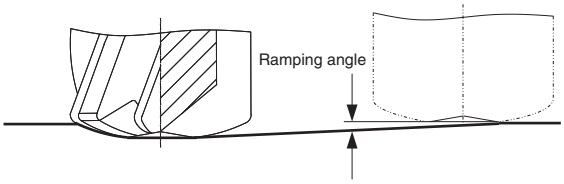
(Unit: mm)

Description	Outside Dia.	Maximum Depth of Cut	Radius of tool tip	Corner-R	Distance between the center line of tool and the center of Rfm	Distance between the center line of tool and the start position of cutting edge	Virtual radius in program
	ϕDc	Xfm	Rfm	Rc	Yfm	Yd	Rt
6PDRS060-045-06	6	0.32	6	0.62	0.75	1.32	0.62
6PDRS080-060-08	8	0.42	8	0.83	1.00	1.76	0.83
6PDRS100-075-10	10	0.53	10	1.04	1.25	2.20	1.04
6PDRS120-090-12	12	0.63	12	1.24	1.50	2.64	1.24

- Cutting with cut amount exceeding the Xfm value is not recommended.

Ramping

During ramping, lower the feed rate to the ratio in the chart on the right.

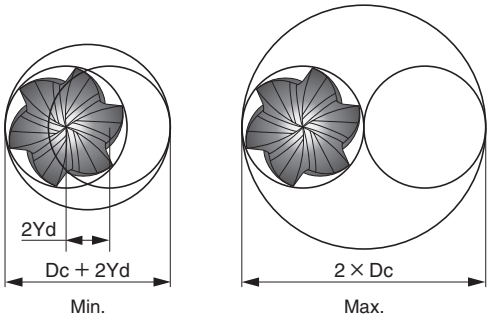


Ramping angle	1°	2°	3°	4°	5°
Ratio of feed rate	100%	70%	50%	30%	10%

- During pocket machining, set the ramping angle at 0.5°.
- Plunge milling is not recommended.

Arc cutting

For arc cutting, hole diameter of each machining should be within the range in the chart on the right.



(Unit: mm)

Description	Min.	Max.
6PDRS060-045-06	8.64	12.00
6PDRS080-060-08	11.52	16.00
6PDRS100-075-10	14.40	20.00
6PDRS120-090-12	17.28	24.00

4JER

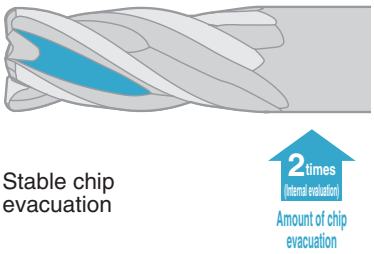
High Efficiency and Stable Machining for Superalloy such as Inconel®

Long Tool Life Machining with MEGACOAT HARD for Excellent Thermal Resistance

1 Resistant to Breakage

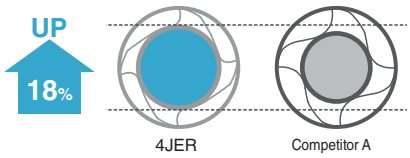
Stable Slotting and Trochoid Machining with Chip Pocket Grooves and Large Core Thickness

● Chip Pocket for Smooth Chip Evacuation During Slotting Applications



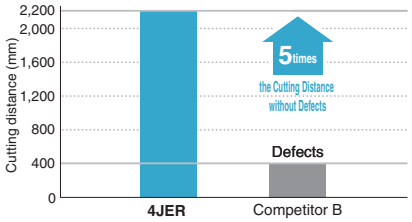
Stable chip evacuation

● Core Thickness Comparison



Decreases Tool Deflection and Achieves Excellent Machining Precision

● Slotting Performance Comparison (Internal evaluation)

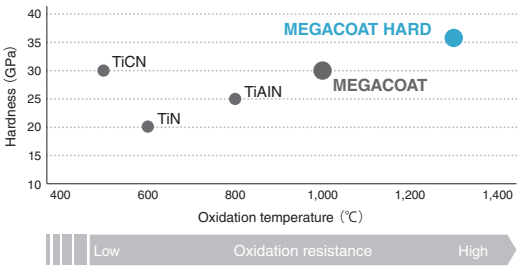


Cutting Conditions : n=1,200min^{-1}, Vf=140mm/min, ap=4mm
End Mill Dia. ϕ8mm, Slotting, Wet
Workpiece Material : Inconel®718 (40HRC)

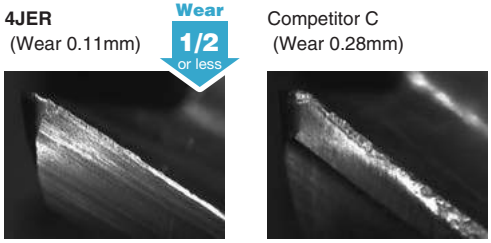
2 Achieves Long Tool Life and Stable Machining

The MEGACOAT HARD coating technology delivers the highest hardness and thermal resistance in Kyocera's PVD coating

● Properties of PVD Coating



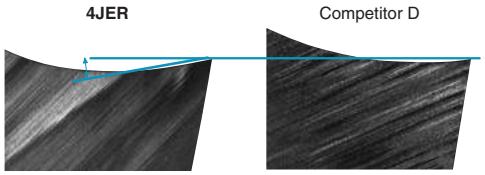
● Wear resistance comparison (Cutting distance 975mm)



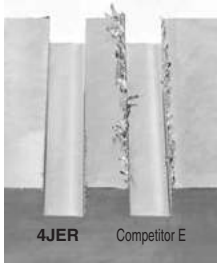
Cutting Conditions : n=1,200min^{-1}, Vf=140mm/min, ap=4mm
End Mill Dia. ϕ8mm, Slotting, Wet
Workpiece Material : Inconel®718 (40HRC)

3 Decreased burr

High Sharpness with a Large Rake Angle



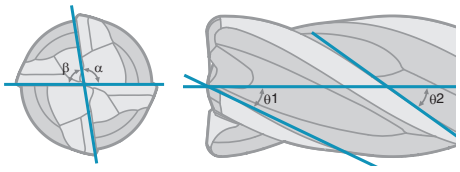
Burring During Slotting (Inconel®718)



Cutting Conditions : n=1,200min^{-1}, Vf=140mm/min, ap=4mm
End Mill Dia. ϕ8mm, Wet

4 Resistance to chattering

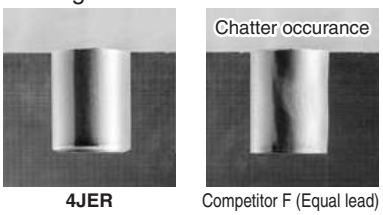
Improved Chatter Resistance with Varied interval flute and Variable Lead



α≠β
Varied interval flute design
Prevents periodical vibration during machining

θ1≠θ2
Variable Lead
Anti vibration effect
Prevents chattering, and superior surface finish.

Slotting Surface in Trochoidal Machining (Inconel®718)



Cutting Conditions : n=1,200min^{-1}, Vf=300mm/min, ap=20mm
End Mill Dia. ϕ16mm, Width 20mm, Wet

4JER NEW

No. of Flutes : 4

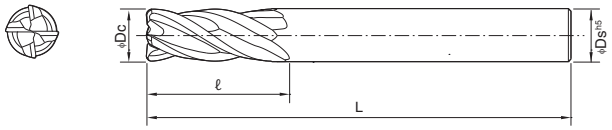
4

MEGACOAT HARD is applied

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel | S Titanium Alloy | S Heat-resistant Alloy ★

MEGACOAT HARD | Radius R | h5 Shank Dia. | 32° 35°



4JER (Short)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Corner Radius r	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4JER060-090-R03	●	6.0	0 -0.020	0.3	9	6	60	4
4JER060-090-R05	●			0.5				
4JER060-090-R10	●			1.0				
4JER080-120-R03	●	8.0	-0.005 -0.025	0.3	12	8	70	4
4JER080-120-R05	●			0.5				
4JER080-120-R10	●			1.0				
4JER080-120-R15	●			1.5				
4JER100-150-R03	●	10.0	-0.005 -0.025	0.3	15	10	80	4
4JER100-150-R05	●			0.5				
4JER100-150-R10	●			1.0				
4JER100-150-R15	●			1.5				
4JER100-150-R20	●			2.0				
4JER100-150-R30	●			3.0				
4JER120-180-R05	●	12.0	-0.010 -0.030	0.5	18	12	100	4
4JER120-180-R10	●			1.0				
4JER120-180-R15	●			1.5				
4JER120-180-R20	●			2.0				
4JER120-180-R30	●			3.0				
4JER160-240-R10	●	16.0	-0.010 -0.030	1.0	24	16	110	4
4JER160-240-R20	●			2.0				
4JER160-240-R30	●			3.0				
4JER200-300-R10	●	20.0	-0.010 -0.030	1.0	30	20	125	4
4JER200-300-R20	●			2.0				
4JER200-300-R30	●			3.0				

4JER (Medium)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Corner Radius r	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4JER060-150-R03	●	6.0	0 -0.020	0.3	15	6	60	4
4JER060-150-R05	●			0.5				
4JER060-150-R10	●			1.0				
4JER080-200-R03	●	8.0	-0.005 -0.025	0.3	20	8	70	4
4JER080-200-R05	●			0.5				
4JER080-200-R10	●			1.0				
4JER080-200-R15	●			1.5				
4JER100-250-R03	●	10.0	-0.005 -0.025	0.3	25	10	80	4
4JER100-250-R05	●			0.5				
4JER100-250-R10	●			1.0				
4JER100-250-R15	●			1.5				
4JER100-250-R20	●			2.0				
4JER100-250-R30	●			3.0				
4JER120-260-R05	●	12.0	-0.010 -0.030	0.5	26	12	100	4
4JER120-260-R10	●			1.0				
4JER120-260-R15	●			1.5				
4JER120-260-R20	●			2.0				
4JER120-260-R30	●			3.0				
4JER160-350-R10	●	16.0	-0.010 -0.030	1.0	35	16	110	4
4JER160-350-R20	●			2.0				
4JER160-350-R30	●			3.0				
4JER200-450-R10	●	20.0	-0.010 -0.030	1.0	45	20	125	4
4JER200-450-R20	●			2.0				
4JER200-450-R30	●			3.0				

Recommended Cutting Conditions ➔ L67

● : Std. Item

No. of Flutes : 4, 5, 6, 7, 8

4HFS, 5HFS, 6HFS, 7HFS, 8HFS

4 5 6 7 8

HFSM

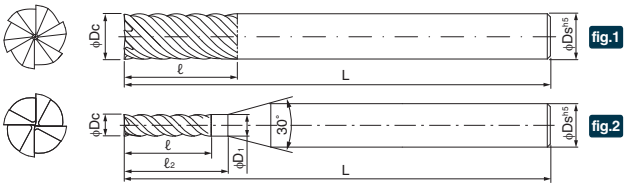
MEGACOAT HARD is applied

High Efficiency Machining

Workpiece Materials ★1st Choice

P ~30HRC	P 30~40HRC	H ~55HRC	H ~68HRC
★	★	★	★

MEGACOAT HARD | Land | h5 Shank Dia. | 45°

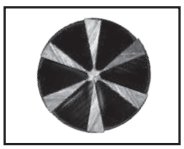


4HFSS, 5HFSS, 6HFSS, 7HFSS (Short)

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4HFSS010-040-06 fig.2	●	1	0 -0.015	4	1.05	4.8	6	60	4
4HFSS020-060-06 fig.2	●	2	0 -0.015	6	2.10	7.2	6	60	4
4HFSS030-080-06 fig.2	●	3	0 -0.015	8	3.15	9.6	6	60	4
4HFSS040-100-06 fig.2	●	4	0 -0.015	10	4.2	12.0	6	60	4
4HFSS050-120-06 fig.2	●	5	0 -0.015	12	5.2	14.4	6	60	4
5HFSS040-100-06 fig.2	●	4	0 -0.015	10	4.2	12.0	6	60	5
6HFSS060-140-06 fig.1	●	6	0 -0.020	14	-	-	6	60	6
6HFSS080-180-08 fig.1	●	8	-0.005 -0.025	18	-	-	8	70	6
6HFSS100-220-10 fig.1	●	10	-0.005 -0.025	22	-	-	10	80	6
6HFSS120-260-12 fig.1	●	12	-0.010 -0.030	26	-	-	12	90	6
7HFSS060-140-06 fig.1	●	6	0 -0.020	14	-	-	6	60	7
7HFSS080-180-08 fig.1	●	8	-0.005 -0.025	18	-	-	8	70	7
7HFSS100-220-10 fig.1	●	10	-0.005 -0.025	22	-	-	10	80	7
7HFSS120-260-12 fig.1	●	12	-0.010 -0.030	26	-	-	12	90	7



Bottom surface of 6HFSS cutting edge

4HFSM, 5HFSM, 6HFSM, 7HFSM, 8HFSM (Medium)

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4HFSM010-050-06 fig.2	●	1	0 -0.015	5	1.05	6	6	60	4
4HFSM020-090-06 fig.2	●	2	0 -0.015	9	2.10	10.8	6	60	4
4HFSM030-120-06 fig.2	●	3	0 -0.015	12	3.15	14.4	6	60	4
4HFSM040-140-06 fig.2	●	4	0 -0.015	14	4.2	16.8	6	60	4
4HFSM050-170-06 fig.2	●	5	0 -0.015	17	5.2	20.4	6	60	4
5HFSM040-140-06 fig.2	●	4	0 -0.015	14	4.2	16.8	6	60	5
6HFSM060-170-06 fig.1	●	6	0 -0.020	17	-	-	6	60	6
6HFSM070-200-08 fig.2	●	7	-0.005 -0.025	20	7.2	24.0	8	70	6
6HFSM080-230-08 fig.1	●	8	-0.005 -0.025	23	-	-	8	70	6
6HFSM100-280-10 fig.1	●	10	-0.005 -0.025	28	-	-	10	80	6
6HFSM120-330-12 fig.1	●	12	-0.010 -0.030	33	-	-	12	90	6
6HFSM140-370-16 fig.2	●	14	-0.010 -0.030	37	14.2	44.4	16	105	6
6HFSM150-420-16 fig.2	●	15	-0.010 -0.030	42	15.2	50.4	16	105	6
6HFSM160-420-16 fig.1	●	16	-0.010 -0.030	42	-	-	16	105	6
6HFSM200-480-20 fig.1	●	20	-0.010 -0.030	48	-	-	20	110	6
7HFSM060-170-06 fig.1	●	6	0 -0.020	17	-	-	6	60	7
7HFSM080-230-08 fig.1	●	8	-0.005 -0.025	23	-	-	8	70	7
7HFSM100-280-10 fig.1	●	10	-0.005 -0.025	28	-	-	10	80	7
7HFSM120-330-12 fig.1	●	12	-0.010 -0.030	33	-	-	12	90	7
7HFSM160-420-16 fig.1	●	16	-0.010 -0.030	42	-	-	16	105	7
8HFSM250-530-25 fig.1	●	25	-0.010 -0.030	53	-	-	25	125	8

- PVD coating "MEGACOAT HARD" for hard materials is applied.
  Achieves high rigidity by ensuring a large core diameter, longer tool life and stable machining.
  Also increases cutting edge strength and chip evacuation with a negative rake angle.

Recommended Cutting Conditions ➔ L68

● : Std. Item

No. of Flutes : 4, 6

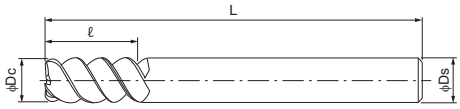
4UGSM, 6UGSM

4 6

Workpiece Materials ★1st Choice

H ~55HRC ★ H ~68HRC

TiAlN h6 Shank Dia. 50°



4UGSM

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
4UGSM030-080-06	●	3	-0.014 -0.028	8	6	50	4
4UGSM040-120-06	●	4	-0.020 -0.038	12	6	57	4
4UGSM050-130-06	●	5	-0.020 -0.038	13	6	57	4

6UGSM

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
6UGSM060-150-06	●	6	-0.020 -0.038	15	6	60	6
6UGSM080-200-08	●	8	-0.025 -0.047	20	8	75	6
6UGSM100-250-10	●	10	-0.025 -0.047	25	10	80	6
6UGSM120-300-12	●	12	-0.032 -0.059	30	12	100	6
6UGSM160-400-16	●	16	-0.032 -0.059	40	16	110	6

● In order to achieve stable machining of hard materials, negative type rake angle is adopted.
Also, for attaining high efficiency, we provide six flutes type for dia. larger than 6mm.

L
Solid End Mill

Recommended Cutting Conditions L68

● : Std. Item

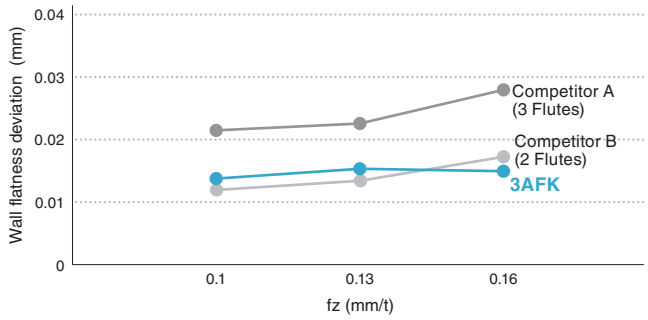
3AFK

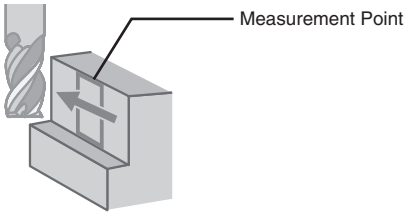
High Efficiency with 3 Flutes. Excellent Precision Machining
Stable Machining due to sharp edge for Anti-chattering Performance.
Wide Range of Applications Including Slotting, Shouldering, Ramping, and Plunge milling

1 High-efficiency and High-precision Machining

High Efficiency with 3 Flutes. Excellent Machining Precision

Comparison of wall flatness (Internal evaluation)





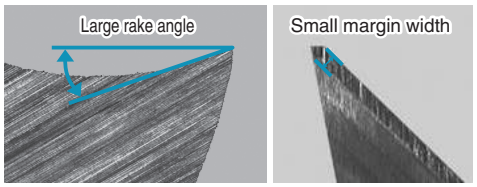
Cutting Conditions : n=11,700min^{-1}, Vf=3,500-5,600mm/min, ap×ae=15×1mm
End Mill Dia. ϕ10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A5052

2 Decreased burr

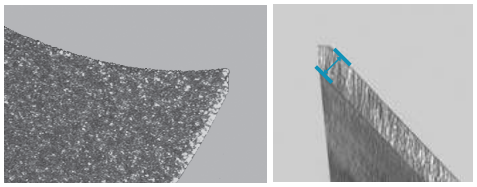
Excellent Sharpness with Large Rake Angle and small margin width

Comparison of the Rake Angle and Margin Width

3AFK



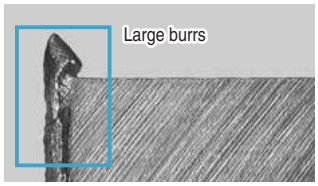
Competitor C



Burr Comparison after Machining
(Internal evaluation)

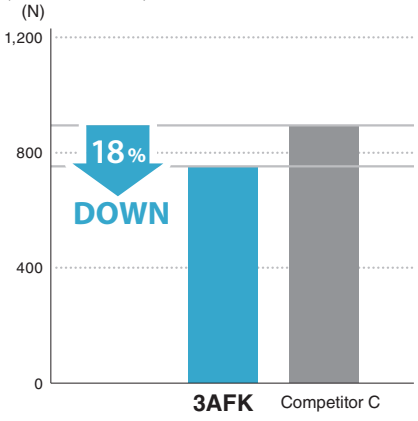
3AFK

Competitor C



Burr Comparison after Machining Cutting Conditions : n=11,700min^{-1}, Vf=4,600mm/min, ap×ae=10×1mm
End Mill Dia. ϕ10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A7075

Cutting Force Comparison
(Internal evaluation)

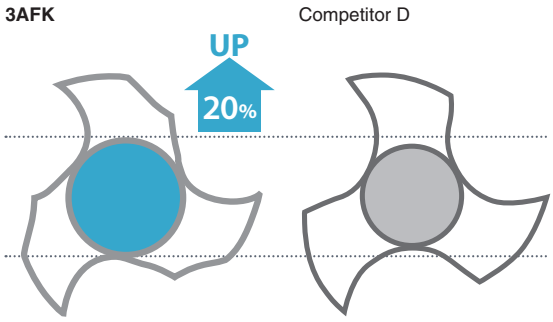


Cutting Conditions : n=11,700min^{-1}, Vf=3,400mm/min
ap×ae=10×10mm
End Mill Dia. ϕ10, Slotting, Wet, BT50
Workpiece Material : A5052

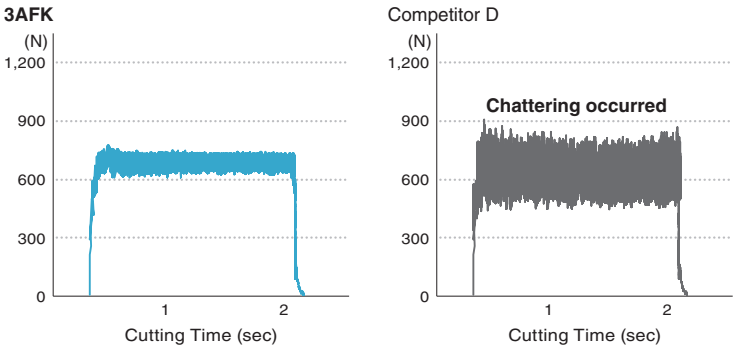
3 Resistance to chattering

Larger Core Thickeness to Reduce Chattering

Core Thickness Comparison

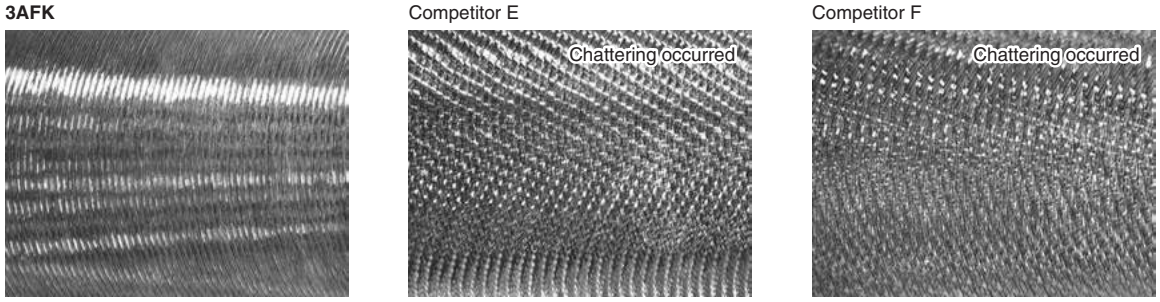


Cutting Force Comparison (Internal evaluation)



Cutting Conditions : n=11,700min^{-1}, Vf=3,400mm/min, ap×ae=10×10mm, End Mill Dia. ϕ10, Slotting, Wet, BT50 Workpiece Material : A5052

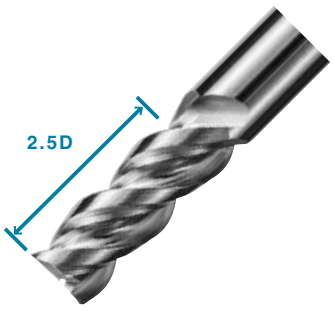
Comparison of Bottom Surface at Slotting (Internal evaluation)



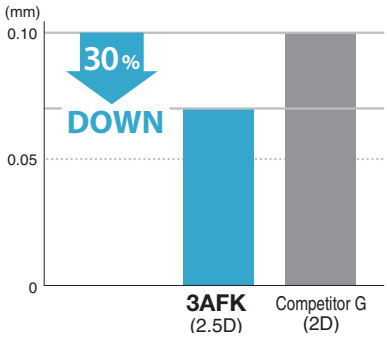
Cutting Conditions : n=11,100min^{-1}, Vf=2,600mm/min, ap=10mm, Wet Workpiece Material : A5052

4 Flute Length 2.5 D (medium type) Added to the Lineup

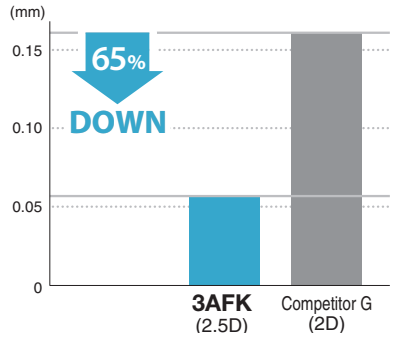
Stable Machining even while Deep Slotting



Comparison of wall flatness
(Internal evaluation)



Burr Height Comparison
(Internal evaluation)



Cutting Conditions : n=11,100min^{-1}, Vf=3,800mm/min, ap×ae=20×1mm
End Mill Dia. ϕ10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A7075

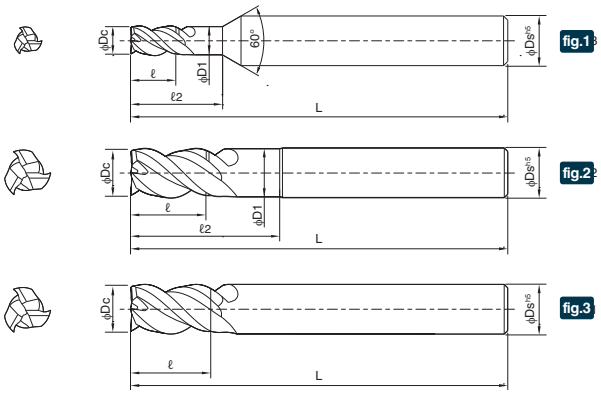
No. of Flutes : 3

3AFK NEW

Workpiece Materials ★1st Choice

N Aluminum & Non Ferrous Material

Uncoated | Land | h5 Shank Dia. | 45°



3AFK (Short : 1.5D)

Shouldering | Slotting | Plunge milling

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Neck Dia. ϕD1	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
3AFK030-045-090 fig.1	●	3.0	0 -0.015	4.5	2.7	9	6	70	3
3AFK040-060-120 fig.1	●	4.0	0 -0.015	6	3.7	12	6	70	3
3AFK050-075-150 fig.1	●	5.0	0 -0.015	7.5	4.7	15	6	70	3
3AFK060-090 fig.3	●	6.0	0 -0.005	9	-	-	6	70	3
3AFK060-090-180 fig.2	●	6.0	0 -0.005	9	5.7	18	6	70	3
3AFK070-105-210 fig.1	●	7.0	0 -0.015	10.5	6.7	21	8	80	3
3AFK080-120 fig.3	●	8.0	0 -0.006	12	-	-	8	80	3
3AFK080-120-240 fig.2	●	8.0	0 -0.006	12	7.7	24	8	80	3
3AFK090-135-270 fig.1	●	9.0	0 -0.015	13.5	8.7	27	10	90	3
3AFK100-150 fig.3	●	10.0	0 -0.006	15	-	-	10	90	3
3AFK100-150-300 fig.2	●	10.0	0 -0.006	15	9.7	30	10	90	3
3AFK110-165-330 fig.1	●	11.0	0 -0.015	16.5	10.7	33	12	110	3
3AFK120-180 fig.3	●	12.0	0 -0.008	18	-	-	12	110	3
3AFK120-180-360 fig.2	●	12.0	0 -0.008	18	11.7	36	12	110	3
3AFK160-240 fig.3	●	16.0	0 -0.008	24	-	-	16	120	3
3AFK160-240-480 fig.2	●	16.0	0 -0.008	24	15.7	48	16	120	3

Recommended Cutting Conditions L68

● : Std. Item

3AFK (Medium :2.5D)

Shouldering | Slotting | Plunge milling

(Unit: mm)

Description	Std.	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes
		ϕDc		ℓ	ϕD1	ℓ2	ϕDs	L	Z
3AFK030-075-150 fig.1	●	3.0	0 -0.015	7.5	2.7	15	6	70	3
3AFK040-100-200 fig.1	●	4.0	0 -0.015	10	3.7	20	6	70	3
3AFK050-125-250 fig.1	●	5.0	0 -0.015	12.5	4.7	25	6	70	3
3AFK060-150 fig.3	●	6.0	0 -0.005	15	-	-	6	70	3
3AFK060-150-300 fig.2	●	6.0	0 -0.005	15	5.7	30	6	70	3
3AFK070-175-350 fig.1	●	7.0	0 -0.015	17.5	6.7	35	8	80	3
3AFK080-200 fig.3	●	8.0	0 -0.006	20	-	-	8	80	3
3AFK080-200-400 fig.2	●	8.0	0 -0.006	20	7.7	40	8	80	3
3AFK090-225-450 fig.1	●	9.0	0 -0.015	22.5	8.7	45	10	90	3
3AFK100-250 fig.3	●	10.0	0 -0.006	25	-	-	10	90	3
3AFK100-250-500 fig.2	●	10.0	0 -0.006	25	9.7	50	10	90	3
3AFK110-275-550 fig.1	●	11.0	0 -0.015	27.5	10.7	55	12	110	3
3AFK120-300 fig.3	●	12.0	0 -0.008	30	-	-	12	110	3
3AFK120-300-600 fig.2	●	12.0	0 -0.008	30	11.7	60	12	110	3
3AFK160-400 fig.3	●	16.0	0 -0.008	40	-	-	16	120	3
3AFK160-400-800 fig.2	●	16.0	0 -0.008	40	15.7	80	16	120	3

Recommended Cutting Conditions L69

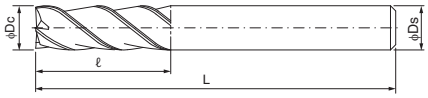
● : Std. Item

Aluminum & Non-ferrous Metals, Varied interval flute design with wiper edge

No. of Flutes : 3

3NESM

Workpiece Materials ★1st Choice



3NESM

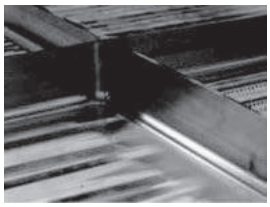
Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia.	Mill Dia. tolerance	Length of cut	Shank Dia.	Overall length	No. of Flutes
		ϕDc		ℓ	ϕDs	L	Z
3NESM030-120-06	●	3	-0.014 -0.028	12	6	50	3
3NESM040-120-06	●	4	-0.020 -0.038	12	6	50	3
3NESM050-140-06	●	5	-0.020 -0.038	14	6	50	3
3NESM060-160-06	●	6	0 -0.008	16	6	50	3
3NESM080-200-08	●	8	0 -0.009	20	8	63	3
3NESM100-220-10	●	10	0 -0.009	22	10	76	3
3NESM120-250-12	●	12	0 -0.011	25	12	76	3
3NESM160-320-16	●	16	0 -0.011	32	16	89	3
3NESM200-380-20	●	20	0 -0.013	38	20	104	3

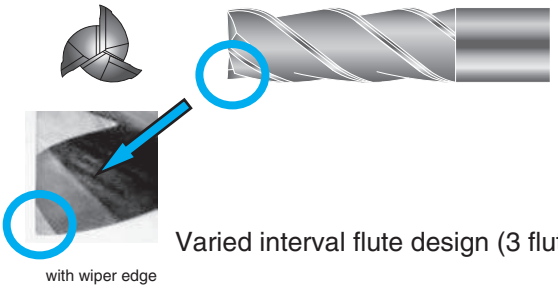
* Cutting edge of over 6mm ϕDc has margin.

- A wiper is attached at the lower edge for improving the bottom surface finish.
  Chattering is controlled with cutting edge slots at varied intervals, and finishing of lateral surfaces is improved.



Finished surface of aluminum alloy at high speed machining.

Reached 0.25μmRa
(Bottom face /side face /corner)



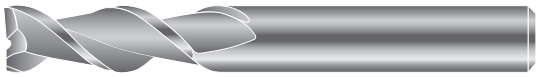
Varied interval flute design (3 flutes)
with wiper edge

Recommended Cutting Conditions ➔ L69

● : Std. Item

No. of Flutes: 2, 3

2NFSM, 3NFSM, 3NFSL

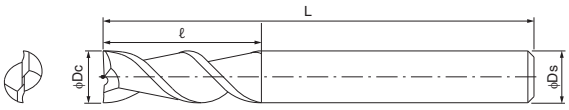


2 3

Workpiece Materials ★1st Choice

N Aluminum & Non Ferrous Material

Uncoated | Sharp | h6 Shank Dia. | 45°



2NFSM (Medium)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2NFSM010-040-04	●	1	-0.014 -0.028	4	4	38	2
2NFSM015-060-04	●	1.5	-0.014 -0.028	6	4	38	2
2NFSM020-080-04	●	2	-0.014 -0.028	8	4	38	2
2NFSM025-080-04	●	2.5	-0.014 -0.028	8	4	38	2
2NFSM030-080-06	●	3	-0.014 -0.028	8	6	50	2
2NFSM040-080-06	●	4	-0.020 -0.038	8	6	50	2
2NFSM050-140-06	●	5	-0.020 -0.038	14	6	50	2
2NFSM060-160-06	●	6	0 -0.008	16	6	50	2
2NFSM080-200-08	●	8	0 -0.009	20	8	63	2
2NFSM100-220-10	●	10	0 -0.009	22	10	76	2
2NFSM120-250-12	●	12	0 -0.011	25	12	76	2
2NFSM160-320-16	●	16	0 -0.011	32	16	89	2
2NFSM200-380-20	●	20	0 -0.013	38	20	104	2

* Cutting edge of over 6mm ϕDc has margin.

3NFSM (Medium)

Shouldering Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
3NFSM030-120-06	●	3	-0.014 -0.028	12	6	50	3
3NFSM040-120-06	●	4	-0.020 -0.038	12	6	50	3
3NFSM050-140-06	●	5	-0.020 -0.038	14	6	50	3
3NFSM060-160-06	●	6	0 -0.008	16	6	50	3
3NFSM080-200-08	●	8	0 -0.009	20	8	63	3
3NFSM100-220-10	●	10	0 -0.009	22	10	76	3
3NFSM120-250-12	●	12	0 -0.011	25	12	76	3
3NFSM160-320-16	●	16	0 -0.011	32	16	89	3
3NFSM200-380-20	●	20	0 -0.013	38	20	104	3

* Cutting edge of over 6mm ϕDc has margin.

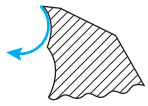
3NFSL (Long)

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
3NFSL030-190-06	●	3	-0.014 -0.028	19	6	63	3
3NFSL040-190-06	●	4	-0.020 -0.038	19	6	63	3
3NFSL050-200-06	●	5	-0.020 -0.038	20	6	63	3
3NFSL060-280-06	●	6	0 -0.008	28	6	76	3
3NFSL080-300-08	●	8	0 -0.009	30	8	76	3
3NFSL100-340-10	●	10	0 -0.009	34	10	89	3
3NFSL120-450-12	●	12	0 -0.011	45	12	100	3
3NFSL160-560-16	●	16	0 -0.011	56	16	125	3
3NFSL200-600-20	●	20	0 -0.013	60	20	125	3

* Cutting edge of over 6mm ϕDc has margin.

NFSM type NFSL type rake angle	A convex shape in the slot improves chip evacuation. 

● Sharpness oriented for aluminum machining.
Good chip evacuation from the 45° helix angle.

Recommended Cutting Conditions ➔ L69~L70

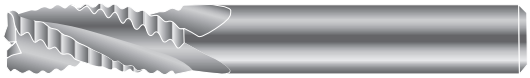
● : Std. Item

No. of Flutes : 3

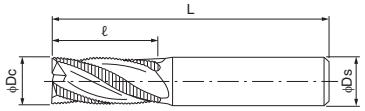
3AESM, 3AESL

Workpiece Materials ★1st Choice

N Aluminum & Non Ferrous Material



Uncoated | Cutting edge shape | C | h6 Shank Dia. | 30°



3

3AESM (Medium)

Shouldering | Slotting

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners C	No. of Flutes Z
3AESM060-130-06	●	6	-0.030 -0.105	13	6	57	0.6	3
3AESM080-160-08	●	8	-0.040 -0.130	16	8	63	0.6	3
3AESM100-220-10	●	10	-0.040 -0.130	22	10	72	0.6	3
3AESM120-260-12	●	12	-0.050 -0.160	26	12	83	1	3
3AESM160-320-16	●	16	-0.050 -0.160	32	16	92	1	3
3AESM200-380-20	●	20	-0.065 -0.195	38	20	104	1	3
3AESM250-450-25	●	25	-0.065 -0.195	45	25	121	1	3

3AESL (Long)

Shouldering

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Length of cut ℓ	Shank Dia. ϕDs	Overall length L	Spec of Corners C	No. of Flutes Z
3AESL060-240-06	●	6	-0.030 -0.105	24	6	76	0.6	3
3AESL080-280-08	●	8	-0.040 -0.130	28	8	76	0.6	3
3AESL100-340-10	●	10	-0.040 -0.130	34	10	89	0.6	3
3AESL120-450-12	●	12	-0.050 -0.160	45	12	100	1	3
3AESL160-560-16	●	16	-0.050 -0.160	56	16	125	1	3
3AESL200-600-20	●	20	-0.065 -0.195	60	20	125	1	3
3AESL250-800-25	●	25	-0.065 -0.195	80	25	150	1	3

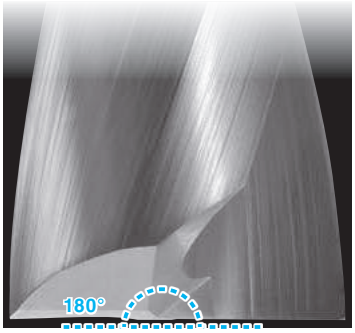
- Three flutes type for roughing of aluminum.
  With corner chamfering.

Recommended Cutting Conditions ➔ L70

● : Std. Item

2ZDK

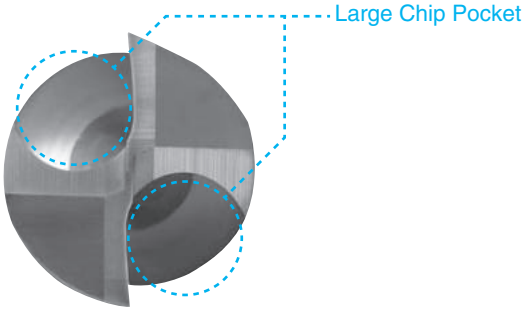
**Edge ends have 180° flat and are applicable to various applications.
Available for high-precision counterboring.
Optimum tool for improvement and cost reduction of difficult machining processes.**



Flat Bottom

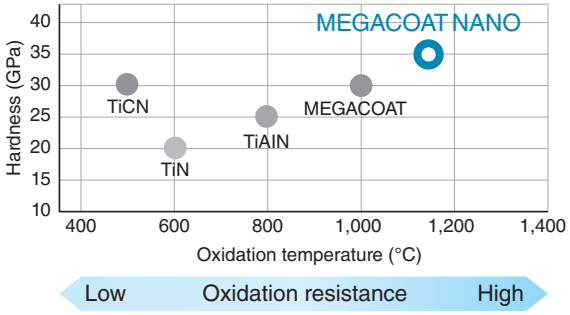
Smooth Chip Evacuation

・Combination of smooth chip control and high rigidity due to the special flute design



Long Tool Life with "MEGACOAT NANO"

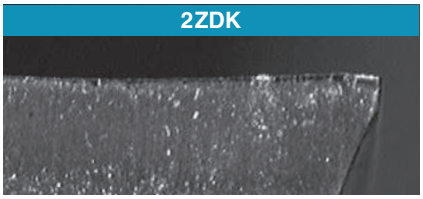
・The special Multilayer Nano Coating prevents wear and chipping with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150 °C)

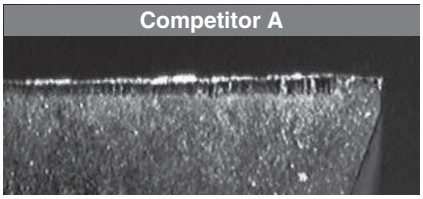


Tool Life Comparison (S45C, 200 holes) (Internal evaluation)

Stable Machining with Minimum Wear

● **Wear Comparison of Bottom Edge**



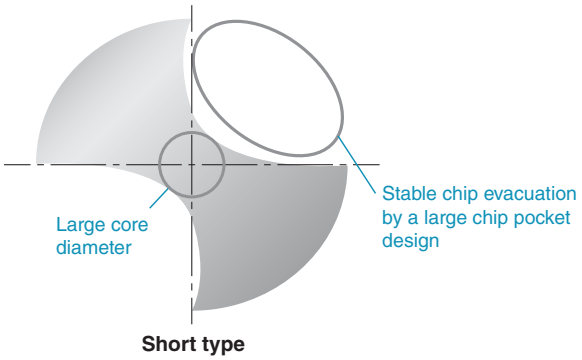


Cutting Conditions:
n=3,000min^{-1}
Vf=420mm/min
Drilling Depth=12mm (1.5D)
Wet

NEW Short type is now available

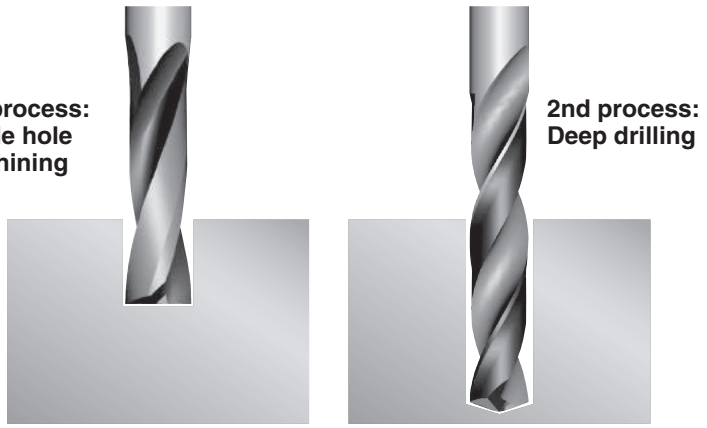
Short type is highly rigid due to large core diameter

Suitable for shallow drilling under 1.5D



Short type

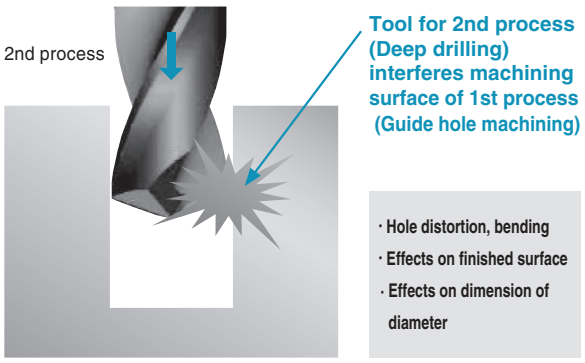
Convenient plus tolerance is available for ϕ6 type (2ZDK060S-P)



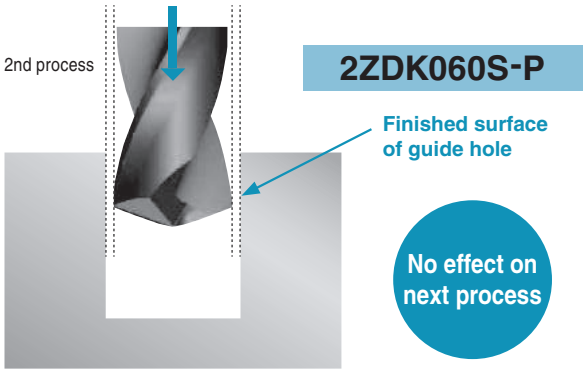
◎Usage example of plus tolerance for ϕ6 type

Suitable situation

1st process: Tool for guide hole machining: Minus tolerance
2nd process: Tool for deep drilling : Minus tolerance

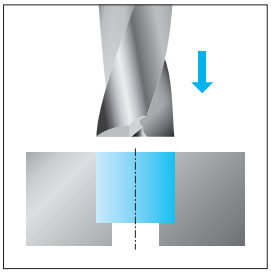


1st process: Tool for guide hole machining: Plus tolerance
2nd process: Tool for deep drilling: Minus tolerance

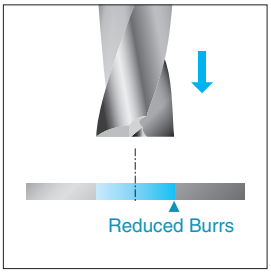


● Applications

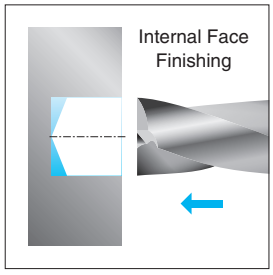
Hole Counterboring



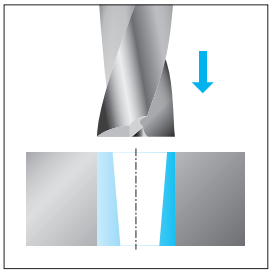
Plunge milling on Thin Plate



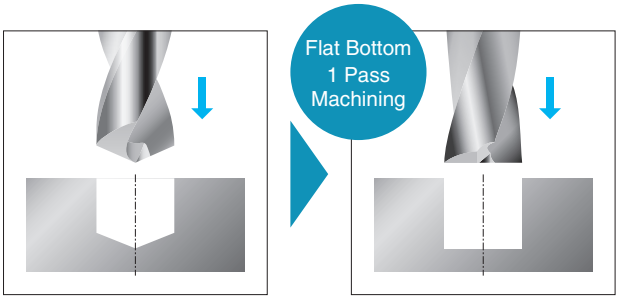
Turning in Automatic Lathes / Turning



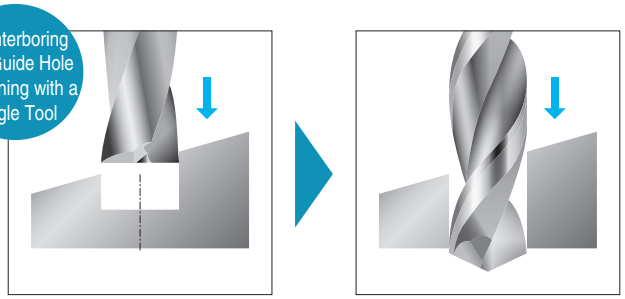
Hole Expanding



Bottom Finishing after Drilling



Counterboring on Slant Surface / Guide Hole Machining



2ZDK

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | K Cast Iron ★ | N Aluminum & Non Ferrous Material ★

2

MEGACOAT NANO is applied

MEGACOAT NANO | h5 Shank Dia.

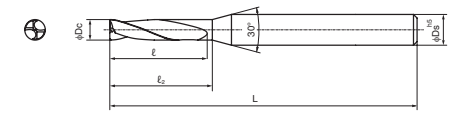


fig.1

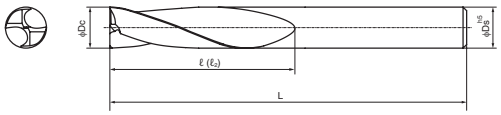


fig.2

2ZDK

Plunge milling

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Flute Length ℓ	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2ZDK030 fig.1	●	3.0	0 -0.010	14	15	6	60	2
2ZDK033 fig.1	●	3.3	0 -0.012	15	16			
2ZDK035 fig.1	●	3.5		17	18			
2ZDK040 fig.1	●	4.0		19	20			
2ZDK042 fig.1	●	4.2		20	21			
2ZDK045 fig.1	●	4.5		21	22			
2ZDK050 fig.1	●	5.0		23	24			
2ZDK053 fig.1	●	5.3		24	25			
2ZDK055 fig.1	●	5.5		25	26			
2ZDK056 fig.1	●	5.6		26	27			
2ZDK060 fig.2	●	6.0		28	(28)			
2ZDK065 fig.1	●	6.5	0 -0.015	30	31	8	70	
2ZDK068 fig.1	●	6.8		31	32			

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Flute Length ℓ	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2ZDK070 fig.1	●	7.0	0 -0.015	32	33	8	70	2
2ZDK075 fig.1	●	7.5		34	35			
2ZDK080 fig.2	●	8.0		36	(36)			
2ZDK085 fig.1	●	8.5	0 -0.015	38	39	10	80	
2ZDK088 fig.1	●	8.8		39	40			
2ZDK090 fig.1	●	9.0		40	41			
2ZDK095 fig.1	●	9.5		42	43			
2ZDK100 fig.2	●	10.0		45	(45)			
2ZDK103 fig.1	●	10.3	0 -0.018	46	47	12	100	
2ZDK105 fig.1	●	10.5		47	48			
2ZDK110 fig.1	●	11.0		51	52			
2ZDK115 fig.1	●	11.5		53	54			
2ZDK120 fig.2	●	12.0		54	(54)			

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

- Helix Angle is 20°
- The drilling depth should be less than 2D(2×Dc).

Recommended Cutting Conditions L71

● : Std. Item

No. of Flutes: 2

2ZDK (Short type)

Workpiece Materials ★1st Choice

P ~30HRC ★ | P 30~40HRC ★ | K Cast Iron ★ | N Aluminum & Non Ferrous Material ★

2

MEGACOAT NANO is applied

MEGACOAT NANO | h5 Shank Dia. (~ϕ12) | h6 Shank Dia. (ϕ12.5~)

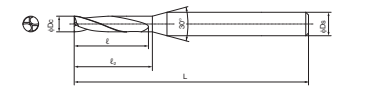


fig.1

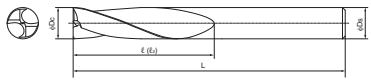


fig.2

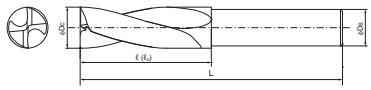


fig.3

Plunge milling

2ZDK (Short type)

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Flute Length ℓ	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2ZDK010S fig.1	●	1.0	0 -0.010	3	4	4	50	2
2ZDK011S fig.1	MTO	1.1		3.5	4.5			
2ZDK012S fig.1	MTO	1.2						
2ZDK013S fig.1	MTO	1.3		4	5			
2ZDK014S fig.1	MTO	1.4		4.5	5.5			
2ZDK015S fig.1	●	1.5		5	6			
2ZDK016S fig.1	●	1.6						
2ZDK017S fig.1	MTO	1.7		5.5	6.5			
2ZDK018S fig.1	MTO	1.8		6	7			
2ZDK019S fig.1	MTO	1.9						
2ZDK020S fig.1	●	2.0						
2ZDK021S fig.1	MTO	2.1		7	8			
2ZDK022S fig.1	MTO	2.2						
2ZDK023S fig.1	MTO	2.3						
2ZDK024S fig.1	●	2.4		8	9			
2ZDK025S fig.1	●	2.5						
2ZDK026S fig.1	●	2.6						
2ZDK027S fig.1	●	2.7		9	10			
2ZDK028S fig.1	MTO	2.8						
2ZDK029S fig.1	●	2.9						
2ZDK030S fig.1	●	3.0				6	60	
2ZDK031S fig.1	●	3.1	0 -0.012	10	11			
2ZDK032S fig.1	MTO	3.2						
2ZDK033S fig.1	●	3.3						
2ZDK034S fig.1	●	3.4		11	12			
2ZDK035S fig.1	●	3.5						
2ZDK036S fig.1	MTO	3.6						
2ZDK037S fig.1	●	3.7		12	13			
2ZDK038S fig.1	MTO	3.8						
2ZDK039S fig.1	MTO	3.9						
2ZDK040S fig.1	●	4.0						
2ZDK041S fig.1	●	4.1		13	14			

(Unit: mm)

Description	Std.	Outside Dia. ϕDc	Mill Dia. tolerance	Flute Length ℓ	Under Neck Length ℓ2	Shank Dia. ϕDs	Overall length L	No. of Flutes Z
2ZDK042S fig.1	●	4.2	0 -0.012	13	14	6	60	2
2ZDK043S fig.1	●	4.3						
2ZDK044S fig.1	MTO	4.4		14	15			
2ZDK045S fig.1	●	4.5						
2ZDK046S fig.1	MTO	4.6						
2ZDK047S fig.1	MTO	4.7		15	16			
2ZDK048S fig.1	●	4.8						
2ZDK049S fig.1	●	4.9						
2ZDK050S fig.1	●	5.0		16	17			
2ZDK051S fig.1	●	5.1						
2ZDK052S fig.1	●	5.2						
2ZDK053S fig.1	●	5.3		17	18			
2ZDK054S fig.1	MTO	5.4						
2ZDK055S fig.1	●	5.5						
2ZDK056S fig.1	●	5.6		18	19			
2ZDK057S fig.1	MTO	5.7						
2ZDK058S fig.1	●	5.8						
2ZDK059S fig.1	MTO	5.9						
2ZDK060S fig.2	●	6.0		19	(21)			
2ZDK060S-P fig.1	●	6.0	*+0.012 0	19	21	8	70	
2ZDK061S fig.1	●	6.1	0 -0.015	19	21	8	70	
2ZDK062S fig.1	●	6.2						
2ZDK063S fig.1	●	6.3		20	22			
2ZDK064S fig.1	●	6.4						
2ZDK065S fig.1	●	6.5						
2ZDK066S fig.1	●	6.6						
2ZDK067S fig.1	MTO	6.7		21	23			
2ZDK068S fig.1	●	6.8						
2ZDK069S fig.1	MTO	6.9						
2ZDK070S fig.1	●	7.0		22	24			
2ZDK071S fig.1	MTO	7.1						
2ZDK072S fig.1	MTO	7.2						

* Mill Dia. tolerance of 2ZDK60S-P is plus tolerance

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

· Helix Angle is 20°

· The drilling depth should be less than 1.5D(1.5×Dc).

Recommended Cutting Conditions ➡ L71

● : Std. Item

MTO : Made to order

2ZDK (Short type)

Plunge milling

(Unit: mm)

Description		Std.	Outside Dia.	Mill Dia. tolerance	Flute Length	Under Neck Length	Shank Dia.	Overall length	No. of Flutes
			ϕDc		ℓ	ℓ2	ϕDs	L	Z
2ZDK073S	fig.1	●	7.3	0 -0.015	23	25	8	70	2
2ZDK074S	fig.1	MTO	7.4						
2ZDK075S	fig.1	●	7.5						
2ZDK076S	fig.1	MTO	7.6		24				
2ZDK077S	fig.1	●	7.7						
2ZDK078S	fig.1	●	7.8						
2ZDK079S	fig.1	MTO	7.9						
2ZDK080S	fig.2	●	8.0		25	(27)			
2ZDK081S	fig.1	MTO	8.1			27	10	80	
2ZDK082S	fig.1	●	8.2						
2ZDK083S	fig.1	MTO	8.3		26	28			
2ZDK084S	fig.1	MTO	8.4						
2ZDK085S	fig.1	●	8.5						
2ZDK086S	fig.1	MTO	8.6		27	29			
2ZDK087S	fig.1	●	8.7						
2ZDK088S	fig.1	●	8.8						
2ZDK089S	fig.1	MTO	8.9		28	30			
2ZDK090S	fig.1	●	9.0						
2ZDK091S	fig.1	MTO	9.1						
2ZDK092S	fig.1	MTO	9.2		29	31			
2ZDK093S	fig.1	MTO	9.3						
2ZDK094S	fig.1	MTO	9.4						
2ZDK095S	fig.1	●	9.5						
2ZDK096S	fig.1	MTO	9.6		30	32			
2ZDK097S	fig.1	MTO	9.7						
2ZDK098S	fig.1	●	9.8						
2ZDK099S	fig.1	MTO	9.9		31	33			
2ZDK100S	fig.2	●	10.0			(33)			
2ZDK101S	fig.1	MTO	10.1	0 -0.018		33	12	100	
2ZDK102S	fig.1	MTO	10.2		32	34			
2ZDK103S	fig.1	●	10.3						
2ZDK104S	fig.1	MTO	10.4						

(Unit: mm)

Description		Std.	Outside Dia.	Mill Dia. tolerance	Flute Length	Under Neck Length	Shank Dia.	Overall length	No. of Flutes
			ϕDc		ℓ	ℓ2	ϕDs	L	Z
2ZDK105S	fig.1	●	10.5	0 -0.018	33	35	12	100	2
2ZDK106S	fig.1	MTO	10.6						
2ZDK107S	fig.1	MTO	10.7						
2ZDK108S	fig.1	MTO	10.8						
2ZDK109S	fig.1	MTO	10.9		34	36			
2ZDK110S	fig.1	●	11.0						
2ZDK111S	fig.1	MTO	11.1						
2ZDK112S	fig.1	MTO	11.2		35	37			
2ZDK113S	fig.1	MTO	11.3						
2ZDK114S	fig.1	MTO	11.4						
2ZDK115S	fig.1	●	11.5		36	38			
2ZDK116S	fig.1	MTO	11.6						
2ZDK117S	fig.1	MTO	11.7						
2ZDK118S	fig.1	MTO	11.8						
2ZDK119S	fig.1	MTO	11.9						
2ZDK120S	fig.2	●	12.0		37	(39)			
2ZDK125S	fig.3	●	12.5		41	41			
2ZDK130S	fig.3	●	13.0		43	43			
2ZDK135S	fig.3	●	13.5		44	44			
2ZDK140S	fig.3	●	14.0		45	45			
2ZDK145S	fig.3	●	14.5		47	47		115	
2ZDK150S	fig.3	●	15.0		48	48			
2ZDK155S	fig.3	●	15.5		50	50			
2ZDK160S	fig.2	●	16.0		52	(52)	16		
2ZDK165S	fig.3	●	16.5		53	53			
2ZDK170S	fig.3	●	17.0		54	54			
2ZDK175S	fig.3	●	17.5		56	56			
2ZDK180S	fig.3	●	18.0		57	57			
2ZDK185S	fig.3	●	18.5	0 -0.021	59	59		125	
2ZDK190S	fig.3	●	19.0		60	60			
2ZDK195S	fig.3	●	19.5		62	62			
2ZDK200S	fig.2	●	20.0		63	(63)	20		

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

· Helix Angle is 20°

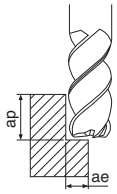
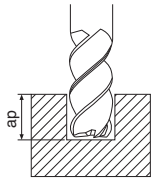
· The drilling depth should be less than 1.5D(1.5×Dc).

Recommended Cutting Conditions ➡ L71

● : Std. Item
MTO : Made to order

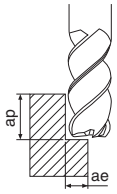
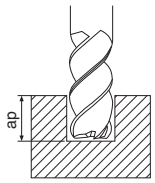
Recommended Cutting Conditions

2FESS

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ1	ϕ2	ϕ4	ϕ6	ϕ8	ϕ12	ϕ16
 Shouldering Depth of Cut (ap×ae) (mm) 1.2Dc×0.05Dc (Dc<ϕ3) 1.2Dc×0.1Dc (Dc≥ϕ3)  Slotting Depth of Cut (ap) (mm) 0.1Dc (Dc<ϕ1) 0.3Dc (ϕ1≤Dc<ϕ3) 0.5Dc (Dc≥ϕ3)	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	25,500	13,200	6,600	4,400	3,300	2,200	1,700
			Feed Rate (mm/min)	225	230	375	415	420	310	240
		Slotting	Spindle Revolution (min^{-1})	19,000	11,000	6,000	4,000	3,000	2,000	1,500
			Feed Rate (mm/min)	135	140	225	250	250	245	245
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	195	220	285	315	310	230	200
		Slotting	Spindle Revolution (min^{-1})	18,000	9,500	4,800	3,200	2,400	1,600	1,200
			Feed Rate (mm/min)	115	130	170	190	185	185	185
	Pre-hardened steel (30~45HRC)	Shouldering	Spindle Revolution (min^{-1})	17,000	8,800	4,400	3,000	2,200	1,500	1,100
			Feed Rate (mm/min)	55	80	100	105	105	110	110
		Slotting	Spindle Revolution (min^{-1})	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	35	50	60	63	63	65	65
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	95	95	110	115	115	115	115
		Slotting	Spindle Revolution (min^{-1})	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	60	60	65	70	70	70	70

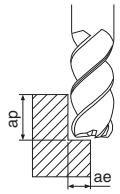
* Machining with water soluble coolant is recommended for stainless steel.

2FESM

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ0.5	ϕ1	ϕ2	ϕ4	ϕ6	ϕ8	ϕ12	ϕ16
 Shouldering Depth of Cut (ap×ae) (mm) 1.5Dc×0.05Dc (Dc<ϕ3) 1.5Dc×0.1Dc (Dc≥ϕ3)  Slotting Depth of Cut (ap) (mm) 0.1Dc (Dc<ϕ1) 0.3Dc (ϕ1≤Dc<ϕ3) 0.5Dc (Dc≥ϕ3)	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	32,000	25,500	13,200	6,600	4,400	3,300	2,200	1,700
			Feed Rate (mm/min)	210	225	230	375	415	420	310	240
		Slotting	Spindle Revolution (min^{-1})	29,000	19,000	11,000	6,000	4,000	3,000	2,000	1,500
			Feed Rate (mm/min)	130	135	140	225	250	250	245	245
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	180	195	220	285	315	310	230	200
		Slotting	Spindle Revolution (min^{-1})	27,000	18,000	9,500	4,800	3,200	2,400	1,600	1,200
			Feed Rate (mm/min)	105	115	130	170	190	185	185	185
	Pre-hardened steel (30~45HRC)	Shouldering	Spindle Revolution (min^{-1})	25,000	17,000	8,800	4,400	3,000	2,200	1,500	1,100
			Feed Rate (mm/min)	50	55	80	100	105	105	110	110
		Slotting	Spindle Revolution (min^{-1})	25,000	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	30	35	50	60	63	63	65	65
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	60	95	95	110	115	115	115	115
		Slotting	Spindle Revolution (min^{-1})	25,000	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	35	60	60	65	70	70	70	70

* Machining with water soluble coolant is recommended for stainless steel.

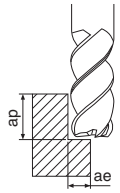
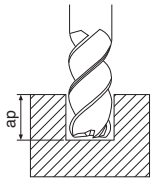
2FESL (Shouldering)

Applications	Workpiece Material	Outside Dia. Dc (mm)	ϕ1	ϕ2	ϕ4	ϕ6	ϕ8	ϕ12	ϕ16
 Shouldering	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	19,000	9,500	4,800	3,200	2,400	1,600	1,200
		Feed Rate (mm/min)	210	210	210	210	210	210	210
	Alloy Steel	Spindle Revolution (min^{-1})	14,300	7,200	3,600	2,400	2,000	1,300	1,000
		Feed Rate (mm/min)	155	160	160	160	170	170	150
	Pre-hardened steel (30~45HRC)	Spindle Revolution (min^{-1})	11,200	5,600	2,800	1,900	1,600	1,000	800
		Feed Rate (mm/min)	85	85	90	90	100	95	80
	Stainless Steel	Spindle Revolution (min^{-1})	14,300	7,200	3,600	2,400	2,000	1,300	1,000
Depth of Cut (ap×ae) (mm) 2.5Dc×0.05Dc (Dc<ϕ3) 2.5Dc×0.1Dc (Dc≥ϕ3)		Feed Rate (mm/min)	95	95	95	95	105	105	80

* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

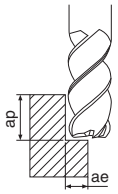
2FEKS, 2FEKM

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	9,300	7,000	4,600	3,600	2,900	2,400	2,000
			Feed Rate (mm/min)	450	450	470	430	400	360	320
		Slotting	Spindle Revolution (min^{-1})	7,500	6,000	4,400	3,300	2,700	2,300	1,900
			Feed Rate (mm/min)	240	260	340	340	340	340	320
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	8,800	6,600	4,400	3,300	2,600	2,200	1,800
			Feed Rate (mm/min)	370	370	440	400	360	330	290
		Slotting	Spindle Revolution (min^{-1})	7,200	5,400	3,600	2,700	2,200	1,800	1,500
Depth of Cut (ap×ae) (mm) 1.2Dc×0.1Dc			Feed Rate (mm/min)	270	270	270	270	270	270	270
 Slotting	Pre-hardened steel (30~45HRC)	Shouldering	Spindle Revolution (min^{-1})	6,400	4,800	3,200	2,400	1,900	1,600	1,200
			Feed Rate (mm/min)	130	130	130	140	140	140	140
		Slotting	Spindle Revolution (min^{-1})	5,300	4,000	2,600	2,000	1,600	1,300	1,000
			Feed Rate (mm/min)	120	120	120	120	120	120	120
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	8,000	6,000	4,000	3,000	2,400	2,000	1,500
			Feed Rate (mm/min)	140	140	140	140	140	140	140
		Slotting	Spindle Revolution (min^{-1})	5,300	4,000	2,600	2,000	1,600	1,300	1,000
Depth of Cut (ap) (mm) 0.5Dc			Feed Rate (mm/min)	80	90	100	100	100	90	90

* Machining with water soluble coolant is recommended for stainless steel.

Recommended Cutting Conditions

4FESM (Shouldering)

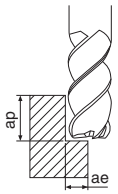
Applications	Workpiece Material	Outside Dia. Dc (mm)	ϕ1	ϕ2	ϕ4	ϕ6	ϕ8	ϕ12	ϕ16
 Shouldering	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	25,500	13,000	6,600	4,400	3,300	2,200	1,700
		Feed Rate (mm/min)	335	345	580	620	625	630	600
	Alloy Steel	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	290	290	395	455	455	470	460
	Pre-hardened steel (30~45HRC)	Spindle Revolution (min^{-1})	12,000	7,200	4,200	3,000	2,200	1,500	1,100
		Feed Rate (mm/min)	105	125	150	160	160	165	140
	Stainless Steel	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	130	145	165	165	170	175	155

Depth of Cut (ap×ae) (mm)
1.5Dc×0.05Dc (Dc<ϕ3) 1.5Dc×0.1Dc (Dc≥ϕ3)

* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

4FEKM (Tough corner edge, Shouldering)

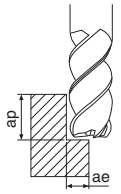
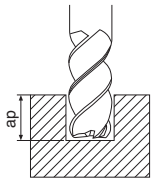
Applications	Workpiece Material	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16
 Shouldering	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	10,600	8,000	5,300	4,000	3,200	2,700	2,100
		Feed Rate (mm/min)	680	690	770	770	770	770	770
	Alloy Steel	Spindle Revolution (min^{-1})	8,800	6,600	4,400	3,300	2,600	2,200	1,800
		Feed Rate (mm/min)	500	550	620	630	630	630	610
	Pre-hardened steel (30~45HRC)	Spindle Revolution (min^{-1})	6,400	4,800	3,200	2,400	1,900	1,600	1,200
		Feed Rate (mm/min)	180	180	180	190	190	190	190
	Stainless Steel	Spindle Revolution (min^{-1})	8,000	4,800	4,000	2,400	2,300	2,000	1,500
		Feed Rate (mm/min)	190	200	200	200	210	210	210

Depth of Cut (ap×ae) (mm)
1.5Dc×0.1Dc

* Machining with water soluble coolant is recommended for stainless steel.

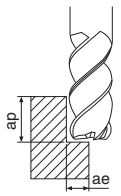
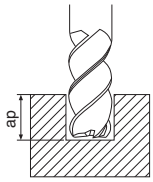
Slotting is not recommended.

2FESW

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ13
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	660	640	640	640	520	450	410	400
		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	550	480	510	530	480	440	410	400
Depth of Cut (ap×ae) (mm)	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
1Dc×0.2Dc			Feed Rate (mm/min)	420	430	430	430	350	300	270	260
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	300	340	360	370	340	310	270	260
 Slotting	Pre-hardened steel (30~45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	160	160	160	160	140	140	140	140
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	110	110	120	120	120	120	120	120
Depth of Cut (ap) (mm)	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
0.2Dc			Feed Rate (mm/min)	180	240	240	240	200	170	160	160
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	120	120	130	130	130	130	130	130

* Machining with water soluble coolant is recommended for stainless steel.

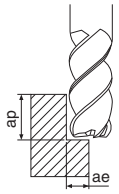
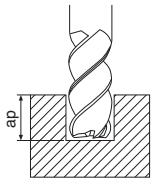
3FESW

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ13
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
Depth of Cut (ap×ae) (mm)	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
1Dc×0.2Dc			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
 Slotting	Pre-hardened steel (30~45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	200	200	200	200	180	180	180	180
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	140	140	150	150	150	150	150	150
Depth of Cut (ap) (mm)	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
0.2Dc			Feed Rate (mm/min)	300	300	300	300	240	210	200	200
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	150	150	160	160	160	160	160	160

* Machining with water soluble coolant is recommended for stainless steel.

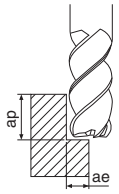
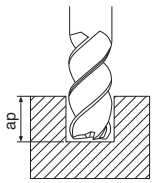
Recommended Cutting Conditions

4FESW

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ13
 Shouldering Depth of Cut (ap×ae) (mm) 1Dc×0.2Dc	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
 Slotting Depth of Cut (ap) (mm) 0.2Dc	Pre-hardened steel (30~45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	240	240	240	240	210	210	210	210
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	160	160	180	180	180	180	180	180
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	360	360	360	360	300	260	240	240
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	180	180	200	200	200	200	200	200

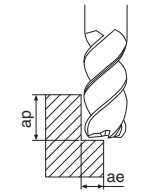
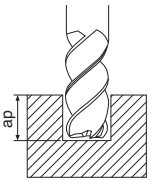
* Machining with water soluble coolant is recommended for stainless steel.

3UFSM

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ2	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering Depth of Cut (ap×ae) (mm) 1.5Dc×0.1Dc	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	18,000	12,000	9,200	7,300	6,100	4,600	3,700	3,100	2,300	1,800
			Feed Rate (mm/min)	380	430	440	500	510	500	560	560	590	590
		Slotting	Spindle Revolution (min^{-1})	16,000	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
			Feed Rate (mm/min)	190	230	240	290	300	290	280	290	310	350
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	14,000	9,000	6,800	5,400	4,500	3,400	2,700	2,300	1,700	1,400
			Feed Rate (mm/min)	250	270	270	320	350	340	360	350	390	420
		Slotting	Spindle Revolution (min^{-1})	11,000	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
			Feed Rate (mm/min)	130	130	150	180	190	180	170	180	190	210
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	10,000	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,200	1,000
			Feed Rate (mm/min)	180	170	170	210	230	220	230	220	220	230
		Slotting	Spindle Revolution (min^{-1})	10,000	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,200	1,000
			Feed Rate (mm/min)	120	120	120	140	150	140	140	140	150	180
 Slotting Depth of Cut (ap) (mm) 0.25Dc (Carbon Steel, Cast Iron 0.5Dc)	Titanium Alloys Heat-resistant Alloys (40~50HRC)	Shouldering	Spindle Revolution (min^{-1})	6,000	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	600
			Feed Rate (mm/min)	60	90	100	120	110	110	120	110	120	130
		Slotting	Spindle Revolution (min^{-1})	6,000	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	600
			Feed Rate (mm/min)	50	60	70	80	90	90	90	80	90	100
	Aluminum Alloys	Shouldering	Spindle Revolution (min^{-1})	32,000	21,000	16,000	13,000	11,000	8,000	6,400	5,300	4,000	3,200
			Feed Rate (mm/min)	670	760	770	900	920	860	1,000	1,100	1,100	1,200
		Slotting	Spindle Revolution (min^{-1})	32,000	21,000	16,000	13,000	11,000	8,000	6,400	5,300	4,000	3,200
			Feed Rate (mm/min)	480	440	480	590	630	580	670	730	860	960

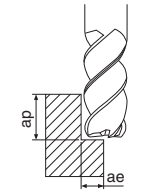
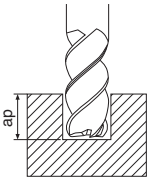
* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

4PGSS, 5PGSS

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering  Slotting	Carbon Steel	Shouldering	1Dc×0.3Dc	Spindle Revolution (min⁻¹)	13,300	10,000	8,000	6,600	5,000	4,000	3,300	2,500	2,000	1,600
				Feed Rate (mm/min)	1,860	1,600	1,440	1,320	1,200	1,360	1,320	1,200	1,200	1,360
		Slotting	1Dc	Spindle Revolution (min⁻¹)				6,600	5,000	4,000	3,300	2,500	2,000	1,600
				Feed Rate (mm/min)				660	600	680	660	600	600	680
	Alloy Steel	Shouldering	1Dc×0.3Dc	Spindle Revolution (min⁻¹)	10,600	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600	1,300
				Feed Rate (mm/min)	1,180	1,020	920	840	880	890	860	880	830	1,040
		Slotting	0.75Dc	Spindle Revolution (min⁻¹)				5,300	4,000	3,200	2,700	2,000	1,600	1,300
				Feed Rate (mm/min)				420	440	440	430	440	410	520
	Pre-hardened steel (30~45HRC)	Shouldering	1Dc×0.25Dc	Spindle Revolution (min⁻¹)	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	710	610	550	500	570	550	580	570	570	700
		Slotting	0.5Dc	Spindle Revolution (min⁻¹)				4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)				250	290	280	290	280	280	350
	Stainless Steel	Shouldering	1Dc×0.25Dc	Spindle Revolution (min⁻¹)	5,300	4,000	3,200	2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)	290	250	230	210	240	250	230	240	240	270
		Slotting	0.4Dc	Spindle Revolution (min⁻¹)				2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)				100	120	120	120	120	120	130
	Titanium Alloys Heat-resistant Alloys (40~50HRC)	Shouldering	1Dc×0.2Dc	Spindle Revolution (min⁻¹)	3,700	2,800	2,200	1,900	1,400	1,100	900	700	550	450
				Feed Rate (mm/min)	160	130	110	110	110	130	120	140	130	150
		Slotting	0.3Dc	Spindle Revolution (min⁻¹)				1,900	1,400	1,100	900	700	550	450
				Feed Rate (mm/min)				60	60	60	60	70	70	80

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

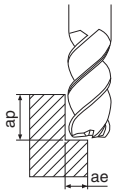
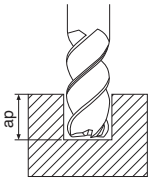
4PGSM, 5PGSM, 6PGSM

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering  Slotting	Carbon Steel	Shouldering	1.5Dc×0.3Dc	Spindle Revolution (min⁻¹)	6,600	5,000	4,000	3,300	2,500	2,000	1,600
				Feed Rate (mm/min)	1,030	980	1,260	1,520	1,570	1,510	1,340
		Slotting	0.5Dc	Spindle Revolution (min⁻¹)	6,600	5,000	4,000	3,300	2,500	2,000	1,600
				Feed Rate (mm/min)	520	500	640	770	790	750	670
	Alloy Steel	Shouldering	1.5Dc×0.3Dc	Spindle Revolution (min⁻¹)	5,300	4,000	3,200	2,700	2,000	1,600	1,300
				Feed Rate (mm/min)	740	670	940	1,130	1,170	1,140	1,030
		Slotting	0.5Dc	Spindle Revolution (min⁻¹)	5,300	4,000	3,200	2,700	2,000	1,600	1,300
				Feed Rate (mm/min)	380	330	480	560	580	570	520
	Pre-hardened steel (30~45HRC)	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min⁻¹)	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	470	490	610	700	730	710	710
		Slotting	0.4Dc	Spindle Revolution (min⁻¹)	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	230	250	310	350	370	350	360
	Stainless Steel	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min⁻¹)	2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)	170	190	250	280	280	280	250
		Slotting	0.4Dc	Spindle Revolution (min⁻¹)	2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)	80	90	120	140	140	140	130
	Titanium Alloys Heat-resistant Alloys (40~50HRC)	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min⁻¹)	1,900	1,400	1,100	900	700	550	450
				Feed Rate (mm/min)	90	90	130	150	160	150	150
		Slotting	0.3Dc	Spindle Revolution (min⁻¹)	1,900	1,400	1,100	900	700	550	450
				Feed Rate (mm/min)	40	40	60	70	80	70	70

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

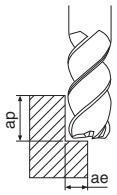
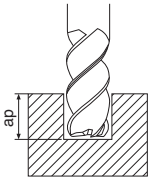
Recommended Cutting Conditions

4PGSL, 5PGSL, 6PGSL

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering  Slotting	Carbon Steel	Shouldering	1.5Dc×0.3Dc	Spindle Revolution (min⁻¹)	6,600	5,000	4,000	3,300	2,500	2,000	1,600
				Feed Rate (mm/min)	1,030	980	1,260	1,520	1,570	1,510	1,340
		Slotting	0.5Dc	Spindle Revolution (min⁻¹)	6,600	5,000	4,000	3,300	2,500	2,000	1,600
				Feed Rate (mm/min)	520	500	640	770	790	750	670
	Alloy Steel	Shouldering	1.5Dc×0.3Dc	Spindle Revolution (min⁻¹)	5,300	4,000	3,200	2,700	2,000	1,600	1,300
				Feed Rate (mm/min)	740	670	940	1,130	1,170	1,140	1,030
		Slotting	0.5Dc	Spindle Revolution (min⁻¹)	5,300	4,000	3,200	2,700	2,000	1,600	1,300
				Feed Rate (mm/min)	380	330	480	560	580	570	520
	Pre-hardened steel (30~45HRC)	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min⁻¹)	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	470	490	610	700	730	710	710
		Slotting	0.4Dc	Spindle Revolution (min⁻¹)	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	230	250	310	350	370	350	360
	Stainless Steel	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min⁻¹)	2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)	170	190	250	280	280	280	250
		Slotting	0.4Dc	Spindle Revolution (min⁻¹)	2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)	80	90	120	140	140	140	130
	Titanium Alloys Heat-resistant Alloys (40~50HRC)	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min⁻¹)	1,900	1,400	1,100	900	700	550	450
				Feed Rate (mm/min)	90	90	130	150	160	150	150
		Slotting	0.3Dc	Spindle Revolution (min⁻¹)	1,900	1,400	1,100	900	700	550	450
				Feed Rate (mm/min)	40	40	60	70	80	70	70

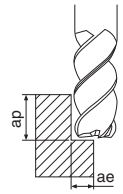
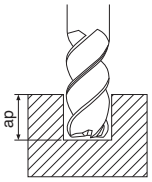
* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

4PGRM

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering  Slotting	Carbon Steel	Shouldering	1Dc×0.3Dc	Spindle Revolution (min⁻¹)	13,300	10,000	8,000	6,600	5,000	4,000	3,300	2,500	2,000
				Feed Rate (mm/min)	1,860	1,600	1,440	1,320	1,200	1,360	1,320	1,200	1,200
		Slotting	1Dc	Spindle Revolution (min⁻¹)				6,600	5,000	4,000	3,300	2,500	2,000
				Feed Rate (mm/min)				660	600	680	660	600	600
	Alloy Steel	Shouldering	1Dc×0.3Dc	Spindle Revolution (min⁻¹)	10,600	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	1,180	1,020	920	840	880	890	860	880	830
		Slotting	0.75Dc	Spindle Revolution (min⁻¹)				5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)				420	440	440	430	440	410
	Pre-hardened steel (30~45HRC)	Shouldering	1Dc×0.25Dc	Spindle Revolution (min⁻¹)	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	710	610	550	500	570	550	580	570	570
		Slotting	0.5Dc	Spindle Revolution (min⁻¹)				4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)				250	290	280	290	280	280
	Stainless Steel	Shouldering	1Dc×0.25Dc	Spindle Revolution (min⁻¹)	5,300	4,000	3,200	2,700	2,000	1,600	1,300	1,000	800
				Feed Rate (mm/min)	290	250	230	210	240	250	230	240	240
		Slotting	0.4Dc	Spindle Revolution (min⁻¹)				2,700	2,000	1,600	1,300	1,000	800
				Feed Rate (mm/min)				100	120	120	120	120	120
	Titanium Alloys Heat-resistant Alloys (40~50HRC)	Shouldering	1Dc×0.2Dc	Spindle Revolution (min⁻¹)	3,700	2,800	2,200	1,900	1,400	1,100	900	700	550
				Feed Rate (mm/min)	160	130	110	110	110	130	120	140	130
		Slotting	0.3Dc	Spindle Revolution (min⁻¹)				1,900	1,400	1,100	900	700	550
				Feed Rate (mm/min)				60	60	60	60	70	70

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

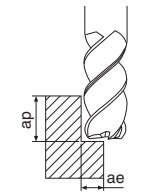
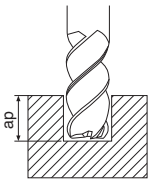
3ZFKS (Short), 3ZFKM (Medium)

Applications	Workpiece Material	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)		ϕ3	ϕ4	ϕ5	ϕ6	ϕ7	ϕ8	ϕ10	ϕ12	ϕ16
 Shouldering	Carbon Steel	Shouldering Short 1.2Dc×0.3Dc Medium 1.5Dc×0.3Dc Plunge milling Slotting 1Dc	Spindle Revolution (min^{-1})		13,800	10,700	8,800	7,500	6,600	6,000	4,800	4,000	3,000
			Feed Rate (mm/min)	Shouldering	850	950	1,100	1,200	1,100	1,000	910	850	800
				Plunge milling	180	170	170	170	160	150	120	100	70
				Slotting	570	650	700	730	750	780	800	750	650
	Alloy Steel	Shouldering Short 1.2Dc×0.3Dc Medium 1.5Dc×0.3Dc Plunge milling Slotting 0.5Dc	Spindle Revolution (min^{-1})		10,600	9,300	8,300	7,400	6,500	6,000	4,700	3,500	1,900
			Feed Rate (mm/min)	Shouldering	700	780	900	980	900	850	750	700	560
				Plunge milling	120	120	130	140	130	130	120	100	70
				Slotting	500	540	570	590	610	600	580	500	340
	Pre-hardened steel (30~45HRC)		Spindle Revolution (min^{-1})		5,200	4,000	3,200	2,600	2,300	2,000	1,600	1,400	1,000
			Feed Rate (mm/min)	Shouldering	440	440	490	490	490	440	400	370	300
				Plunge milling	90	110	110	130	110	100	80	70	50
				Slotting	220	270	270	320	330	330	230	200	140
 Plunge milling Slotting	Stainless Steel	Shouldering Short 1.2Dc×0.2Dc Medium 1.5Dc×0.2Dc Plunge milling Slotting 0.5Dc	Spindle Revolution (min^{-1})		3,300	2,500	2,000	1,700	1,400	1,300	1,100	900	750
			Feed Rate (mm/min)	Shouldering	280	270	330	340	330	330	350	320	300
				Plunge milling	20	30	40	40	40	30	20	20	20
				Slotting	110	110	130	140	130	130	120	120	120
	Titanium Alloys		Spindle Revolution (min^{-1})		3,300	2,500	2,000	1,700	1,400	1,300	1,100	900	750
			Feed Rate (mm/min)	Shouldering	280	270	330	340	330	330	350	320	300
				Plunge milling	20	30	40	40	40	30	20	20	20
				Slotting	110	110	130	140	130	130	120	120	120

· Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

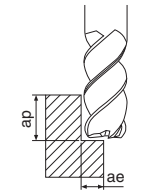
Recommended Cutting Conditions

4MFK (Short, Medium), 4MFR (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16
 Shouldering	Carbon Steel	Shouldering	Short : 1.2Dc×0.15Dc Medium : 1.5Dc×0.15Dc	Spindle Revolution (min^{-1})	13,800	10,700	8,800	7,500	6,000	4,800	4,000	3,300
				Feed Rate (mm/min)	1,400	1,400	1,400	1,500	1,500	1,400	1,400	1,300
		Slotting	ap≤1Dc	Spindle Revolution (min^{-1})	13,800	10,700	8,800	7,500	6,000	4,800	4,000	3,300
				Feed Rate (mm/min)	620	700	750	780	830	850	800	750
	Alloy Steel	Shouldering	Short : 1.2Dc×0.1Dc Medium : 1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	10,600	9,300	8,300	7,400	6,000	4,700	3,800	2,800
				Feed Rate (mm/min)	1,000	1,000	1,000	1,100	1,100	1,000	1,000	900
		Slotting	ap≤1Dc	Spindle Revolution (min^{-1})	10,600	9,300	8,300	7,400	6,000	4,700	3,800	2,800
				Feed Rate (mm/min)	500	510	520	530	550	570	530	450
 Slotting	Pre-hardened steel (30~45HRC)	Shouldering	Short : 1.2Dc×0.07Dc Medium : 1.5Dc×0.07Dc	Spindle Revolution (min^{-1})	8,700	6,800	5,500	4,600	3,500	2,800	2,300	1,700
				Feed Rate (mm/min)	670	730	790	840	900	810	770	630
		Slotting	ap≤1Dc	Spindle Revolution (min^{-1})	6,700	5,800	4,800	4,000	3,000	2,300	1,900	1,400
				Feed Rate (mm/min)	320	330	360	370	400	420	380	300
	Stainless Steel Titanium Alloys	Shouldering	Short : 1.2Dc×0.1Dc Medium : 1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	8,700	7,000	6,000	5,200	4,000	3,000	2,500	1,700
				Feed Rate (mm/min)	670	720	780	830	840	760	710	520
		Slotting	ap≤0.3Dc	Spindle Revolution (min^{-1})	6,800	6,000	5,100	4,300	3,400	2,600	2,000	1,400
				Feed Rate (mm/min)	190	220	240	250	250	240	230	190

· Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

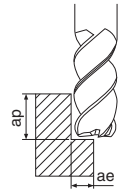
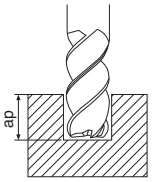
4MFK (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16
 Shouldering	Carbon Steel	Shouldering	3Dc×0.02Dc	Spindle Revolution (min^{-1})	11,000	8,500	7,000	6,000	4,800	3,800	3,200	2,600
				Feed Rate (mm/min)	910	910	910	970	970	910	910	840
	Alloy Steel	Shouldering		Spindle Revolution (min^{-1})	6,500	5,700	5,100	4,500	3,700	2,900	2,300	1,700
				Feed Rate (mm/min)	540	540	540	600	600	540	540	490
	Pre-hardened steel (30~45HRC)	Shouldering		Spindle Revolution (min^{-1})	4,900	3,900	3,100	2,600	2,000	1,600	1,300	1,000
				Feed Rate (mm/min)	330	360	400	420	450	400	380	310
	Stainless Steel Titanium Alloys	Shouldering		Spindle Revolution (min^{-1})	4,300	3,500	3,000	2,600	2,000	1,500	1,300	900
				Feed Rate (mm/min)	330	360	390	410	420	380	350	260

· Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

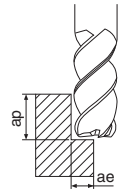
Slotting is not recommended.

4TFK (Short, Medium), 4TFR (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering  Slotting	Carbon Steel, Cast Iron	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min^{-1})	13,800	10,300	8,300	6,900	5,200	4,100	3,400	2,600	2,100
				Feed Rate (mm/min)	1,490	1,570	1,590	1,660	1,630	1,490	1,410	1,240	1,080
		Slotting	Dc≤ϕ12 : ap≤1.0Dc Dc>ϕ12 : ap≤12	Spindle Revolution (min^{-1})	11,100	8,400	6,700	5,600	4,200	3,300	2,800	2,100	1,700
				Feed Rate (mm/min)	770	790	790	800	750	690	600	540	410
	Alloy Steel	Shouldering	1.5Dc×0.2Dc	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	900	1,020	1,020	1,020	920	870	800	720	640
		Slotting	Dc≤ϕ12 : ap≤1.0Dc Dc>ϕ12 : ap≤12	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	540	530	550	590	570	530	500	450	410
	Pre-hardened steel (30~45HRC)	Shouldering	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	9,500	7,200	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	690	760	810	850	830	800	770	640	590
		Slotting	ap≤0.5×Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	480	540	570	600	550	490	460	380	340
	Stainless Steel	Shouldering	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	9,500	7,200	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	690	760	810	850	830	800	770	640	590
		Slotting	ap≤0.5×Dc	Spindle Revolution (min^{-1})	5,500	4,200	3,800	3,500	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	120	130	180	360	420	370	340	280	250
	Titanium Alloys	Shouldering	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	500	520	520	640	700	730	670	560	450
		Slotting	Dc≤ϕ12 : ap≤1.0Dc Dc>ϕ12 : ap≤12	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	290	330	330	350	370	410	380	290	230
	Heat-resistant Alloys	Shouldering	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	640
				Feed Rate (mm/min)	250	250	250	250	240	230	220	210	200
		Slotting	ap≤0.3×Dc	Spindle Revolution (min^{-1})	3,000	2,200	1,800	1,500	1,100	900	700	600	400
				Feed Rate (mm/min)	90	100	100	100	110	130	120	90	70

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

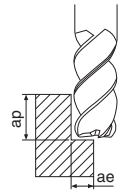
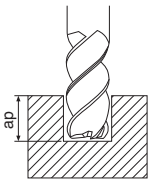
4TFK (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering	Carbon Steel, Cast Iron	Shouldering	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	11,000	8,200	6,600	5,500	4,200	3,300	2,700	2,100	1,700
				Feed Rate (mm/min)	970	1,020	1,030	1,080	1,060	970	920	810	700
	Alloy Steel	Shouldering	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	6,000	4,600	3,600	3,000	2,300	1,800	1,500	1,100	910
				Feed Rate (mm/min)	490	550	550	550	500	470	430	390	350
	Pre-hardened steel (30~45HRC)	Shouldering	2.5Dc×0.05Dc	Spindle Revolution (min^{-1})	6,000	4,600	3,600	3,000	2,300	1,800	1,500	1,100	910
				Feed Rate (mm/min)	490	550	550	550	500	470	430	390	350
	Stainless Steel	Shouldering	2.5Dc×0.05Dc	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,500	1,200	900	700
				Feed Rate (mm/min)	350	380	410	430	420	400	390	320	300
	Titanium Alloys	Shouldering	2.5Dc×0.05Dc	Spindle Revolution (min^{-1})	4,300	3,200	2,600	2,100	1,600	1,300	1,100	800	700
				Feed Rate (mm/min)	250	260	260	320	350	370	340	280	230
	Heat-resistant Alloys	Shouldering	2.5Dc×0.02Dc	Spindle Revolution (min^{-1})	2,100	1,600	1,300	1,100	800	650	550	400	320
				Feed Rate (mm/min)	125	125	125	125	120	115	110	105	100

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

Slotting is not recommended.

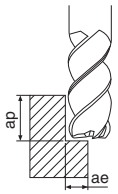
4YEKM, 4YECM, 4YERM

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering  Slotting	Carbon Steel Alloy Steel (~30HRC)	Shouldering	1Dc×0.5Dc	Spindle Revolution (min^{-1})	8,400	6,700	5,600	4,200	3,300	2,800	2,100	1,700	1,300
				Feed Rate (mm/min)	840	800	890	840	790	720	580	510	390
		Slotting	1Dc	Spindle Revolution (min^{-1})	8,400	6,700	5,600	4,200	3,300	2,800	2,100	1,700	1,300
				Feed Rate (mm/min)	840	800	890	840	790	720	580	510	390
	Carbon Steel Alloy Steel (30~40HRC)	Shouldering	1Dc×0.3Dc	Spindle Revolution (min^{-1})	6,800	5,400	4,500	3,400	2,700	2,300	1,700	1,400	1,100
				Feed Rate (mm/min)	540	540	630	610	540	500	400	360	300
		Slotting	1Dc	Spindle Revolution (min^{-1})	6,800	5,400	4,500	3,400	2,700	2,300	1,700	1,400	1,100
				Feed Rate (mm/min)	540	540	630	610	540	500	400	360	300
	Stainless Steel	Shouldering	1Dc×0.25Dc	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,600	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	510	510	580	570	520	460	380	330	280
		Slotting	0.5Dc	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,600	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	510	510	580	570	520	460	380	330	280
	Titanium Alloys	Shouldering	1Dc×0.25Dc	Spindle Revolution (min^{-1})	4,000	3,200	2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)	190	190	210	240	190	200	180	190	160
		Slotting	0.5Dc	Spindle Revolution (min^{-1})	4,000	3,200	2,700	2,000	1,600	1,300	1,000	800	600
				Feed Rate (mm/min)	190	190	210	240	190	200	180	190	160
	Heat-resistant Alloys	Shouldering	1Dc×0.25Dc	Spindle Revolution (min^{-1})	2,400	1,900	1,600	1,200	1,000	800	600	500	400
				Feed Rate (mm/min)	100	80	100	130	100	120	110	110	80
		Slotting	0.3Dc	Spindle Revolution (min^{-1})	2,400	1,900	1,600	1,200	1,000	800	600	500	400
				Feed Rate (mm/min)	100	80	100	130	100	120	110	110	80

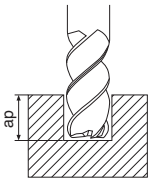
* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

Recommended Cutting Conditions

5DEKM, 5DERM

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	Medium Carbon Steel High Carbon Steel (>0.3%C)	Shouldering	Spindle Revolution (min^{-1})	16,000	12,700	10,600	8,000	6,400	5,300	4,000	3,200	2,500
			Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900	1,600	1,600	1,400
		Slotting	Spindle Revolution (min^{-1})	16,000	12,700	10,600	8,000	6,400	5,300	4,000	3,200	2,500
			Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900	1,600	1,600	1,400
	Alloy Steel Alloy Tool Steel (<330HB <35HRC)	Shouldering	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800	3,600	2,900	2,300
			Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700	1,400	1,300	1,100
		Slotting	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800	3,600	2,900	2,300
			Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700	1,400	1,300	1,100
	Alloy Steel Alloy Tool Steel (340~450HB 36~48HRC)	Shouldering	Spindle Revolution (min^{-1})	13,000	10,000	8,500	6,400	5,100	4,200	3,200	2,500	2,000
			Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300	1,100	1,000	1,000
		Slotting	Spindle Revolution (min^{-1})	13,000	10,000	8,500	6,400	5,100	4,200	3,200	2,500	2,000
			Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300	1,100	1,000	1,000
	Austenitic Stainless Steel SUS302 SUS303 SUS304	Shouldering	Spindle Revolution (min^{-1})	9,200	7,300	6,100	4,600	3,700	3,100	2,300	1,800	1,500
			Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100	920	820	730
		Slotting	Spindle Revolution (min^{-1})	9,200	7,300	6,100	4,600	3,700	3,100	2,300	1,800	1,500
			Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100	920	820	730
	Austenitic Stainless Steel SUS316 SUS316L	Shouldering	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300	1,000
			Feed Rate (mm/min)	640	760	640	640	640	640	560	510	410
		Slotting	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300	1,000
			Feed Rate (mm/min)	640	760	640	640	640	640	560	510	410
	Titanium Alloys	Shouldering	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600	1,200	960	760
			Feed Rate (mm/min)	480	380	480	480	380	400	360	380	340
		Slotting	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600	1,200	960	760
			Feed Rate (mm/min)	480	380	480	480	380	400	360	380	340
	Heat-resistant Alloys	Shouldering	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100	800	640	510
			Feed Rate (mm/min)	160	130	210	240	190	210	200	190	180
		Slotting	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100	800	640	510
			Feed Rate (mm/min)	160	130	210	240	190	210	200	190	180
	Gray Cast Iron	Shouldering	Spindle Revolution (min^{-1})	14,000	11,000	9,000	6,800	5,400	4,500	3,400	2,700	2,200
			Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800	1,700	1,600	1,400
		Slotting	Spindle Revolution (min^{-1})	14,000	11,000	9,000	6,800	5,400	4,500	3,400	2,700	2,200
			Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800	1,700	1,600	1,400
	Nodular Cast Iron Malleable Cast Iron	Shouldering	Spindle Revolution (min^{-1})	10,000	8,300	6,900	5,200	4,100	3,500	2,600	2,100	1,700
			Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000	910	830	830
		Slotting	Spindle Revolution (min^{-1})	10,000	8,300	6,900	5,200	4,100	3,500	2,600	2,100	1,700
			Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000	910	830	830

Depth of Cut (ap×ae) (mm)
5DEKM: 1.5Dc×0.25Dc 5DERM: 1.5Dc×0.5Dc

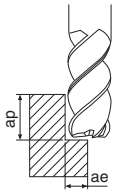


Slotting

Depth of Cut (ap) (mm)
5DEKM: 0.25Dc 5DERM: 0.8Dc

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

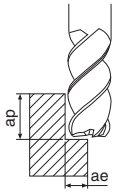
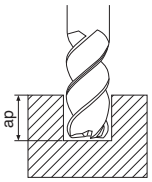
4YFSM, 6YFSM (Shouldering)

Applications	Workpiece Material	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering	Carbon Steel (<20HRC)	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	10,000	8,000	6,600	5,000	4,000	3,300	2,500	2,000
			Feed Rate (mm/min)	800	800	1,340	1,340	1,340	1,350	1,490	1,610
	Alloy Steel (<30HRC)		Spindle Revolution (min^{-1})	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
			Feed Rate (mm/min)	570	570	960	960	960	960	1,080	1,150
	Pre-hardened steel (30~45HRC)		Spindle Revolution (min^{-1})	6,000	4,800	4,000	3,000	2,400	2,000	1,500	1,200
			Feed Rate (mm/min)	360	360	620	660	660	660	740	790
	Stainless Steel		Spindle Revolution (min^{-1})	5,200	4,100	3,500	2,600	2,100	1,700	1,300	1,000
			Feed Rate (mm/min)	270	280	520	540	550	550	620	650
	Titanium Alloys	1Dc×0.05Dc	Spindle Revolution (min^{-1})	3,600	2,900	2,400	1,800	1,400	1,200	900	700
			Feed Rate (mm/min)	160	170	340	360	360	360	410	410
	Heat-resistant Alloys		Spindle Revolution (min^{-1})	3,600	2,900	2,400	1,800	1,400	1,200	900	700
			Feed Rate (mm/min)	160	170	340	360	360	360	410	410

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

Slotting is not recommended.

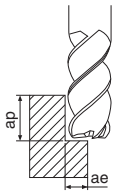
3RDSM, 4RDSM, 5RDSM

Applications	Workpiece Material		Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	Steel	<22HRC	Shouldering	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	11,100	8,400	6,700	5,600	4,200	3,300	2,700
					Feed Rate (mm/min)	1,000	1,000	1,320	1,340	1,340	1,340	1,380
			Slotting	1Dc	Spindle Revolution (min^{-1})	9,300	6,900	5,600	4,600	3,500	2,800	2,200
					Feed Rate (mm/min)	800	800	1,000	1,030	1,040	1,050	1,110
		22~32HRC	Shouldering	1.5Dc×0.4Dc	Spindle Revolution (min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
					Feed Rate (mm/min)	720	720	860	860	860	920	1,030
			Slotting	0.75Dc	Spindle Revolution (min^{-1})	7,900	5,900	4,800	4,000	3,000	2,400	1,900
					Feed Rate (mm/min)	550	550	740	740	740	760	860
		32~40HRC	Shouldering	1.5Dc×0.4Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
					Feed Rate (mm/min)	320	320	410	410	400	400	400
			Slotting	0.6Dc	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,600	2,000	1,600	1,300
					Feed Rate (mm/min)	260	260	340	340	330	330	330
		40~45HRC	Shouldering	1Dc×0.4Dc	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,400	1,100
					Feed Rate (mm/min)	220	220	260	260	250	250	250
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	4,300	3,200	2,600	2,200	1,600	1,300	1,000
					Feed Rate (mm/min)	180	180	240	230	230	220	220
 Slotting		45~50HRC	Shouldering	1Dc×0.3Dc	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,000
					Feed Rate (mm/min)	150	150	180	180	170	170	170
			Slotting	0.4Dc	Spindle Revolution (min^{-1})	3,800	2,900	2,300	1,900	1,400	1,100	900
					Feed Rate (mm/min)	140	140	170	160	160	150	150
	Stainless Steel		Shouldering	1.5Dc×0.4Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
					Feed Rate (mm/min)	190	230	310	300	340	310	360
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	2,700	2,000	1,600	1,300	1,000	800	600
					Feed Rate (mm/min)	110	130	180	170	190	180	190
	Cast Iron		Shouldering	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
					Feed Rate (mm/min)	850	850	1,030	1,030	1,030	1,100	1,380
			Slotting	1Dc	Spindle Revolution (min^{-1})	7,900	5,900	4,800	4,000	3,000	2,400	1,900
					Feed Rate (mm/min)	700	700	900	900	900	910	1,140

* Machining with water soluble coolant is recommended for stainless steel.

Recommended Cutting Conditions

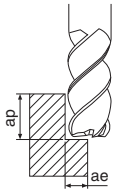
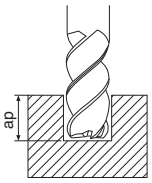
3RDSL, 4RDSL, 5RDSL (Shouldering)

Applications	Workpiece Material		Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	Steel	<22HRC	2.5Dc×0.5Dc	Spindle Revolution (min^{-1})	7,800	5,900	4,700	3,900	2,900	2,300	1,900
				Feed Rate (mm/min)	700	700	770	780	840	840	940
		22~32HRC	2.5Dc×0.4Dc	Spindle Revolution (min^{-1})	6,700	5,000	4,000	3,400	2,500	2,000	1,600
				Feed Rate (mm/min)	500	500	600	600	600	640	720
		32~40HRC		Spindle Revolution (min^{-1})	4,500	3,400	2,700	2,200	1,700	1,300	1,100
				Feed Rate (mm/min)	220	220	290	290	280	280	280
		40~45HRC		Spindle Revolution (min^{-1})	3,400	2,500	2,000	1,700	1,300	1,000	800
				Feed Rate (mm/min)	150	150	180	180	180	180	180
		45~50HRC	2.5Dc×0.3Dc	Spindle Revolution (min^{-1})	2,900	2,200	1,800	1,500	1,100	900	700
				Feed Rate (mm/min)	110	110	130	130	120	120	120
	Stainless Steel		1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
				Feed Rate (mm/min)	120	150	200	200	220	200	230
	Cast Iron		2.5Dc×0.5Dc	Spindle Revolution (min^{-1})	6,700	5,000	4,000	3,400	2,500	2,000	1,600
				Feed Rate (mm/min)	600	600	720	720	720	770	970

* Machining with water soluble coolant is recommended for stainless steel.

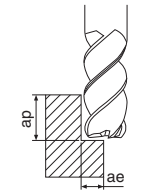
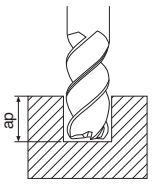
Slotting is not recommended.

4RFSM, 6RFSM

Applications	Workpiece Material		Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16		ϕ20		ϕ25
										4 flutes	6 flutes	4 flutes	6 flutes	
 Shouldering	Steel	35~45HRC	Shouldering	1.5Dc×0.4Dc	Spindle Revolution (min^{-1})	8,000	6,000	4,800	4,000	3,000	3,000	2,400	2,400	1,900
					Feed Rate (mm/min)	630	630	630	640	640	900	640	930	800
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	2,400	1,900	1,900	1,500
					Feed Rate (mm/min)	480	480	490	500	500	720	500	750	640
		45~55HRC	Shouldering	1.5Dc×0.33Dc	Spindle Revolution (min^{-1})	5,800	4,400	3,500	2,900	2,200	2,200	1,800	1,800	1,400
					Feed Rate (mm/min)	350	350	350	350	350	530	350	530	460
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	4,700	3,500	2,800	2,300	1,800	1,800	1,400	1,400	1,100
					Feed Rate (mm/min)	280	280	280	280	280	420	280	420	370
		55~60HRC	Shouldering	1.5Dc×0.25Dc	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,800	1,400	1,400	1,100
					Feed Rate (mm/min)	190	220	230	240	220	320	230	340	310
			Slotting	0.3Dc	Spindle Revolution (min^{-1})	3,800	2,900	2,300	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	150	170	180	180	180	260	180	280	250
	Stainless Steel		Shouldering	1.5Dc×0.4Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	300	280	260	300	280	420	290	430	380
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	3,200	2,400	1,900	1,600	1,200	1,200	1,000	1,000	800
					Feed Rate (mm/min)	200	190	180	200	190	290	210	310	270
 Slotting	Titanium Alloys	<40HRC	Shouldering	2Dc×0.4Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	390	390	390	390	390	590	390	540	450
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	3,000	2,200	1,800	1,500	1,100	1,100	900	900	700
					Feed Rate (mm/min)	310	310	310	310	310	470	310	430	360
		>40HRC	Shouldering	1.5Dc×0.25Dc	Spindle Revolution (min^{-1})	3,200	2,400	1,900	1,600	1,200	1,200	1,000	1,000	800
					Feed Rate (mm/min)	300	300	300	300	300	430	300	430	370
			Slotting	0.3Dc	Spindle Revolution (min^{-1})	2,500	1,900	1,500	1,300	1,000	1,000	800	800	600
					Feed Rate (mm/min)	230	230	230	230	230	340	230	340	290
	Heat-resistant Alloys (Ni-base heat-resistant alloys)		Shouldering	1Dc×0.2Dc	Spindle Revolution (min^{-1})	1,600	1,200	1,000	800	600	600	500	500	400
					Feed Rate (mm/min)	100	100	100	100	100	140	100	140	130
			Slotting	0.25Dc	Spindle Revolution (min^{-1})	1,300	1,000	800	600	500	500	400	400	300
					Feed Rate (mm/min)	80	80	80	80	80	120	80	120	100

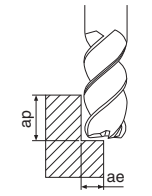
* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

3RFRS, 4RFRS

Applications	Workpiece Material		Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12
 Shouldering	Steel	<30HRC	Shouldering	0.8Dc×0.5Dc	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800
					Feed Rate (mm/min)	860	860	1,150	1,150	1,150	1,150
			Slotting	0.8Dc	Spindle Revolution (min^{-1})	11,500	9,200	7,600	5,700	4,600	3,800
					Feed Rate (mm/min)	690	690	920	920	920	920
		30~40HRC	Shouldering	0.8Dc×0.4Dc	Spindle Revolution (min^{-1})	9,600	7,600	6,400	4,800	3,800	3,200
					Feed Rate (mm/min)	430	460	640	610	610	570
			Slotting	0.8Dc	Spindle Revolution (min^{-1})	7,600	6,100	5,100	3,800	3,100	2,500
					Feed Rate (mm/min)	340	370	490	490	490	460
		40~50HRC	Shouldering	0.8Dc×0.4Dc	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100
					Feed Rate (mm/min)	190	230	320	320	320	340
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	5,100	4,100	3,400	2,500	2,000	1,700
					Feed Rate (mm/min)	150	180	260	260	260	270
 Slotting		50~60HRC	Shouldering	0.8Dc×0.25Dc	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600
					Feed Rate (mm/min)	100	100	130	140	150	160
			Slotting	0.3Dc	Spindle Revolution (min^{-1})	3,800	3,100	2,500	1,900	1,500	1,300
					Feed Rate (mm/min)	80	80	100	120	120	130
		60~70HRC	Shouldering	0.8Dc×0.2Dc	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100
					Feed Rate (mm/min)	60	60	70	70	80	90
			Slotting	0.25Dc	Spindle Revolution (min^{-1})	2,500	2,000	1,700	1,300	1,000	800
					Feed Rate (mm/min)	50	50	60	60	60	70
	Titanium Alloys		Shouldering	0.8Dc×0.4Dc	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100
					Feed Rate (mm/min)	190	230	340	320	350	380
			Slotting	0.5Dc	Spindle Revolution (min^{-1})	4,000	3,200	2,700	2,000	1,600	1,300
					Feed Rate (mm/min)	80	100	150	140	160	170

* Machining with water soluble coolant is recommended for titanium alloys.

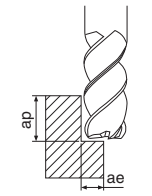
6PFK, 8PFK (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Dc<ϕ20 : 1.5Dc×0.2Dc Dc≥ϕ20 : 1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,800
				Feed Rate (mm/min)	2,650	2,640	2,410	2,250	2,010	1,700	1,500
	Alloy Steel	Shouldering	Dc<ϕ20 : 1.5Dc×0.2Dc Dc≥ϕ20 : 1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
				Feed Rate (mm/min)	2,250	2,090	1,950	1,910	1,720	1,450	1,220
	Pre-hardened steel (30~38HRC)	Shouldering	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	5,600	4,200	3,300	2,800	2,100	1,700	1,300
				Feed Rate (mm/min)	1,780	1,710	1,520	1,400	1,220	1,120	980
	Stainless Steel Titanium Alloys	Shouldering	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	5,000	3,800	3,000	2,500	1,900	1,500	1,200
				Feed Rate (mm/min)	1,350	1,320	1,200	1,130	970	850	720

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

6PFK, 8PFK (Long)

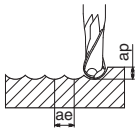
Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	Carbon Steel, Cast Iron	Shouldering	3.0Dc×0.01Dc	Spindle Revolution (min^{-1})	4,600	3,500	2,800	2,300	1,700	1,400	1,100
				Feed Rate (mm/min)	1,830	1,730	1,530	1,380	1,120	880	660
	Alloy Steel	Shouldering	3.0Dc×0.01Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,800	1,400	1,100	900
				Feed Rate (mm/min)	1,490	1,340	1,220	1,120	940	720	540
	Pre-hardened steel (30~38HRC)	Shouldering	3.0Dc×0.01Dc	Spindle Revolution (min^{-1})	2,800	2,100	1,700	1,400	1,100	850	650
				Feed Rate (mm/min)	920	680	750	670	550	480	390
	Stainless Steel Titanium Alloys	Shouldering	3.0Dc×0.01Dc	Spindle Revolution (min^{-1})	2,500	1,900	1,500	1,300	950	750	600
				Feed Rate (mm/min)	700	670	590	540	440	370	290

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

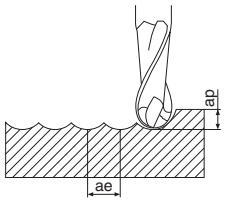
Recommended Cutting Conditions

2SEB

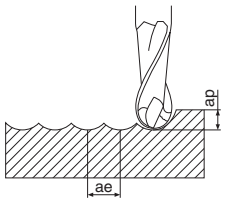
Applications	Workpiece Material		Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ2	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16
 Copying	Carbon Steel, Cast Iron		0.05Dc×0.05Dc	Spindle Revolution (min^{-1})	25,900	22,800	21,300	19,700	16,000	14,000	12,800	11,800	9,500
				Feed Rate (mm/min)	3,910	3,570	3,290	3,070	2,890	2,660	2,540	2,500	2,470
	Tool Steel, Alloy Steel		0.04Dc×0.04Dc	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,100	2,880	2,670	2,490	2,330	2,110	2,010	1,980	1,970
	Stainless Steel		0.05Dc×0.05Dc	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,150	2,880	2,660	2,500	2,370	2,190	2,060	1,970	1,920
	Pre-hardened steel	30~38HRC	0.05Dc×0.05Dc	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,150	2,880	2,660	2,500	2,370	2,190	2,060	1,970	1,920
		38~45HRC	0.03Dc×0.03Dc	Spindle Revolution (min^{-1})	20,900	18,500	17,200	15,900	13,700	11,300	10,400	9,500	7,700
				Feed Rate (mm/min)	2,550	2,330	2,170	2,040	1,940	1,800	1,680	1,590	1,550
		45~55HRC	0.03Dc×0.03Dc	Spindle Revolution (min^{-1})	18,600	16,400	15,300	14,200	12,200	10,000	9,200	8,500	6,800
				Feed Rate (mm/min)	2,060	1,850	1,700	1,600	1,520	1,410	1,320	1,230	1,190
	Heat Treated Steel	45~55HRC	0.03Dc×0.03Dc	Spindle Revolution (min^{-1})	18,600	16,400	15,300	14,200	12,200	10,000	9,200	8,500	6,800
				Feed Rate (mm/min)	2,060	1,850	1,700	1,600	1,520	1,410	1,320	1,230	1,190
		55~60HRC	0.03Dc×0.03Dc	Spindle Revolution (min^{-1})	14,300	12,600	11,800	10,900	9,400	7,700	7,100	6,500	5,200
				Feed Rate (mm/min)	1,230	1,130	1,030	980	930	850	800	780	760

* Machining with water soluble coolant is recommended for stainless steel.

2UEBS

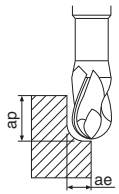
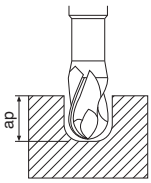
Applications	Workpiece Material		Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ4	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Copying	Steel	<42HRC	0.3Dc×0.7Dc	Spindle Revolution (min^{-1})	9,600	6,400	4,800	3,800	3,200	2,400	1,900
				Feed Rate (mm/min)	380	420	380	380	340	300	310
		42~48HRC		Spindle Revolution (min^{-1})	8,000	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	300	330	300	290	270	240	240
		48~52HRC		Spindle Revolution (min^{-1})	6,400	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	190	210	190	190	170	150	150
	Cast Iron	<180HB		Spindle Revolution (min^{-1})	12,700	8,500	6,400	5,100	4,200	3,200	2,500
				Feed Rate (mm/min)	760	850	760	750	690	610	610
		>180HB		Spindle Revolution (min^{-1})	11,100	7,400	5,600	4,500	3,700	2,800	2,200
				Feed Rate (mm/min)	540	590	540	530	480	420	430

3UEBS

Applications	Workpiece Material	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12
 Copying	Carbon Steel, Cast Iron (<20HRC)	0.2Dc×0.3Dc	Spindle Revolution (min^{-1})	13,300	10,000	8,000	6,600	5,000	4,000	3,300
			Feed Rate (mm/min)	600	870	840	850	1,400	1,200	990
	Alloy Steel (<35HRC)	0.2Dc×0.3Dc	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,700
			Feed Rate (mm/min)	410	500	610	640	940	830	730
	Pre-hardened steel (30~45HRC)	0.1Dc×0.2Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900
			Feed Rate (mm/min)	220	250	257	280	250	240	230
	Stainless Steel	0.05Dc×0.1Dc	Spindle Revolution (min^{-1})	5,800	4,400	3,500	2,900	2,200	1,800	1,500
			Feed Rate (mm/min)	160	180	190	180	190	190	170

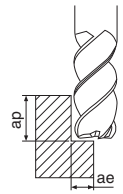
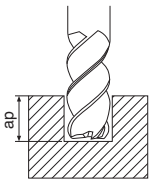
* Machining with water soluble coolant is recommended for stainless steel.

4YEBM

Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering  Slotting	Low Carbon Steel	Shouldering	1Dc×0.5Dc	Spindle Revolution (min^{-1})	9,400	7,900	5,900	4,700	3,900	2,900	2,400
				Feed Rate (mm/min)	1,020	1,130	1,270	1,020	990	800	760
		Slotting	1Dc	Spindle Revolution (min^{-1})	8,600	7,200	5,400	4,300	3,600	2,700	2,200
				Feed Rate (mm/min)	930	1,030	1,160	930	900	730	700
	Stainless Steel	Shouldering	1Dc×0.5Dc	Spindle Revolution (min^{-1})	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	620	630	630	640	560	450	390
		Slotting	1Dc	Spindle Revolution (min^{-1})	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	550	610	570	550	500	400	350
	Titanium Alloys	Shouldering	1Dc×0.3Dc	Spindle Revolution (min^{-1})	3,200	2,700	2,000	1,600	1,300	1,000	800
				Feed Rate (mm/min)	180	190	220	170	170	160	160
		Slotting	0.5Dc	Spindle Revolution (min^{-1})	2,900	2,400	1,800	1,400	1,200	900	700
				Feed Rate (mm/min)	160	170	190	170	170	160	160
	Heat-resistant Alloys	Shouldering	1Dc×0.2Dc	Spindle Revolution (min^{-1})	1,700	1,400	1,000	800	700	500	400
				Feed Rate (mm/min)	70	80	100	80	90	90	80
		Slotting	0.5Dc	Spindle Revolution (min^{-1})	1,400	1,200	900	700	600	400	400
				Feed Rate (mm/min)	60	70	80	80	80	80	70
	Gray Cast Iron	Shouldering	1Dc×0.4Dc	Spindle Revolution (min^{-1})	7,800	6,500	4,900	3,900	3,200	2,400	1,900
				Feed Rate (mm/min)	840	930	1,050	840	820	660	630
		Slotting	1Dc	Spindle Revolution (min^{-1})	7,000	5,800	4,400	3,500	2,900	2,200	1,800
				Feed Rate (mm/min)	760	840	950	760	740	600	570

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

4JER (Short, Medium)

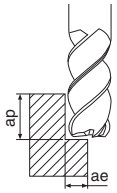
Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering  Slotting	Carbon Steel, Cast Iron	Shouldering	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	6,900	5,200	4,100	3,400	2,600	2,100
				Feed Rate (mm/min)	1,500	1,500	1,400	1,400	1,300	1,100
		Slotting	Dc≤ϕ12 : ap≤1.0Dc Dc>ϕ12 : ap≤12	Spindle Revolution (min^{-1})	5,600	4,200	3,300	2,800	2,100	1,700
				Feed Rate (mm/min)	720	670	620	540	480	360
	Alloy Steel	Shouldering	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	1,020	920	870	800	720	640
		Slotting	Dc≤ϕ12 : ap≤1.0Dc Dc>ϕ12 : ap≤12	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	530	510	470	450	400	360
	Pre-hardened steel (30~45HRC)	Shouldering	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	4,600	3,500	2,800	2,300	1,700	1,300
				Feed Rate (mm/min)	850	830	800	770	640	590
		Slotting	ap≤0.5×Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	480	450	440	410	340	300
	Stainless Steel	Shouldering	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	850	830	800	770	640	590
		Slotting	ap≤0.5×Dc	Spindle Revolution (min^{-1})	3,500	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	300	280	250	230	190	170
	Titanium Alloys	Shouldering	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	580	630	660	600	500	400
		Slotting	Dc≤ϕ12 : ap≤1.0Dc Dc>ϕ12 : ap≤12	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	320	340	370	340	260	210
	Superalloy Inconel® 718, etc.	Shouldering	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	2,400	1,800	1,400	1,200	900	720
				Feed Rate (mm/min)	330	320	320	320	320	290
		Slotting	ap≤0.5×Dc	Spindle Revolution (min^{-1})	1,600	1,200	950	800	600	480
				Feed Rate (mm/min)	180	140	110	100	80	60

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

Recommended Cutting Conditions

4HFSS, 5HFSS, 6HFSS, 7HFSS (Shouldering)

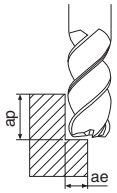
4HFSM, 5HFSM, 6HFSM, 7HFSM, 8HFSM (Shouldering)

Applications	Workpiece Material		Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ1	ϕ2	ϕ4	ϕ6	ϕ8	ϕ12
 Shouldering	Tool Steel (< 40HRC) Pre-hardened steel		1.5Dc×0.05Dc (Dc<ϕ3) 1.5Dc×0.1Dc (ϕ3≤Dc)	Spindle Revolution (min^{-1})	20,700	20,000	11,100	7,400	5,600	3,700
				Feed Rate (mm/min)	910	1,750	2,000	2,900	2,930	2,930
	Tool Steel, Heat Treated Steel (40~45HRC) Pre-hardened steel			Spindle Revolution (min^{-1})	20,700	20,000	9,900	6,600	5,000	3,300
				Feed Rate (mm/min)	910	1,750	1,800	2,630	2,650	2,650
	Heat Treated Steel	45~55HRC	1.5Dc×0.05Dc	Spindle Revolution (min^{-1})	20,700	16,000	8,000	5,300	4,000	2,700
				Feed Rate (mm/min)	910	1,400	1,400	2,100	2,100	2,100
		55~60HRC	1.5Dc×0.02Dc	Spindle Revolution (min^{-1})	20,700	12,000	6,000	4,000	3,000	2,000
				Feed Rate (mm/min)	640	730	740	1,100	1,100	1,100
		60~65HRC		Spindle Revolution (min^{-1})	20,700	11,100	5,600	3,700	2,800	1,900
				Feed Rate (mm/min)	550	600	600	880	880	880
		65~70HRC		Spindle Revolution (min^{-1})	15,900	8,000	4,000	2,700	2,000	1,330
				Feed Rate (mm/min)	370	370	370	560	560	550

* Above is even number flute condition. In case of Odd number flute, please take standard with increasing feed rate 15-20% condition.

Slotting is not recommended.

4UGSM, 6UGSM (Shouldering)

Applications	Workpiece Material		Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ4	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16
 Shouldering	Steel	45~55HRC	1Dc×0.05Dc	Spindle Revolution (min^{-1})	11,900	8,000	6,000	4,800	4,000	3,000
				Feed Rate (mm/min)	810	1,200	1,200	1,000	980	900
		55~60HRC		Spindle Revolution (min^{-1})	8,000	5,300	4,000	3,200	2,700	2,000
				Feed Rate (mm/min)	510	760	740	610	610	540
		60~65HRC	1Dc×0.2mm	Spindle Revolution (min^{-1})	5,200	3,500	2,600	2,100	1,700	1,300
				Feed Rate (mm/min)	290	480	450	390	370	330
		65~70HRC		Spindle Revolution (min^{-1})	2,800	1,900	1,400	1,100	900	700
				Feed Rate (mm/min)	150	250	230	200	200	170

Slotting is not recommended.

3AFK (Short)

Workpiece Material	Applications	Depth of Cut (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ7	ϕ8	ϕ9	ϕ10	ϕ11	ϕ12	ϕ16
			Spindle Revolution (min^{-1})	20,000	20,000	20,000	19,500	16,800	14,700	13,000	11,700	10,700	9,800	7,300
Aluminum Alloys	Shouldering	ae×ap= 1.5Dc×0.3Dc	Feed Rate (mm/min)	2,400	2,800	3,500	4,200	4,300	4,400	4,500	4,600	4,700	4,700	3,500
	Slotting	1Dc		1,600	2,000	2,500	3,000	3,100	3,200	3,300	3,400	3,500	3,500	2,200
	Plunge milling	1Dc		350	350	350	350	350	350	350	350	350	350	350
Workpiece Material	Applications	Depth of Cut (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ7	ϕ8	ϕ9	ϕ10	ϕ11	ϕ12	ϕ16
			Spindle Revolution (min^{-1})	20,000	19,900	15,900	13,200	11,300	9,900	8,800	7,900	7,200	6,600	4,900
Aluminum Alloy Casting	Shouldering	ae×ap= 1.5Dc×0.3Dc	Feed Rate (mm/min)	2,400	2,500	2,500	2,500	2,500	2,600	2,600	2,600	2,600	2,600	1,900
	Slotting	1Dc		1,300	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,800	1,300
	Plunge milling	1Dc		300	250	200	200	190	150	150	100	100	80	60

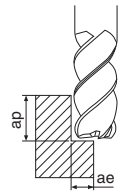
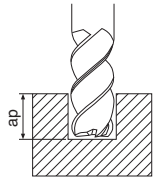
・Water soluble coolant is recommended
・The cutting conditions should be adjusted based on the overhang of the tool and the machine or workpiece rigidity.
・Spindle revolution and feed rate should be adjusted by the same percentage.
・Pecking may be necessary if chips become clogged while plunge milling.

3AFK (Medium)

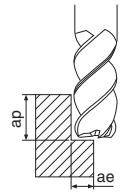
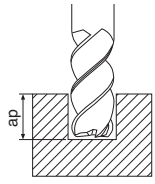
Workpiece Material	Applications	Depth of Cut (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ7	ϕ8	ϕ9	ϕ10	ϕ11	ϕ12	ϕ16
			Spindle Revolution (min^{-1})	20,000	20,000	19,000	16,000	13,500	12,000	10,500	9,500	8,500	8,000	6,000
Aluminum Alloys	Shouldering	ae×ap= 2.5Dc×0.3Dc	Feed Rate (mm/min)	2,300	2,600	3,200	3,600	3,600	3,600	3,700	3,900	4,000	4,000	2,800
	Slotting	0.5Dc		1,500	1,900	2,300	2,600	2,600	2,700	2,700	2,800	2,900	2,900	1,600
	Plunge milling	0.5Dc		300	300	300	300	300	300	300	300	300	300	300
Workpiece Material	Applications	Depth of Cut (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ4	ϕ5	ϕ6	ϕ7	ϕ8	ϕ9	ϕ10	ϕ11	ϕ12	ϕ16
			Spindle Revolution (min^{-1})	20,000	15,900	12,700	10,600	9,100	7,900	7,000	6,300	5,800	5,300	3,950
Aluminum Alloy Casting	Shouldering	ae×ap= 2.5Dc×0.3Dc	Feed Rate (mm/min)	2,300	2,200	2,000	2,000	2,000	2,000	2,000	2,000	2,100	2,100	1,500
	Slotting	0.5Dc		1,300	1,300	1,300	1,400	1,400	1,400	1,400	1,400	1,400	1,500	1,100
	Plunge milling	0.5Dc		300	200	150	160	160	120	120	80	80	60	50

・Water soluble coolant is recommended
・The cutting conditions should be adjusted based on the overhang of the tool and the machine or workpiece rigidity.
・Spindle revolution and feed rate should be adjusted by the same percentage.
・Pecking may be necessary if chips become clogged while plunge milling.

3NESM

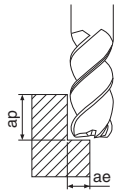
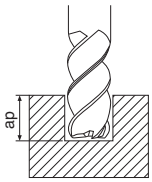
Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering	Aluminum Alloys	Shouldering	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	34,000	17,000	13,000	10,200	8,500	6,400	5,100
				Feed Rate (mm/min)	2,750	2,750	2,750	2,750	2,750	2,750	2,750
 Slotting		Slotting	1Dc	Spindle Revolution (min^{-1})	26,500	13,000	9,800	8,000	6,600	5,000	4,000
				Feed Rate (mm/min)	1,100	1,100	1,100	1,100	1,100	1,100	1,100

2NFSM

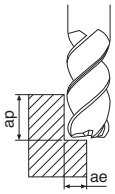
Applications	Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering	Aluminum Alloys	Shouldering	1Dc×0.5Dc	Spindle Revolution (min^{-1})	26,500	13,300	10,000	8,000	6,600	5,000	4,000
				Feed Rate (mm/min)	690	950	950	1,130	1,260	1,000	880
		Slotting	1Dc	Spindle Revolution (min^{-1})	21,200	10,600	8,000	6,400	5,300	4,000	3,200
				Feed Rate (mm/min)	550	750	750	900	1,010	800	700
 Slotting	High-silicon aluminum	Shouldering	1Dc×0.5Dc	Spindle Revolution (min^{-1})	19,100	9,600	7,200	5,700	4,800	3,600	2,900
				Feed Rate (mm/min)	420	500	500	600	670	770	570
		Slotting	1Dc	Spindle Revolution (min^{-1})	15,900	7,900	5,900	4,800	4,000	3,000	2,400
				Feed Rate (mm/min)	350	420	420	500	560	640	480

Recommended Cutting Conditions

3NFSM

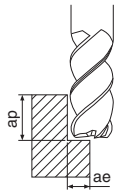
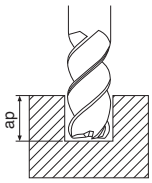
Applications		Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ3	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
 Shouldering	 Slotting	Aluminum Alloys	Shouldering	1Dc×0.5Dc	Spindle Revolution (min^{-1})	26,500	13,300	10,000	8,000	6,600	5,000	4,000
					Feed Rate (mm/min)	1,040	1,400	1,400	1,700	1,890	1,490	1,310
			Slotting	1Dc	Spindle Revolution (min^{-1})	21,200	10,600	8,000	6,400	5,300	4,000	3,200
					Feed Rate (mm/min)	830	1,100	1,100	1,360	1,510	1,290	1,050
		High-silicon aluminum	Shouldering	1Dc×0.5Dc	Spindle Revolution (min^{-1})	19,100	9,600	7,200	5,700	4,800	3,600	2,900
					Feed Rate (mm/min)	630	750	750	890	1,000	1,160	860
			Slotting	1Dc	Spindle Revolution (min^{-1})	15,900	7,900	5,900	4,800	4,000	3,000	2,400
					Feed Rate (mm/min)	520	630	630	740	830	960	710

3NFSL(Shouldering)

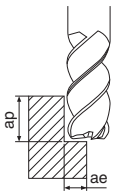
Applications	Workpiece Material	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	Aluminum Alloys	2.5Dc×0.5Dc	Spindle Revolution (min^{-1})	18,500	9,300	7,000	5,600	4,600	3,500	2,800
			Feed Rate (mm/min)	730	980	980	1,200	1,320	1,040	920
	High-silicon aluminum	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	13,400	6,700	5,000	4,000	3,400	2,500	2,000
			Feed Rate (mm/min)	440	530	530	620	700	810	600

Slotting is not recommended.

3AESM

Applications		Workpiece Material	Application	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	 Slotting	Aluminum Alloys	Shouldering	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	33,200	24,900	19,900	16,600	12,400	10,000	8,000
					Feed Rate (mm/min)	5,370	5,150	5,080	4,980	4,890	4,840	4,780
			Slotting	1Dc	Spindle Revolution (min^{-1})	19,900	14,900	11,900	10,000	7,500	6,000	4,800
					Feed Rate (mm/min)	3,230	3,090	3,050	2,990	2,930	2,900	2,870
		High-silicon aluminum	Shouldering	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,500
					Feed Rate (mm/min)	1,430	1,390	1,360	1,320	1,300	1,290	1,280
			Slotting	1Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
					Feed Rate (mm/min)	860	830	810	790	780	770	770

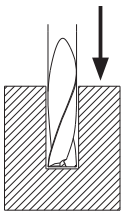
3AESL (Shouldering)

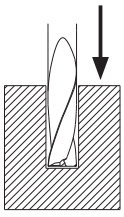
Applications	Workpiece Material	Depth of Cut (ap×ae) (mm)	Outside Dia. Dc (mm)	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25
 Shouldering	Aluminum Alloys	2.5Dc×0.5Dc	Spindle Revolution (min^{-1})	23,000	17,500	14,000	11,600	8,700	7,000	5,600
			Feed Rate (mm/min)	3,760	3,600	3,560	3,490	3,420	3,390	3,350
	High-silicon aluminum		Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,800
			Feed Rate (mm/min)	1,000	970	950	920	910	900	900

Slotting is not recommended.

Recommended Cutting Conditions (Plunge milling)

2ZDK

Applications	Workpiece Material	Application	Outside Dia. Dc (mm)	ϕ1	ϕ2	ϕ3	ϕ4	ϕ5	ϕ6	ϕ8
 Plunge milling	Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min^{-1})	19,500	11,200	8,300	6,200	5,000	4,200	3,200
			Feed Rate (mm/min)	300	380	520	520	520	520	520
	Alloy Steel		Spindle Revolution (min^{-1})	19,000	10,000	7,200	5,400	4,400	3,600	2,700
			Feed Rate (mm/min)	300	320	450	450	450	450	450
	Pre-hardened steel (30~45HRC)		Spindle Revolution (min^{-1})	16,000	8,000	3,900	2,900	2,300	1,900	1,500
			Feed Rate (mm/min)	210	210	210	210	210	210	210
	Nodular Cast Iron		Spindle Revolution (min^{-1})	16,000	10,000	7,200	5,400	4,400	3,600	2,700
			Feed Rate (mm/min)	200	300	390	390	390	390	390
	Aluminum Alloys		Spindle Revolution (min^{-1})	20,000	20,000	17,800	13,100	10,500	8,900	6,700
			Feed Rate (mm/min)	500	850	1,270	1,270	1,270	1,270	1,270
	Aluminum Alloy Casting		Spindle Revolution (min^{-1})	20,000	20,000	13,100	10,000	8,000	6,700	5,000
			Feed Rate (mm/min)	450	750	820	820	820	820	820

Applications	Workpiece Material	Application	Outside Dia.Dc (mm)	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20
 Plunge milling	Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min^{-1})	2,500	2,100	1,800	1,600	1,400	1,300
			Feed Rate (mm/min)	450	450	450	450	450	450
	Alloy Steel		Spindle Revolution (min^{-1})	2,200	1,800	1,500	1,350	1,200	1,100
			Feed Rate (mm/min)	400	400	400	400	400	400
	Pre-hardened steel (30~45HRC)		Spindle Revolution (min^{-1})	1,200	1,000	850	750	650	600
			Feed Rate (mm/min)	190	190	190	190	190	190
	Nodular Cast Iron		Spindle Revolution (min^{-1})	2,200	1,800	1,550	1,350	1,200	1,100
			Feed Rate (mm/min)	340	340	340	340	340	340
	Aluminum Alloys		Spindle Revolution (min^{-1})	5,400	4,500	3,800	3,400	3,000	2,700
			Feed Rate (mm/min)	1,270	1,270	1,270	1,270	1,270	1,270
	Aluminum Alloy Casting		Spindle Revolution (min^{-1})	4,000	3,400	2,900	2,500	2,200	2,000
			Feed Rate (mm/min)	820	820	820	820	820	820

NOT recommended for slotting

***This tool is specially designed for plunge milling and NOT recommended for slotting.**

- Coolant is recommended.
- Adjust cutting conditions to suit machine rigidity.
- Use chuck and machine with as high rigidity as possible.
- Stainless steel machining is NOT recommended.
- Adjust cutting conditions can be needed when machining a slant surface, depending on the slant angle. (fig.1)
  When workpiece slant degree is 30° or less, reduce the feed rate by 50%.
  When workpiece slant degree is more than 30°, reduce the revolution by 70% and the feed rate by 30%.

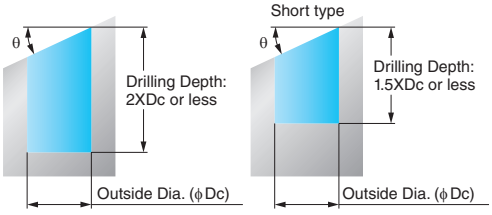


Fig.1

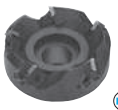
Milling

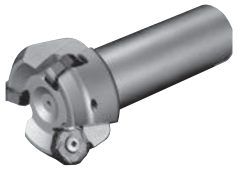
M

M1~M195

Milling Series		**M2~M8**
Product Lineup		M2
Milling Inserts		**M9~M25**
Milling Inserts Identification System		M9
Milling Inserts		M10
Lead Angle 45° / 20°		**M26~M45**
MFPN45		M26
MFK		M30
MOF45		M34
MOFX45	Easy edge adjustment	M36
MSE45		M38
MSE45-SF	Easy edge adjustment	M40
MSD45		M43
MSO45-S / MSO45 / MSO45-09		M44
Lead Angle 15°		**M46~M51**
MSRS15		M46
MSP15 / MSE15		M51
Lead Angle 0°		**M52~M113**
MEW		M54
MEC / MECX		M62
MEWH		M76
MECH		M80
MFWN		M88
MTE90-SF	Easy edge adjustment	M94
MTE90 / MTP90		M95
MSO90 / MSO90-S		M96
MSRS90		M98
MSR / MSR-BT50		M103
DMC / DMC-SX / DMC-H		M109
MEAL	End Mill for Aluminum Machining	M112
MTPS / MTES		M113
High Feed Cutter		**M114~M133**
MFH	MFH Harrier	M114
MFH	MFH Mini	M123
MFH	MFH Micro	M128
Multi-Function Machining End Mill		**M134~M139**
MEY		M134
MEZ-G		M138
Slot Mill		**M140~M165**
MSTA	Width 1.6, 2.2(2.25), 3.05, 4.05 mm fixed	M142
MSTB	Width 6 - 13 mm Semi-Adjustable	M146
MSTC	Width 14 - 23.3 mm Full-Adjustable	M151
Ball-nose End Mill / Radius Series (Face Mill + End Mill)		**M166~M185**
MRF / MRFW	Magic Ball	M166
MRW		M168
MRX		M174
MRP / MRP-S	Radius Mill	M180
Other Applications		**M186~M194**
MCSE	Chamfering End Mill	M186
MEF	Bolt Countersink End Mill	M188
METS	T-Slot Mill	M190
MGI	Grooving End Mill for M/C	M192
MVG	Ring Grooving End Mill for M/C	M194

Lead Angle 45° / Lead Angle 20° / Lead Angle 15°

Lead Angle	Applications / Shape	Facing	Chamfering
45°	**MFPN45** M26	●10-edge pentagonal inserts Double-sided pentagonal insert Economical with 10-edge insert ●Low cutting force due to helical cutting-edge design ●Dual Cutting Edge Design (High Toughness)	
45°	**MOF45** M34	●Octagonal Insert with 8-Edge Insert ●Insert sizes are available in 05 and 07 types ●Silver coated	
45°	**MOFX45** M36	●Octagonal Insert with 8-Edge Insert ●The insert is fixed by wedge clamp ●Easy edge adjustment ●SH Chipbreakers (for general purpose / low cutting force) and GT chipbreakers (tough edge)	
45°	**MSE45** (Standard / Multi-edge) M38	●The insert is fixed by wedge clamp ●Silver coated ●Standard edge type and fine pitch type	
45°	**MSE45-SF** (Easy edge adjustment) M40	●Easy edge adjustment ●Silver coated	
45°	**MSO45**  M44	●Use insert size with 13.494mm internal circumference	
20°	**MFK** M32	●High Efficiency Multi-edge Cutter for Cast Iron ●10-edge pentagonal inserts Economical Double-sided 10-edge Insert ●Low cutting force due to helical cutting-edge design Improved surface finish, minimizing chattering and prevented burr formation ●Dual Cutting Edge Design (High Toughness)	

Lead Angle	Applications / Shape	Facing	Chamfering
45°	**MFPN45**  M27	●10-edge pentagonal inserts Double-sided pentagonal insert Economical with 10-edge insert ●Low cutting force due to helical cutting-edge design ●Dual Cutting Edge Design (High Toughness) ●With ϕ32 cylindrical shank	
45°	**MSD45** M43	●Low cutting force ●For small machines and M/C ●For thin workpiece milling (Anti-vibration)	
45°	**MSE45** M39	●Low cutting force ●For small machines and M/C ●For thin workpiece milling (Anti-vibration)	
45°	**MSO45-S-09** M45	●Screw clamping and 09 size insert ●Smaller insert for MSO45 series	
45°	**MSO45-S** M44	●High efficiency machining of Stainless steel ●Stronger edge with Insert Thickness 3.97 mm	
15°	**MSRS15** M48	●For Heavy Milling ●Max. ap 12mm ●Chip evacuation per unit time is increased	
15°	**MSP15** M51	●Facing ●Medium to Roughing of Steel / Cast iron	
15°	**MSE15** M51	●Low cutting force	

Lead Angle 0° (Double-sided Insert)

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MEW End Mill** M54	●Economical Double-sided 4-edge Insert ●Obtuse edge increases cutting edge toughness ●Smooth surface wall due to low cutting force and reduced chattering		
	MEW Face Mill M55			
	MEW type Head (Modular type) M56			

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MFWN Face Mill** M90	●Economical Double-sided 6-edge Insert ●Superior fracture resistance due to thick edge design ●"Large slant edge" Design reduces shock when cutting edge enters the workpiece ●Low cutting force and reduce chattering ●End mills have ϕ32 cylindrical shank		
	MFWN End Mill M91			

Lead Angle 0° (Heavy Milling)

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0° (Long Cutting Edge)	**MEWH** M77	●Low cutting force and sharp cutting performance ●Excellent surface finish quality ●Economical Double-sided 4-edge Insert ●High quality and stable machining with heavy milling		
	MEWH Shell Mill M78	●MEWH Shell Mill		
	MSR M104	●Low cutting force and restrain chattering with notched insert ●Chipbreaker design with specialized notches improves chip evacuation ●Chipbreaker achieves stabilized machining for heavy milling		
	MSR-BT50 M105	●Highly rigid BT50 Arbor integrated for MSR		

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0° (Long Cutting Edge)	**MECH** M80	●Notched insert improves higher productivity		
	MECH Shell Mill M81	●MECH Shell Mill		
	MECH-BT50 **MECH-BT50SA** M81	●High rigid BT50 Arbor integrated for MECH ●Head exchangeable type is available (MECH-BT50SA)		

Lead Angle 0°

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MEC** M62	●Good squareness ●Low cutting force ●The silver coating prevents chip wear on the tool body ●With coolant hole (Over ϕ16)		
	MEC type Head (Modular type) M65			
	MECX M72	●Good squareness ●Small size insert with multi-edge specification ●Low cutting force ●The silver coating prevents chip wear on the tool body ●With coolant hole		
	MSO90-S M97	●Screw clamping & 4-edge insert reduces cost ●Good chip evacuation ●Low cutting force		
	MTE90 M95	●Low cutting force ●For shouldering of Cast iron, Non-ferrous Metals		
	MTP90 M95	●Medium to Roughing of Steel / Cast iron ●For small machines and M/C		

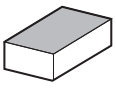
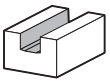
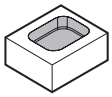
Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**DMC** M109	●For small milling machine and M/C		
	DMC-H M111	●High Rake ●For small milling machine and M/C		
	DMC-SX M110	●For small milling machine and M/C		
	MTPS / MTES M113	●For small dia., Low cutting force		
	MEAL M112	●For Aluminum alloys ●With coolant hole		

Lead Angle 0°

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MEC** M64	●The twisted cutting edge improves cutting performance ●Smooth surface of shoulder wall ●Good squareness ●The silver coating prevents chip wear on the tool body ●With coolant hole		
	MECX M73	●Efficient machining due to small diameter cutter that holds multiple inserts ●Recommended for small machines: low cutting force and high strength design ●The silver coating prevents chip wear on the tool body ●With coolant hole		
	MSO90 M96	●Highly efficient multiple insert design ●Safe design with shim ●Lower weight owing to slim design		

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MSRS90** M100	●High efficiency, low cutting force and stable machining without chatter ●Various expansive possibilities due to combining neutral insert and custom-ordered cutter		
	MTE90-SF (Easy edge adjustment) M94	●A simplified adjusting mechanism eases the task of adjusting cutting edge fluctuation ●Silver coated		

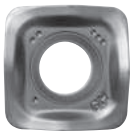
High Feed Cutter NEW

Applications / Shape	Facing	Shouldering	Slotting	Pocketing	Cutting Dia. ϕD
					ϕ8 ϕ16 ϕ25 ϕ32 ϕ40 ϕ50 ϕ80 ϕ160

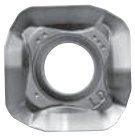
MFH Harrier Face Mill

M116

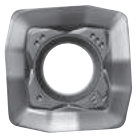
●Applicable to various applications with 3 types of inserts



GM (General purpose)



LD (Large ap) MAX. ap=5mm



FL (With Wiper Edge) Applicable for both roughing and finishing

ϕ50 — ϕ160

MFH Harrier End Mill

M119

●3D convex cutting edge reduces shock of biting workpiece
●Multi-functional cutter for ramping, helical milling vertical milling (plunging) etc. (GM type)

(SOMT10 type) ϕ25 ϕ40

(SOMT14 type) ϕ50 ϕ80

MFH Harrier type Head (Modular type)

M120

ϕ25 ϕ40

MFH Mini End Mill

M124

●Economical Double-sided 4-edge Insert

GM

●High efficiency and high feed machining at small dia. machining and small machining center

ϕ16 ϕ32

MFH Mini type Head (Modular type)

M125

ϕ16 ϕ32

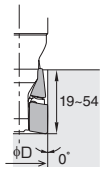
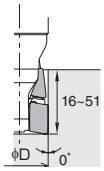
MFH Micro End Mill

M130

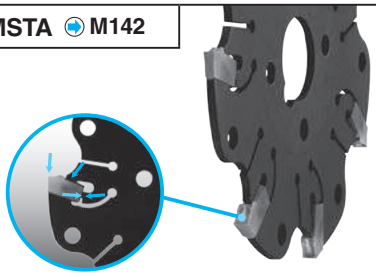
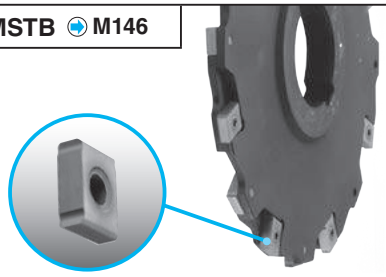
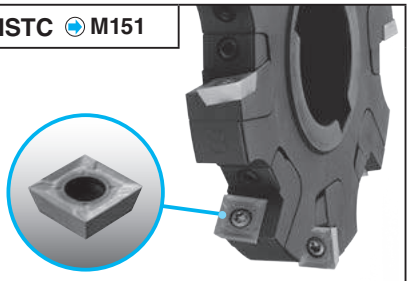
●Micro Dia. Cutter for High Feed Machining
●High efficiency machining due to low cutting force and reduced chattering

ϕ8 ϕ16

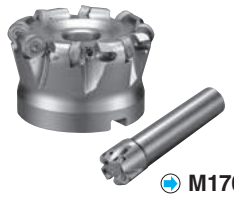
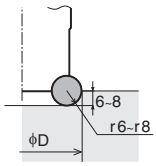
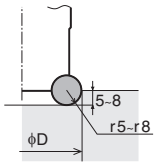
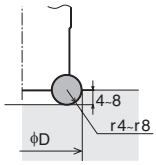
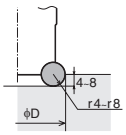
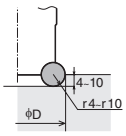
Multi-Function Machining End Mill

Applications / Shape	Facing	Shouldering	Slotting	Deep Slotting	Pocketing	Drilling	Lead Angle and Max. ap	Cutting Dia. ϕD (ϕ16 ϕ25 ϕ50)
MEY M134	●Multi-function machining (Drilling / Ramping / Shouldering / Grooving) ●High efficiency mold machining		●Low cutting force, Good chip evacuation ●Full 2-Flute structure and high stability ●Good chip control when Ramping		●Cutting diameters that are larger than the shank diameters enables wall shouldering ●The silver coating prevents chip wear on the tool body			
MEZ-G M138	●Multi-function machining (Drilling / Ramping / Shouldering / Grooving) ●High efficiency mold machining		●Low cutting force, Good chip evacuation ●The silver coating prevents chip wear on the tool body		●The clearance groove prevents chip welding			

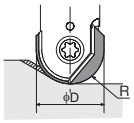
Slot Mill MST

MSTA M142	MSTB M146	MSTC M151
		
●Self-clamping type ●Remove insert with appropriate wrench	●Easy screw on tangential clamped insert	●Adjustable slotting width due to unique cam adjustment structure

Radius

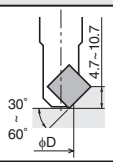
Applications / Shape	Facing	Shouldering	Pocketing	Lead Angle and Max. ap	Cutting Dia. ϕD
MRW Face Mill NEW **End Mill**  M170	●High efficiency radius cutter with double-sided insert ●Combine sharpness and cutting edge strength (A.R. Max. +12°) ●Prevent insert rotation during machining with Flat Lock Structure ●Wide application range from steel to heat-resistant alloys				
MRX Face Mill NEW M175	●Low cutting force and high performance Radius Cutter ●Low cutting force due to helical cutting-edge design (A.R. Max. +10°) ●Prevent insert rotation during machining with Flat Lock Structure ●Wide application from facing, grooving, pocketing to plunging ●Wide application range from steel to heat-resistant alloys				
MRX End Mill NEW M176					
MRX type Head (Modular type) NEW M177					
MRP-S M180	●For mold machining ●Recommended for various types of machining (Contouring, Helical Milling, Ramping, etc.) ●Firm insert seat owing to ratchet design				
MRP M181					

Ball-nose End Mill

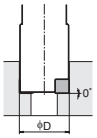
Applications / Shape	Contouring / Profiling	Pocketing	Lead Angle and Max. ap	Cutting Dia. ϕD
MRF M166	●For high quality mold finishing ●High R-accuracy (Insert's R-accuracy: Under ±0.01mm) ●The bushing ensures insert installation accuracy			
MRFW M166	●Carbide Shank ●For high quality mold finishing ●High R-accuracy (Insert's R-accuracy: Under ±0.01mm) ●The bushing ensures insert installation accuracy ●Superior to anti vibration, and stable machining is possible with long overhang length without chattering			

Product Lineup

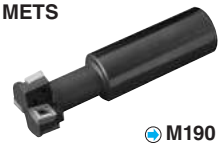
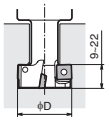
Chamfering

Applications / Shape	Chamfering	Back Chamfering	V Shape Slotting	Countersinking	Lead Angle and Max. ap
MCSE M186	●For 30°, 45°, 60° Chamfering ●Economical 4-edge Insert ●Available back chamfering				

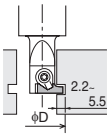
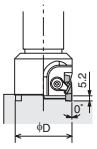
Bolt Countersinking

Applications / Shape	Bolt Countersinking	Facing	Shouldering	Lead Angle and Max. ap
MEF M188	●Countersink for hexagon socket bolt (M6~M30) ●Economical 4-edge Insert			

T-Slotting

Applications / Shape	T-Slotting	Back side milling	Lead Angle and Max. ap
METS  M190	●T-Slotting ●Recommended for high feed machining with 2 flute design ●Economical 4-edge Insert		

Grooving

Applications / Shape	Internal Grooving	Ring Grooving	Lead Angle and Max. ap
MGI M192	●Edge Width 1.0~4.0mm ●Grooving for M/C		
MVG M194		●Cutting Dia. ϕ30~ϕ75 ●Edge Width 4.0~4.9mm ●O-Ring Grooving (G Series)	

Milling Inserts Identification System

Symbol	Shape
H	Hexagon
O	Octagon
P	Pentagon
S	Square
T	Triangle
C	80° Rhombic
D	55° Rhombic
E	75° Rhombic
F	50° Rhombic
M	86° Rhombic
V	35° Rhombic
W	Trigon
L	Rectangle
A	85° Parallelogram
B	82° Parallelogram
K	55° Parallelogram
R	Round

Shown angle stands for acute angle for rhombic and parallelogram inserts.

(1) Shape

Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other angles

(2) Relief Angle

Symbol (Class)	Tolerance (mm)		
	Corner Height	Thickness	I.C. Size
A	±0.005	±0.025	±0.025
F			±0.013
C	±0.013		±0.025
H			±0.013
E	±0.025		±0.025
G		±0.13	
J	±0.005	±0.025	±0.05~±0.15
K*	±0.013		
L*	±0.025		
M*	±0.08~±0.18	±0.13	
N*		±0.025	
U*	±0.13~±0.38	±0.13	±0.08~±0.25

Insert's periphery is as fired.
* Tolerance difference is depending on insert size.

(3) Tolerance

Symbol	Shape
W	No chipbreaker, with hole
T	Single-sided chipbreaker, with hole
F	Double-sided chipbreakers, without hole
N	No Chipbreaker, without hole
R	Single-sided chipbreaker, without hole
M	Single-sided chipbreaker, with hole
A	No chipbreaker, with hole

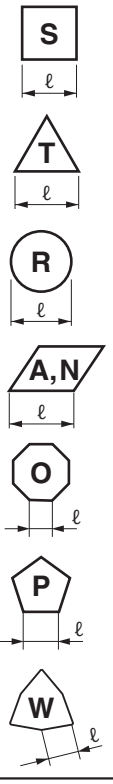
(4) Chipbreaker / Hole

Symbol	Shape
F	Sharp Edge
E	R-honed
T	Chamfered
S	Chamfered + R-honed

(9) Edge Preparation

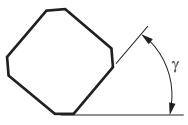
S	E	K	N	12	03	A	F	T	N	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

(5) Edge Length

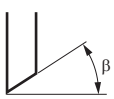


(6) Thickness	
Symbol	Thickness(mm)
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35

(7) Lead Angle	
Symbol	Lead Angle
A	45°
D	60°
E	75°
F	85°
H	87°
P	90°
X	65°



(8) Relief Angle	
Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
R	10°
S	14°
T	22°
U	23°

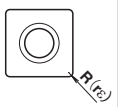


(10) Hand of Tool	
Symbol	Hand of Tool
R	Right-hand
L	Left-hand
N	Neutral

(11) Manufacturer's Option
Chipbreaker, etc.

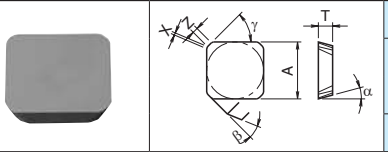
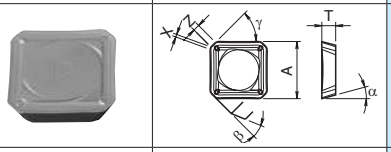
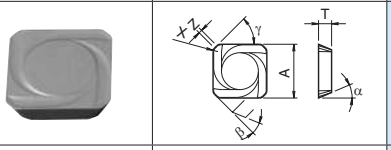
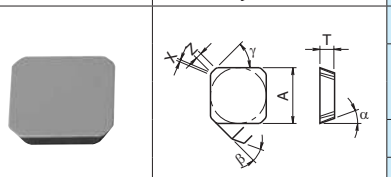
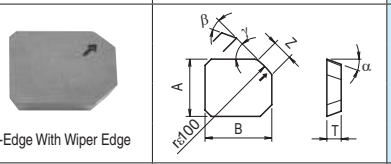
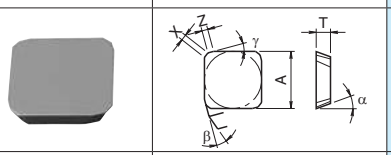
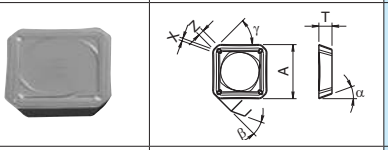
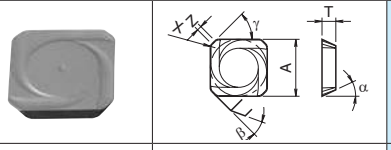
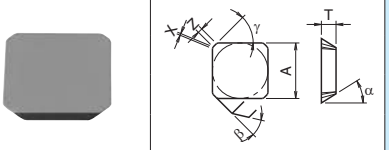
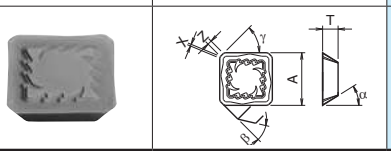
In case of indicating corner-R (rε) at (7) and (8)

(7) (8) Corner-R (rε)(mm)	
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0



Milling Inserts

Classification of usage			
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■ ★ ★
		Mold Steel	■ ★ ★
	M	Stainless Steel	★
	K	Gray Cast Iron	★ ☆
		Nodular Cast Iron	★
	N	Non-ferrous Metals	★
	S	Heat-resistant Alloys	★
		Titanium Alloys	★ ☆
	H	Hard Materials	□ □

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	X	Z	rε	Angle α	β	γ	Cermet TN60	TN100M	TC60M	CVD Coated Carbide CA6535	CA420M	MN PR1535	MEGACOAT PR1225	PR1210	PVD Coated Carbide PR830	Carbide KW10	Ref. to Page for Applicable Toolholders
	SDCN 1203AUTN	12.70	3.18	0.5	1.2	-	15°	23°	45°		●					●				M43
	SDKN 1203AUTN										●					●	●			
	1203AUFN																		●	
	SDKN 1504AUTN	15.875	4.76								●					●				-
	SDKR 1203AUEN-S	12.70	3.18	0.5	1.7	-	15°	23°	45°		●					●				M43
	SDMR 1203AUER-H	12.70	3.18	R1.0	0.8	-	15°	23°	45°							●				
	SEEN 1203AFTN	12.70	3.18	0.5	1.4	-	20°	25°	45°		●									M38
	SEKN 1203AFTN										●					●	●	●		M39
	1203AFFN																		●	M40
	SEKN 1204AFTN		4.76													●				-
	SEKN 1504AFTN	15.875														●				
 1-Edge With Wiper Edge	SEEN 1203AFTR-W	12.70	3.18	-	3.5	B= 14.56	20°	25°	45°		●									M40
	1203AFFR-W																		●	
	SEKN 1203EFTR	12.70	3.18	1.2	1.4	-	20°	25°	15°		●									M51
	SEKR 1203AFEN-S	12.70	3.18	0.5	1.7	-	20°	25°	45°		●					●		●		M38 M39 M40
	SEMR 1203AFER-H	12.70	3.18	R1.0	1.0	-	20°	25°	45°							●		●		
	SOKN 13T3AXTN	13.494	3.97	0.5	1.1	-	27°	32°	45°		○					○	○			M44
	13T3AXFN																		○	
	SOKR 13T3AXEN-J	13.494	3.97	0.5	1.1	-	27°	32°	45°		○					○			○	

* MN indicates MEGACOAT NANO.

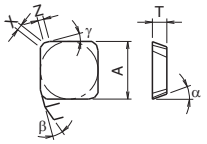
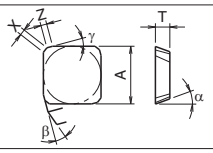
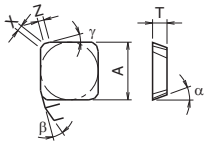
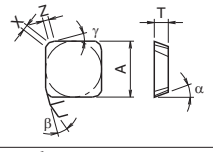
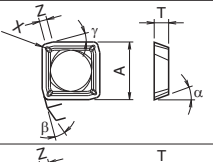
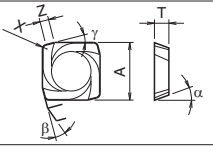
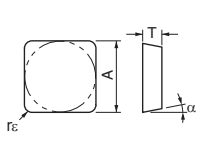
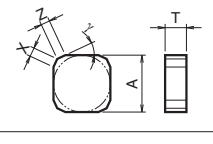
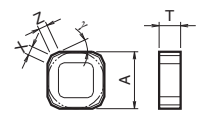
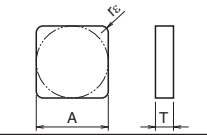
Inserts are sold in 10 piece boxes

SEEN-W type Inserts are sold in 5 piece boxes

● : Std. Item
○ : Check Availability

Milling Inserts

Classification of usage			
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■
		Mold Steel	■
	M	Stainless Steel	★
	K	Gray Cast Iron	★ ☆
		Nodular Cast Iron	★ ☆
	N	Non-ferrous Metals	★
	S	Heat-resistant Alloys	★
		Titanium Alloys	★ ☆
	H	Hard Materials	□

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle			Cermet			CVD Coated Carbide		MN	MEGACOAT		PVD Coated Carbide	Carbide	Ref. to Page for Applicable Toolholders
			A	T	X	Z	rε	α	β	γ	TN60	TN100M	TC60M	CA6535	CA420M	PR1535	PR1225	PR1210	PR830	KW10	
		SPCN 1203EDTR	12.70	3.18	R1.0	2.0	-	11°	15°	15°		●									M51
		SPKN 1203EDTR			1.0							●					●	●			
		1203EDTL			R1.0							●									-
		1203EDER			1.0	1.6									●						M51
		1203EDFR																		●	
		SPKN 1504EDTR	15.875	4.76		2.2						●					●	●			-
		1504EDFR																		●	
		SPEN 1203EEER	12.70	3.18	1.0	1.4	-	11°	20°	15°					●						-
		1203EESR																●			
		SPCN 1203XPTR	12.70	3.18	R1.0	2.0	-	11°	11°	25°		●									-
		SPKN 1203XPTR			1.0							●									
		1203XPTL			R1.0																
		1203XPFR			1.0															●	
		SPKN 1504XETR	15.875	4.76					20°			●									
		SPCN 1904EETR1	19.05	4.76	0.7	1.2	-	11°	20°	15°		●									-
		SPKR 1203EDER-S	12.70	3.18	R1.0	2.0	-	11°	15°	15°		●					●				M51
		SPMR 1203EDER-H	12.70	3.18	R1.0	2.0	-	11°	15°	15°							●				
		SPMN 120308	12.70	3.18	-	-	0.8	11°	-	-	●	●									-
		120312					1.2				●	●									
		SPMN 120408		4.76			0.8								●			●			
		120412					1.2								●						
		SPGN 090304	9.525	3.18			0.4													●	
		090308					0.8													●	
		SPGN 120304	12.70				0.4													●	
		120308					0.8													●	
		SNCN 1204XNTN	12.70	4.76	2.0	2.0	-	-	-	25°		●									-
		SNKN 1204XNTN										●									
		SNMF 1204XNTN	12.70	4.76	2.0	2.0	-	-	-	25°		●									-
		SNMN 120408	12.70	4.76	-	-	0.8	-	-	-								●			-
		120412					1.2								●			●			
		120424					2.4								●						

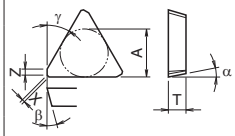
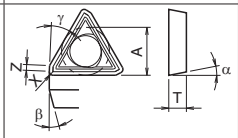
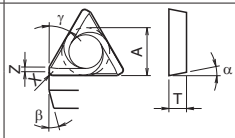
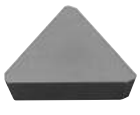
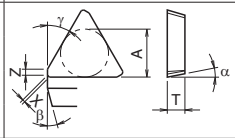
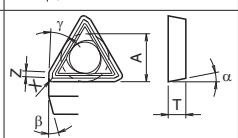
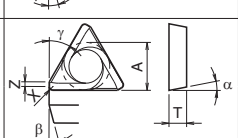
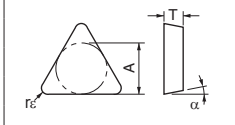
* MN indicates MEGACOAT NANO.

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts

Classification of usage																		
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel		■					★		★		Ref. to Page for Applicable Toolholders
		Mold Steel		■					★		★		
	M	Stainless Steel							★				
	K	Gray Cast Iron								★		☆	
		Nodular Cast Iron								★			
	N	Non-ferrous Metals										★	
	S	Heat-resistant Alloys							★				
		Titanium Alloys								★		☆	
	H	Hard Materials							□		□		

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	X	Z	rε	Angle α	β	γ	Cermet TN60	TN100M	TC60M	CVD Coated Carbide CA6535	CA420M	MN PR1535	MEGACOAT PR1225	PR1210	PVD Coated Carbide PR830	Carbide KW10	Ref. to Page for Applicable Toolholders
	TEKN 1603PTTR	9.525	3.18	R0.8	1.0	-	20°	22°	30°		●					●				M113
	TEKN 1603PTFR			0.7													●		●	
	TEEN 2204PTTR	12.70	4.76	R1.0	1.4						●									M94 M95
	TEKN 2204PTTR										●					●		●		
	TEKN 2204PTFR			0.7													●		●	
	TEKR 2204PTER-S	12.70	4.76	R1.0	1.4	-	20°	22°	30°		●					●		●		M94 M95
	TEMR 1603PTER-H	9.525	3.18	R0.8	1.2	-	20°	22°	30°							●				M113
	TEMR 2204PTER-H	12.70	4.76	R1.0	1.4											●		●		M94 M95
 	TPKN 1603PDTR	9.525	3.18	0.7	1.2	-	11°	15°	30°		●					●	●			-
	TPKN 1603PDFR																		●	
	TPKN 2204PDTR	12.70	4.76	0.7	1.6						●					●	●			M95
	TPKN 2204PDFR																		●	
	TPKR 2204PDER-S	12.70	4.76	R1.0	1.4	-	11°	15°	30°		●					●				
	TPMR 1603PDER-H	9.525	3.18	R0.8	1.2	-	11°	15°	30°							●				-
	TPMR 2204PDER-H	12.70	4.76	R1.0	1.4											●				M95
	TPMN 110304	6.35	3.18	-	-	0.4	11°	-	-										●	M113
	TPMN 110308					0.8													●	
	TPMN 160304	9.525				0.4					●								●	-
	TPMN 160308					0.8					●								●	
	TPMN 160312					1.2					●									
	TPMN 220408	12.70	4.76			0.8					●									
	TPGN 090202	5.56	2.38			0.2				●									●	-
	TPGN 090204					0.4				●									●	
	TPGN 090208					0.8				●										
	TPGN 110302	6.35	3.18			0.2													●	M113
	TPGN 110304					0.4				●									●	
	TPGN 110308					0.8				●									●	
	TPGN 160304	9.525				0.4				●									●	-
	TPGN 160308					0.8				●									●	
	TPGN 160312					1.2													●	

* MN indicates MEGACOAT NANO.

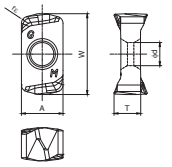
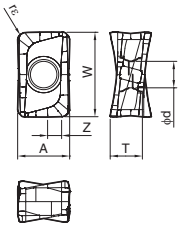
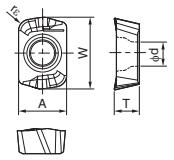
Cutting Range	Chipbreaker		Features
Finishing - Roughing	S		S chipbreaker for general-purpose cutter. Low cutting force is possible with 13° chipbreaker rake angle. Recommended for various ap with 3-step chipbreaker design.
Medium - Roughing	H		H chipbreaker for general-purpose cutter. Smooth chip evacuation due to the chipbreaker's smooth rake face. 20% less cutting force than non-chipbreaker type due to 25° rake angled chipbreaker.

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage														
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel				★								
		Mold Steel				★								
	M Stainless Steel	Austenitic related			★	☆								
		Martensitic related		★		☆								
		Precipitation Hardening				★								
	K	Gray Cast Iron					★							
		Nodular Cast Iron					★							
	N	Non-ferrous Metals												
	S	Heat-resistant Alloys		★		☆								
		Titanium Alloys				★								
	H	Hard Materials					□							

Insert Handed Insert shows Right-hand		Description	Dimension (mm)						Angle			Cermet	CVD Coated Carbide		MEGACOAT NANO			MEGA COAT			Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	Ref. to Page for Applicable Toolholders
			A	T	φd	W (X)	Z	rε	α	β	γ	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050	
 General purpose		LOGU 030310ER-GM	6.2	3.96	3.45	11.9	-	1.0	-	-	-		●		●	●	●					M124 M125
 General purpose		LOMU 100404ER-GM	6.6	4.0	3.4	10.9	2.1	0.4	-	-	-		●		●	●	●					M54 M55 M56
		LOMU 100408ER-GM					1.7	0.8					●		●	●	●					
		LOMU 100412ER-GM					1.3	1.2					●		●	●	●					
		LOMU 100416ER-GM					1.0	1.6					●		●	●	●					
		LOMU 100420ER-GM					1.0	2.0					●		●	●	●					
		LOMU 150504ER-GM	9.2	5.6	4.8	15.7	2.2	0.4	-	-	-		●		●	●	●					
		LOMU 150508ER-GM					1.8	0.8					●		●	●	●					
		LOMU 150510ER-GM					1.6	1.0								●						
		LOMU 150512ER-GM					1.4	1.2					●		●	●	●					
		LOMU 150516ER-GM					1.0	1.6					●		●	●	●					
		LOMU 150520ER-GM					0.6	2.0					●		●	●	●					
 Low cutting force		LOMU 100408ER-SM	6.6	4.0	3.4	10.9	1.7	0.8	-	-	-		●		●	●	●					
		LOMU 150508ER-SM	9.2	5.6	4.8	15.7	1.8	0.8					●		●	●	●					
 Tough Edge (For Heavy Milling)		LOMU 100408ER-GH	6.6	4.0	3.4	10.9	1.7	0.8	-	-	-		●		●	●	●					
		LOMU 150508ER-GH	9.2	5.6	4.8	15.7	1.8	0.8					●		●	●	●					
 General purpose		LPGT 010210ER-GM	4.19	2.19	2.1	6.26	-	1.0	-	-	-		●		●	●						M130

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage			
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	
		Mold Steel	
	M Stainless Steel	Austenitic related	
		Martensitic related	
		Precipitation Hardening	
	K	Gray Cast Iron	★ ☆
		Nodular Cast Iron	★ ☆
	N	Non-ferrous Metals	
	S	Heat-resistant Alloys	
		Titanium Alloys	
	H	Hard Materials	

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) A	T	φd	W (X)	Z	rε	Angle α	β	γ	Cermet TN100M	CVD Coated Carbide CA6535	CA420M	MEGACOAT NANO PR1535	PR1525	PR1510	MEGA COAT PR1225	PR1210	Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride Ceramic CS7050	Ref. to Page for Applicable Toolholders
High speed machining		**PNEA 1106XNTN-T01020**	16.94	6.5	-	1.5	1.5	-	-	-	-									●	●	M32
High speed machining (With Chipbreaker)		**PNEG 1106XNTR-T00515**	17.07	6.35	-	-	-	-	-	-	-									●	●	
Surface-Finish Oriented		**PNEG 1106XNEN-GL**	17.18			2.6	2.6							●		●	●					
General purpose		**PNMG 1106XNEN-GM**												●		●	●					
Tough Edge		**PNMG 1106XNEN-GH**	17.23	6.35	-	2.0	2.0	-	-	-	-			●		●	●					
2-Edge With Wiper Edge		**PNEG 1106XNER-W**	18.02				10.0							●		●	●					

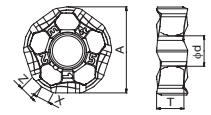
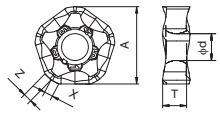
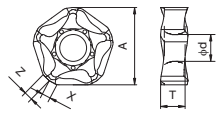
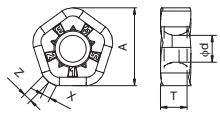
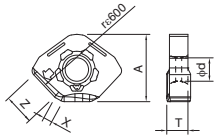
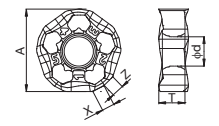
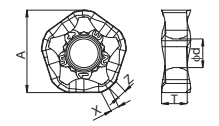
Inserts are sold in 10 piece boxes

PNEG1106XNER-W Inserts are sold in 5 piece boxes

● : Std. Item

Milling Inserts (With Hole)

Classification of usage													Ref. to Page for Applicable Toolholders
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■			★		☆					
		Mold Steel	■			★		☆					
	M Stainless Steel	Austenitic related			★	☆		☆					
		Martensitic related		★		☆							
		Precipitation Hardening				★							
	K	Gray Cast Iron					★		☆				
		Nodular Cast Iron					★		☆				
	N	Non-ferrous Metals											
	S	Heat-resistant Alloys		★		☆		☆					
		Titanium Alloys				★			☆				
	H	Hard Materials					□						

Insert		Description	Dimension (mm)						Angle			Cermet	CVD Coated Carbide		MEGACOAT NANO			MEGA COAT		Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	Ref. to Page for Applicable Toolholders
			A	T	φd	W (X)	Z	rε	α	β	γ	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050	
Surface-Finish Oriented (Precision Class)		**PNEU 1205ANER-GL**	17.51	5.56	6.2	2.7	2.7	-	-	-	-		●		●	●	●	●	●			**M26 M27**
General purpose		**PNMU 1205ANER-GM**	17.88			2.0	2.0						●		●	●	●	●	●			
Low cutting force		**PNMU 1205ANER-SM**											●		●	●	●	●	●			
Tough Edge (For Heavy Milling)		**PNMU 1205ANER-GH**	17.98	6.17									●		●	●	●	●	●			
2-Edge With Wiper Edge		**PNEU 1205ANER-W**	17.85	5.56		2.3	8.1					●	●		●	●	●					
Surface-Finish Oriented (Precision Class)		**PNEU 1205ANEL-GL**	17.51			2.7	2.7						●		●	●	●					**M26**
General purpose		**PNMU 1205ANEL-GM**	17.88			2.0	2.0						●		●	●	●					

● : Std. Item

Inserts are sold in 10 piece boxes

PNEU1205ANER-W Inserts are sold in 5 piece boxes

Milling Inserts (With Hole)

| Classification of usage | | |

Milling Inserts (With Hole)

Classification of usage																
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel				★										
		Mold Steel				★										
	M Stainless Steel	Austenitic related			★	☆										
		Martensitic related		★		☆										
		Precipitation Hardening				★										
	K	Gray Cast Iron					★									
		Nodular Cast Iron					★									
	N	Non-ferrous Metals													★	☆
	S	Heat-resistant Alloys		★		☆										
		Titanium Alloys				★										
	H	Hard Materials					□									

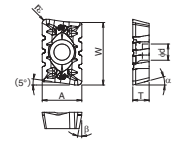
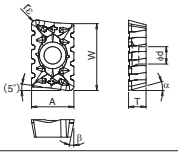
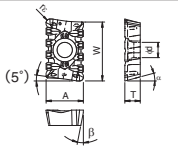
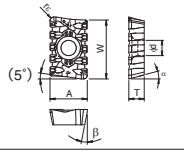
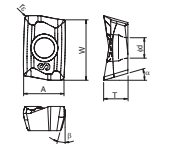
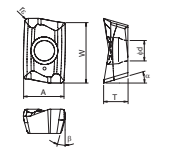
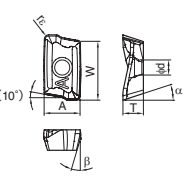
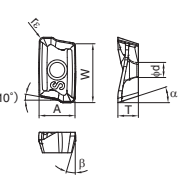
Insert (Handed Insert shows Right-hand)		Description	Dimension (mm)						Angle			Cermet	CVD Coated Carbide		MEGACOAT NANO			MEGA COAT		Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	DLC Coated Carbide	Carbide	Ref. to Page for Applicable Toolholders
			A	T	ϕd	W (X)	Z	rε	α	β	γ	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050	PDL025	GW25	
General purpose		SOMT 100420ER-GM	10.30	4.58	4.6	-	-	2.0	16°	-	-		●		●	●	●							M116 M118 M119 M120
		140520ER-GM	14.14	5.56	5.8								●		●	●	●							
Large ap		SOMT 100420ER-LD	10.45	4.58	4.6	-	0.9	2.0	16°	-	-		●		●	●	●							
		140520ER-LD	14.76	5.56	5.8		1.6						●		●	●	●							
With Wiper Edge		SOMT 100420ER-FL	10.44	4.58	4.6	-	1.4	2.0	16°	-	-		●		●	●	●							
		140514ER-FL	14.57	5.56	5.8		3.1	1.4					●		●	●	●							
Surface-Finish Oriented (Precision Class)		WNEU 080608EN-GL	14.02	6.65	6.2	-	1.5	0.8	-	-	-		●		●	●	●							M64 M91
General purpose		WNMU 080604EN-GM					1.7	0.4					●		●	●	●							
		080608EN-GM					1.3	0.8					●		●	●	●							
Low cutting force		WNMU 080608EN-SM											●		●	●	●							
Tough Edge (For Heavy Milling)		WNMU 080608EN-GH											●		●	●	●							
Non-ferrous Metals (3-edges)		WNGT 080608FN-AM					1.5															●	●	

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage			
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	
		Mold Steel	
	M Stainless Steel	Austenitic related	
		Martensitic related	
		Precipitation Hardening	
	K	Gray Cast Iron	
		Nodular Cast Iron	
	N	Non-ferrous Metals	
	S	Heat-resistant Alloys	
		Titanium Alloys	
	H	Hard Materials	

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) A	T	ϕd	W (X)	rε (Z)	Angle α	β	γ	Cermet TN100M	CVD Coated Carbide CA6535	MN PR1535	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR830	DLC Coated Carbide PDL025	Carbide GW25	Ref. to Page for Applicable Toolholders
3-Notched		APMT	250608ER-NB3	15.875	6.35	6.5	25	0.8	15°	11°	-					●	●	●			M104 M105
			250616ER-NB3					1.6								●	●	●			
			250640ER-NB3					4.0								●	●	●			
		APMT	250616EL-NB3					1.6								●		●			-
4-Notched		APMT	250608ER-NB4	15.875	6.35	6.5	25	0.8	15°	11°	-					●	●	●			M104 M105
			250616ER-NB4					1.6								●	●	●			
			250640ER-NB4					4.0								●	●	●			
		APMT	250616EL-NB4					1.6								●		●			-
3-Notched / Low Cutting Force		APMT	250616ER-NB3P	15.875	6.35	6.5	25	1.6	15°	11°	-					●	●	●			M104 M105
4-Notched / Low Cutting Force		APMT	250616ER-NB4P	15.875	6.35	6.5	25	1.6	15°	11°	-					●	●	●			M104 M105
		BDMT	070302ER-JS	4.6	2.6	2.3	6.7	0.2	16°	15°	-		●	●	●			●			M72 M73
			070304ER-JS					0.4					●	●	●			●			
			070308ER-JS					0.8					●	●	●			●			
		BDMT	070302ER-JT	4.6	2.6	2.3	6.7	0.2	16°	15°	-		●	●	●		●	●			
			070304ER-JT					0.4					●	●	●		●	●			
			070308ER-JT					0.8					●	●	●		●	●			
Non-ferrous Metals		BDGT	11T302FR-JA	6.7	3.8	2.8	11.0	0.2	18°	13°	-								●	●	M62 M63 M64 M65
			11T304FR-JA					0.4											●	●	
			11T308FR-JA					0.8											●	●	
		BDGT	170404FR-JA	9.6	4.9	4.4	17.0	0.4	18°	13°	-								●	●	
			170408FR-JA					0.8											●	●	
			170420FR-JA					2.0											●	●	
			170431FR-JA					3.1											●	●	
Stainless Steel / Low cutting force		BDMT	110302ER-JS	6.3	3.0	2.8	11.0	0.2	18°	15°	-		●	●	●			●			M62 M63
			110304ER-JS					0.4					●	●	●			●			
			110308ER-JS					0.8					●	●	●			●			
		BDMT	11T302ER-JS	6.7	3.8	2.8	11.0	0.2	18°	13°	-		●	●	●			●			M62 M63 M64 M65
			11T304ER-JS					0.4					●	●	●			●			
			11T308ER-JS					0.8					●	●	●			●			
		BDMT	170404ER-JS	9.6	4.9	4.4	17.0	0.4	18°	13°	-		●	●	●			●			
			170408ER-JS					0.8					●	●	●			●			

* MN indicates MEGACOAT NANO.

Inserts are sold in 10 piece boxes

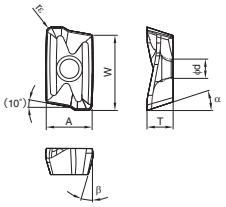
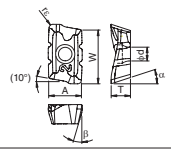
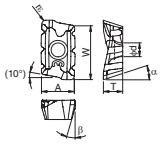
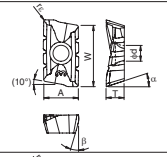
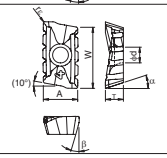
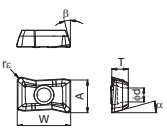
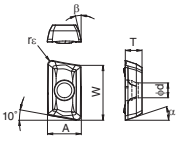
● : Std. Item

Milling Inserts (With Hole)

Classification of usage

★ : Roughing / 1st Choice
☆ : Roughing / 2nd Choice
■ : Finishing / 1st Choice
□ : Finishing / 2nd Choice
(In case hardness is under 45HRC)

P	Carbon Steel / Alloy Steel	■			★	★		☆				
	Mold Steel	■			★	★		☆				
M Stainless Steel	Austenitic related			★	☆	☆		☆				
	Martensitic related		★	☆								
	Precipitation Hardening			★								
K	Gray Cast Iron						★					
	Nodular Cast Iron						★					
N	Non-ferrous Metals											
S	Heat-resistant Alloys		★	☆	★	★						
	Titanium Alloys			★			★					
H	Hard Materials				□			□				

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) A	T	φd	W (X)	rε (Z)	Angle α	β	γ	Cermet TN100M	CVD Coated Carbide CA6535	MN PR1535	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR830	Carbide GW25	Ref. to Page for Applicable Toolholders
		BDMT 110302ER-JT	6.3	3.0	2.8	11.0	0.2	18°	15°	-		●	●	●		●	●		M62 M63
		BDMT 110304ER-JT					0.4					●	●	●		●	●		
		BDMT 110308ER-JT					0.8					●	●	●		●	●		
		BDMT 11T302ER-JT	6.7	3.8	2.8	11.0	0.2	18°	13°	-		●	●	●		●	●		M62 M63 M64 M65
		BDMT 11T304ER-JT					0.4				●	●	●	●		●	●		
		BDMT 11T308ER-JT					0.8				●	●	●	●		●	●		
		BDMT 11T312ER-JT					1.2					●	●	●		●	●		
		BDMT 11T316ER-JT					1.6					●	●	●		●	●		
		BDMT 11T320ER-JT					2.0					●	●	●		●	●		
		BDMT 11T324ER-JT					2.4					●	●	●		●	●		
		BDMT 11T331ER-JT					3.1					●	●	●		●	●		
		BDMT 170404ER-JT	9.6	4.9	4.4	17.0	0.4	18°	13°	-		●	●	●		●	●		
		BDMT 170408ER-JT					0.8				●	●	●	●		●	●		
		BDMT 170412ER-JT					1.2					●	●	●		●	●		
		BDMT 170416ER-JT					1.6					●	●	●		●	●		
		BDMT 170420ER-JT					2.0					●	●	●		●	●		
		BDMT 170424ER-JT					2.4					●	●	●		●	●		
		BDMT 170431ER-JT					3.1					●	●	●		●	●		
		BDMT 170440ER-JT					4.0					●	●	●		●	●		
2-Notched		BDMT 11T308ER-N2	6.7	3.8	2.8	11.0	0.8	18°	13°	-			●	●	●	●	●		M80 M81 M82 M83
3-Notched		BDMT 11T308ER-N3	6.7	3.8	2.8	11.0	0.8	18°	13°	-			●	●	●	●	●		
3-Notched		BDMT 170408ER-N3	9.6	4.9	4.4	17.0	0.8	18°	13°	-			●	●	●	●	●		
4-Notched		BDMT 170408ER-N4	9.6	4.9	4.4	17.0	0.8	18°	13°	-			●	●	●	●	●		
		GOMT 08T208ER-D	5.21	2.78	2.3	8.7	0.8	13°	17°	-				●		●	●		M134
		GOMT 100308ER-D	6.56	3.30	2.8	10.7								●		●	●		
		GOMT 13T308ER-D	8.36	3.85	3.4	13.2								●		●	●		
		GOMT 160408ER-D	10.03	4.76	4.4	16.7								●		●	●		
		JOMT 08T208ER-D	5.14	2.78	2.3	8.5	0.8	17°	13°	-				●		●	●		
		JOMT 100308ER-D	6.41	3.18	2.8	10.2								●		●	●		
		JOMT 13T308ER-D	8.07	3.70	3.4	13.2								●		●	●		
		JOMT 160408ER-D	9.72	4.50	4.4	16.7								●		●	●		

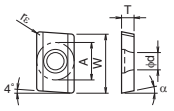
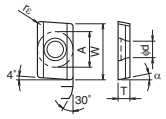
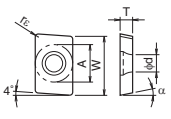
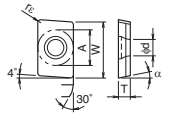
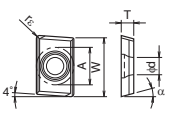
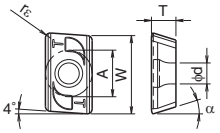
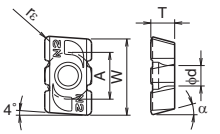
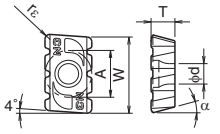
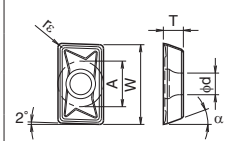
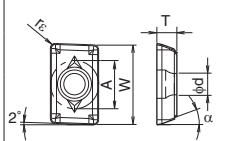
* MN indicates MEGACOAT NANO.

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage																
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■			★			☆							
		Mold Steel	■			★			☆							
	M	Stainless Steel				★										
	K	Gray Cast Iron							★			☆				
		Nodular Cast Iron							★							
	N	Non-ferrous Metals										★				
	S	Heat-resistant Alloys				★										
		Titanium Alloys							★			☆				
	H	Hard Materials				□			□							

Insert Handed Insert shows Right-hand		Description		Dimension (mm)					Angle			Cermet	CVD Coated Carbide	MN	MEGACOAT			PVD Coated Carbide	Carbide	Ref. to Page for Applicable Toolholders
				A	T	ϕd	W (X)	rε (Z)	α	β	γ	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10	
		NDCT	090204TR	6.35	2.38	2.8	9.5	0.4	15°	-	-	●								M109
			090204FR																●	
		NDCT	120208TR	7.94	2.38	3.4	12.7	0.8	15°	-	-	●								
			120208FR																●	
		NDCT	150308TR	9.525	3.18	4.5	15.0	0.8	15°	-	-	●								M110
			150308FR																●	
		NDCT	150308TRX	9.525	3.18	4.4	15.0	0.8	15°	-	-	●								M110 M111
		NDCW	150302TR	9.525	3.18	4.5	15.0	0.2	15°	-	-	●								M110
			150304TR					0.4				●								
			150308TR					0.8				●								
			150320TR					2.0				●								
			150330TR					3.0				●								
			150340TR					4.0				●								
		NDCW	150308TRX	9.525	3.18	4.4	15.0	0.8	15°	-	-	●								M110 M111
			150308FRX																●	
		NDMM	090204ER-SP	6.35	2.38	2.8	9.5	0.4	15°	-	-	●								
		NDMM	120204ER-SP	7.94	2.38	3.4	12.7	0.4				●								M109
			120208ER-SP					0.8				●								
		NDMM	150304ER-SP	9.525	3.18	4.4	15.0	0.4				●								M110
			150308ER-SP					0.8				●								M111
		NDMM	12T308ER-T	7.58	3.97	3.4	12.7	0.8	15°	-	-	●						●	●	-
 2-Notched		NDMM	12T308ER-N2	7.79	3.97	3.4	12.7	0.8	15°	-	-	●						●	●	
 3-Notched		NDMM	12T308ER-N3	7.79	3.97	3.4	12.7	0.8	15°	-	-	●						●	●	
		NDMT	080208ER-D	5.086	2.38	2.2	8.5	0.8	15°	-	-	●			●		●		●	M138
			10T208ER-D	6.276	2.78	2.8	10.2					●			●		●		●	
		NEMT	120308ER-D	7.669	3.18	3.4	12.7	0.8	20°	-	-	●			●		●		●	
			16T308ER-D	9.254	3.97	4.4	16.2					●			●		●		●	
 Tough Edge		NDMT	080208ER-DH	5.086	2.38	2.2	8.5	0.8	15°	-	-	●			●		●		●	
			10T208ER-DH	6.276	2.78	2.8	10.2					●			●		●		●	
		NEMT	120308ER-DH	7.669	3.18	3.4	12.7	0.8	20°	-	-	●			●		●		●	
			16T308ER-DH	9.254	3.97	4.4	16.2					●			●		●		●	

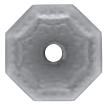
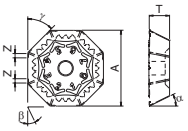
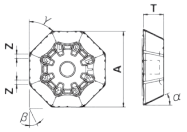
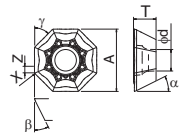
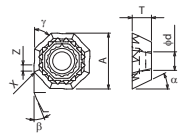
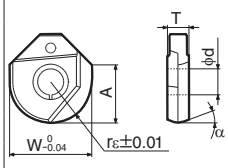
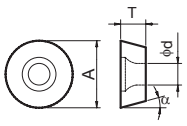
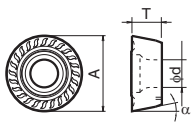
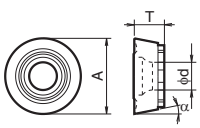
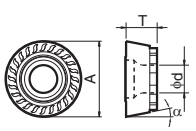
* MN indicates MEGACOAT NANO.

Inserts are sold in 10 piece boxes

● : Std. Item

Milling Inserts (With Hole)

Classification of usage			
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■ ★ ☆
		Mold Steel	■ ★ ☆
	M	Stainless Steel	★
	K	Gray Cast Iron	★ ☆
		Nodular Cast Iron	★
	N	Non-ferrous Metals	★
	S	Heat-resistant Alloys	★
		Titanium Alloys	★ ☆
	H	Hard Materials	□

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)					Angle			Cermet	CVD Coated Carbide	MN	MEGACOAT			PVD Coated Carbide		Carbide	Ref. to Page for Applicable Toolholders
				A	T	ϕd	W	rε	α	β	γ	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	PR915	KW10	
		OFMR	070405EN-SH	17.98	4.94	-	-	Z=1.2	26°	26°	45°				○		○	○			M36
		OFMR	070408EN-GT	17.85	5.14	-	-	Z=1.1							○		○	□			
		OFMT	050405EN-GT	13.35	4.83	4.6	X=R0.5	Z=1.4	26°	26°	45°				●		●	●			M34
			070408EN-GT	17.85	5.12	5.9	X=R0.8	Z=1.2							●		●	●			
		OFMT	050405ER-SH	13.47	4.76	4.4	X=R0.5	Z=1.7	26°	22°	45°				●		●	●			
			070405EN-SH	17.98	4.87	5.8		-		26°					●		●	●			
		RDFG	08FR	6.6	2.1	3.1	8.0	4.0	15°	-	-								●		M166
			10FR	8.0	2.7	3.6	10.0	5.0											●		
			12FR	9.4	3.2	4.1	12.0	6.0											●		
			16FR	11.3	4.2	5.1	16.0	8.0	10°	-	-								●		
			20FR	14.1	5.2	6.1	20.0	10.0											●		
			25FR	15.5	6.2	6.1	25.0	12.5											●		
		RDHX	0702M0T	7.0	2.39	2.8	-	-	15°	-	-					●					-
			1003M0T	10.0	3.18	3.8										●					
			12T3M0T	12.0	3.97											●					
Tough Edge		RDMT	08T2M0-H	8.0	2.78	3.4	-	-	15°	-	-					●	●			●	M180
Low cutting force		RPMT	10T3M0	10.0	3.97	3.4	-	-	11°	-	-					●	●			●	M180 M181
			1204M0	12.0	4.76	4.4										●	●			●	
Tough Edge		RPMT	1204M0-H	12.0	4.76	4.4	-	-	11°	-	-	●				●	●			●	
			1606M0-H	16.0	6.35	5.5						●				●	●			●	
			2006M0-H	20.0	6.35	6.5										●	●			●	M181

* MN indicates MEGACOAT NANO.

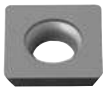
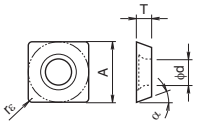
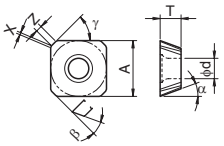
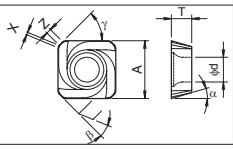
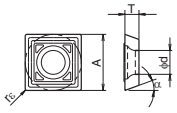
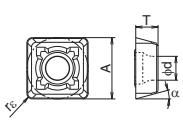
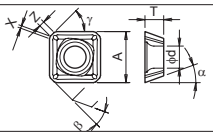
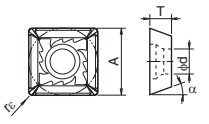
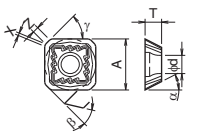
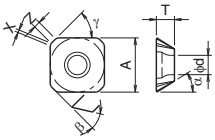
● : Std. Item
○ : Check Availability
□ : Deleted from the next catalogue

RDFG Inserts are sold in 2 piece boxes

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage			
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	■ ★ ★ ☆
☆ : Roughing / 2nd Choice		Mold Steel	■ ★ ★ ☆
■ : Finishing / 1st Choice	M	Stainless Steel	★ ★
□ : Finishing / 2nd Choice	K	Gray Cast Iron	★ ☆
(In case hardness is under 45HRC)		Nodular Cast Iron	★
	N	Non-ferrous Metals	★
	S	Heat-resistant Alloys	★ ★
		Titanium Alloys	★ ☆
	H	Hard Materials	□ □ □

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) A	T	ϕd	W (X)	rε (Z)	Angle α	β	γ	Cermet TN100M	CVD Coated Carbides CA6535	MN PR1535	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbides PR830	Carbide KW10	Ref. to Page for Applicable Toolholders
		SDKW 09T204TN	9.525	2.78	3.4	-	0.4	15°	-	-	●			●					M186
		09T204FN																●	
		SEKW 120304TN	12.70	3.18	5.5			20°			●			●					
		120304FN																●	
		120308TN					0.8				●			●					
		120308FN																●	
		SDKW 1204AESN	12.70	4.76	5.5	X= R1.0	Z= 1.5	15°	20°	45°				●					-
		1204AETN														●			
		SEKW 1204AFTN				X= 0.5	Z= 1.7	20°	25°					●		●			-
		SDMT 1204AESR-H	12.70	4.76	5.5	X= R1.0	Z= 0.8	15°	20°	45°				●					-
Low cutting force		SDMT 09T204C	9.525	2.78	3.4	-	0.4	15°	-	-	●			●				●	M186
		SEMT 120304C	12.70	3.18	5.5	-	0.4	20°	-	-				●				●	
		SDMT 060304E-K	6.35	3.18	2.8	-	0.4	15°	-	-					●	●		●	M190
		080308E-K	8.00		3.4		0.8								●	●		●	
		120408E-K	12.70	4.76	4.4										●	●		●	
		SEKT 1204AFEN-S	12.70	4.76	5.5	X= 0.5	Z= 1.7	20°	25°	45°				●					-
		SEMM 09T308PESR	9.525	3.97	3.4	-	0.8	20°	-	-	○							○	M97
		150408PESR	15.875	4.76	5.5						○			○		○	○	○	M96 M97
		SOMT 0903AXEN-J	9.525	3.18	3.4	X= 0.5	Z= 1.1	27°	32°	45°	○							○	M45
		SOMW 0903AXTN	9.525	3.18	3.4	X= 0.5	Z= 1.1	27°	32°	45°	○								
		0903AXFN																○	

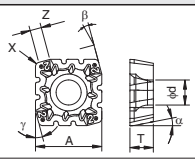
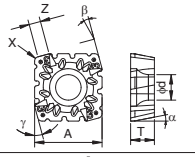
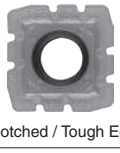
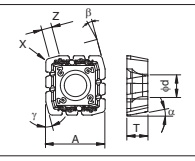
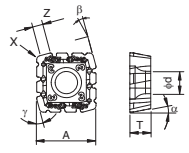
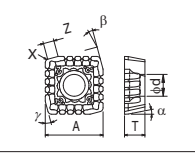
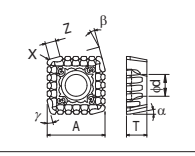
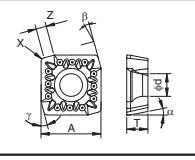
* MN indicates MEGACOAT NANO.

Inserts are sold in 10 piece boxes

● : Std. Item
○ : Check Availability

Milling Inserts (With Hole)

Classification of usage																
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel				★	★		☆		Ref. to Page for Applicable Toolholders
		Mold Steel				★	★		☆		
	M	Stainless Steel				★	★				
	K	Gray Cast Iron						★			
		Nodular Cast Iron						★			
	N	Non-ferrous Metals									
	S	Heat-resistant Alloys				★	★				
		Titanium Alloys						★			
	H	Hard Materials				□	□		□		

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle			Cermet	CVD Coated Carbides	MN	MEGACOAT			PVD Coated Carbides	Carbide	
			A	T	ϕd	W	rε	α	β	γ	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10	
2-Notched / General purpose		**SPMT 1806EDER-NB2**	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°				●	●	●	●		**M48**
3-Notched / General purpose		**SPMT 1806EDER-NB3**	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°				●	●	●	●		
 2-Notched / Tough Edge		**SPMT 1806EDSR-NB2T**	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°					●	●	●		**M48**
		SPMT 1806EDSL-NB2T													●		□		-
3-Notched / Tough Edge		**SPMT 1806EDSR-NB3T**	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°					●	●	●		**M48**
		SPMT 1806EDSL-NB3T													●		□		-
4-Notched / Low cutting force		**SPMT 1806EDER-NB2P**	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°				●	●	●	●		**M48**
5-Notched / Low cutting force		**SPMT 1806EDER-NB3P**	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°				●	●	●	●		
Without notch		**SPMT 1806EDER-V**	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°				●	●	●	●		

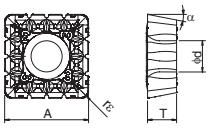
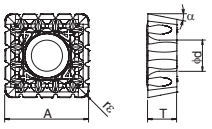
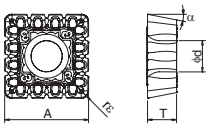
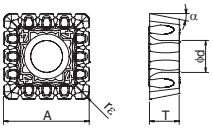
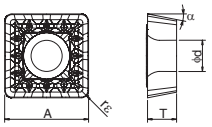
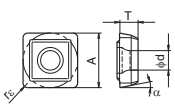
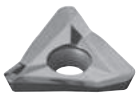
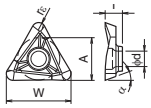
* MN indicates MEGACOAT NANO.

● : Std. Item
□ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage																	
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel				★	★										
		Mold Steel				★	★										
	M	Stainless Steel				★	★										
	K	Gray Cast Iron						★		☆							
		Nodular Cast Iron						★									
	N	Non-ferrous Metals								★							
	S	Heat-resistant Alloys				★	★										
		Titanium Alloys						★		☆							
	H	Hard Materials				□	□										

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle			Cermet	CVD Coated Carbide	MN	MEGACOAT			PVD Coated Carbide	Carbide	Ref. to Page for Applicable Toolholders
			A	T	ϕd	W	rε	α	β	γ	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10	
3-Notched		**SPMT 180616EN-NB3**	18	6.35	6.8	-	1.6	11°	-	-					●	●			M100
4-Notched		**SPMT 180616EN-NB4**	18	6.35	6.8	-	1.6	11°	-	-					●	●			
3-Notched / Low cutting force		**SPMT 180616EN-NB3P**	18	6.35	6.8	-	1.6	11°	-	-					●	●			
4-Notched / Low cutting force		**SPMT 180616EN-NB4P**	18	6.35	6.8	-	1.6	11°	-	-					●	●			
Without notch		**SPMT 180616EN-V**	18	6.35	6.8	-	1.6	11°	-	-					●	●			
		**SPMT 060204E-Z**	6.35	2.38	2.5	-	0.4	11°	-	-				●		●		●	M188
		060208E-Z					0.8							●		●		●	
		SPMT 090304E-Z	9.525	3.18	3.4	-	0.4	11°	-	-				●		●		●	
		090308E-Z					0.8							●		●		●	
		**TEMT 250624-AQ**	15.875	6.35	5.5	23.0	2.4	20°	-	-								●	M112

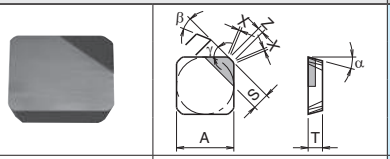
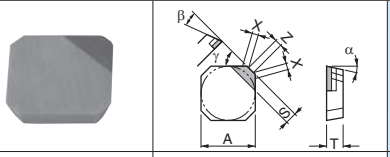
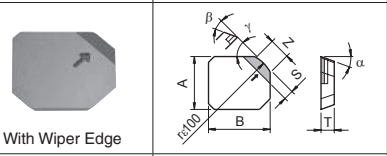
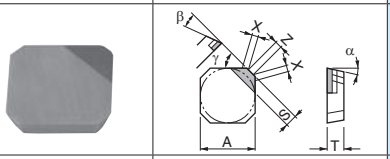
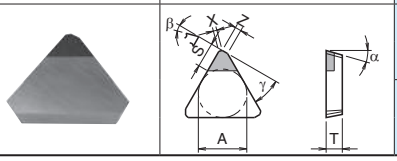
* MN indicates MEGACOAT NANO.

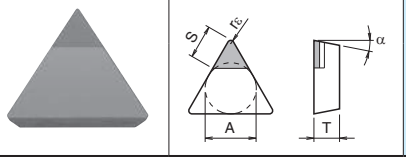
● : Std. Item

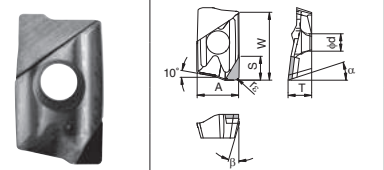
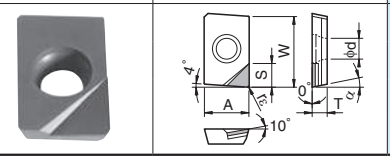
Inserts are sold in 10 piece boxes

Milling Inserts (PCD)

Classification of usage							
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice	P	Carbon Steel / Alloy Steel					
		Mold Steel					
	M	Stainless Steel					
	K	Gray Cast Iron					
		Nodular Cast Iron					
	N	Non-ferrous Metals	□		■		
	S	Heat-resistant Alloys					
		Titanium Alloys	□		■		
	H	Hard Materials					

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	X	Z	S	B	Angle α	β	γ	PCD KPD001	KPD010	KPD230	Ref. to Page for Applicable Toolholders
	SDKN 1203AUFN-NE	12.70	3.18	0.5	1.2	3.1	-	15°	23°	45°	●			M43
	1203AUFN					3.6					●	●		
	SEEN 1203AFFN-NE	12.70	3.18	0.5	1.4	3.0	-	20°	25°	45°	●			M38 M39 M40
	1203AFFN					3.5					●	●		
 With Wiper Edge	SEEN 1203AFFR-W	12.50	3.18	-	3.5	1.7	14.56	20°	25°	45°	●			M40
	SOKN 13T3AXFN-NE	13.494	3.97	0.4	1.1	3.0	-	27°	32°	45°			○	M44
	TEEN 1603PTFR-NE	9.525	3.18	0.6	1.4	4.1	-	20°	22°	30°	●		●	M113
	1603PTFR					4.7					●	●		
	TEKN 2204PTFR-NE	12.70	4.76	0.7	1.8	4.2	-	20°	22°	30°	●		●	M94 M95
	2204PTFR					4.8					●	●		

Insert	Description	Dimension (mm) A	T	rε	S	Angle α	PCD KPD001	KPD010	KPD230	Ref. to Page for Applicable Toolholders
	TPGN 110302	6.35	3.18	0.2	3.9	11°	●	●		M113
	110304			0.4	3.7		●	●		
	110308			0.8	3.4			●		

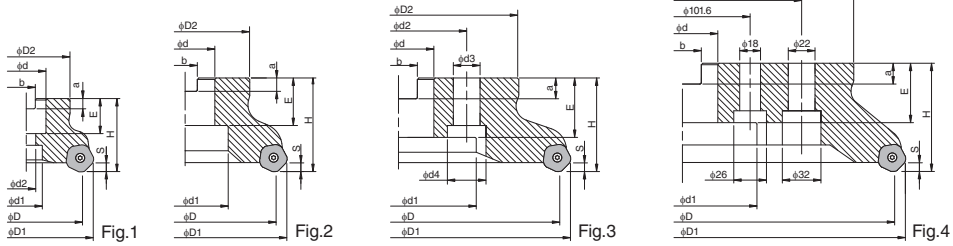
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	ϕd	W	rε	S	Angle α	β	PCD KPD001	KPD010	KPD230	Ref. to Page for Applicable Toolholders
	BDMT 11T302FR	6.7	3.8	2.8	11.0	0.2	3.6	18°	13°	●		●	M62 M63 M64 M65
	11T304FR					0.4				●		●	
	BDMT 170402FR	9.6	4.9	4.4	17.0	0.2	4.4	18°	13°	●		●	
	170404FR					0.4				●		●	
	NDCW 150302FRX-NE	9.525	3.18	4.4	15.0	0.2	5.1	15°	-	●		●	M111
	150302FRX						5.7			●	●		

● : Std. Item
○ : Check Availability

CBN & PCD Inserts are sold in 1 piece boxes

MFPN45 Face Mill

Rake Angle	A.R.	R.R.	
	(max.)+10°	ϕD=63:-10°	ϕD=100-315:-6°
		ϕD=80:-8°	



Toolholder Dimensions

Description				Std. R	Std. L	No. of Inserts	Dimension (mm) ϕD	ϕD1	ϕD2	ϕd	ϕd1	ϕd2	H	E	a	b	ϕd3	ϕd4	Drawing	Weight (kg)	Shim
Metric	Coarse pitch	MFPN	45063R-4T-M	●		4	63	76	47	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	Yes
			45080R-5T-M	●		5	80	93	60	27	22	13	50	24	7	12.4				1.1	
			45100R-6T-M	●		6	100	113	70	32	48	-		30	8	14.4			Fig.2	1.4	
			45125R-7T-M	●		7	125	138	87	40	58		63	32	9	16.4				2.6	
			45160R-8T-M	●		8	160	173	102		68	66.7					14	20	Fig.3	3.8	
			45200R-10T-M	●		10	200	213	142	60	110	101.6		40	14	25.7	18	26		6.4	
			45250R-12T-M	●		12	250	263												9.1	
			45315R-14T-M	MTO		14	315	328	220			-	80				-	-	Fig.4	21.3	
	Fine pitch	MFPN	45063R-5T-M	●		5	63	76	47	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	No
			45080R-6T-M	●		6	80	93	60	27	22	13	50	24	7	12.4				1.0	
			45100R-8T-M	●		8	100	113	70	32	48	-		30	8	14.4			Fig.2	1.4	
			45125R-10T-M	●		10	125	138	87	40	58		63	32	9	16.4				2.5	
			45160R-12T-M	●		12	160	173	102		68	66.7					14	20	Fig.3	3.8	
			45200R-14T-M	●		14	200	213	142	60	110	101.6		40	14	25.7	18	26		6.5	
			45250R-16T-M	●		16	250	263												9.1	
			45315R-18T-M	MTO		18	315	328	220			-	80				-	-	Fig.4	21.7	
	Extra fine pitch	MFPN	45063R-6T-M	●		6	63	76	47	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	No
			45080R-8T-M	●		8	80	93	60	27	22	13	50	24	7	12.4				1.1	
			45100R-10T-M	●		10	100	113	70	32	48	-		30	8	14.4			Fig.2	1.3	
			45125R-13T-M	●		13	125	138	87	40	58		63	32	9	16.4				2.6	
			45160R-16T-M	●		16	160	173	102		68	66.7					14	20	Fig.3	3.9	
			45200R-18T-M	●		18	200	213	142	60	110	101.6		40	14	25.7	18	26		6.6	
			45250R-20T-M	●		20	250	263												9.3	
Bore Dia. Inch spec	Coarse pitch	MFPN	45080R/L-5T	○	○	5	80	93	60	25.4	22	13	50	27	6	9.5	-	-	Fig.1	1.1	Yes
			45100R/L-6T	○	○	6	100	113	70	31.75	48	-		32	8	12.7				1.4	
			45125R/L-7T	○	○	7	125	138	87	38.1	58		63	36	10	15.9			Fig.2	2.6	
			45160R/L-8T	○	○	8	160	173	102	50.8	72			38	11	19.1				4.0	
			45200R-10T	○		10	200	213	142	47.625	110	101.6		40	14	25.4	18	26	Fig.3	6.7	
			45250R-12T	○		12	250	263												9.4	
			45315R-14T	MTO		14	315	328	220			-	80				-	-	Fig.4	21.2	
	Fine pitch	MFPN	45080R-6T	○		6	80	93	60	25.4	22	13	50	27	6	9.5	-	-	Fig.1	1.1	No
			45100R-8T	○		8	100	113	70	31.75	48	-		32	8	12.7				1.4	
			45125R-10T	○		10	125	138	87	38.1	58		63	36	10	15.9			Fig.2	2.7	
			45160R-12T	○		12	160	173	102	50.8	72			38	11	19.1				4.0	
			45200R-14T	○		14	200	213	142	47.625	110	101.6		40	14	25.4	18	26	Fig.3	6.9	
			45250R-16T	○		16	250	263												9.6	
			45315R-18T	MTO		18	315	328	220			-	80				-	-	Fig.4	21.5	
	Extra fine pitch	MFPN	45080R-8T	○		8	80	93	60	25.4	22	13	50	27	6	9.5	-	-	Fig.1	1.1	No
			45100R-10T	○		10	100	113	70	31.75	48	-		32	8	12.7				1.3	
			45125R-13T	○		13	125	138	87	38.1	58		63	36	10	15.9			Fig.2	2.7	
			45160R-16T	○		16	160	173	102	50.8	72			38	11	19.1				4.0	
			45200R-18T	○		18	200	213	142	47.625	110	101.6		40	14	25.4	18	26	Fig.3	6.9	
			45250R-20T	○		20	250	263												9.6	

* Dimension S: 6 mm (GM, SM, GH Chipbreakers), 5 mm (GL Chipbreaker), 3 mm (W Chipbreaker)

Recommended Cutting Conditions ➔ M28

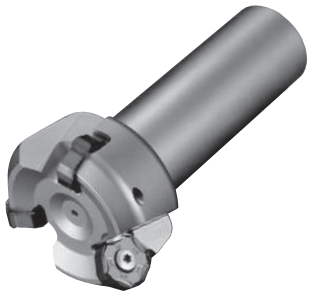
● : Std. Item
MTO : Made to order

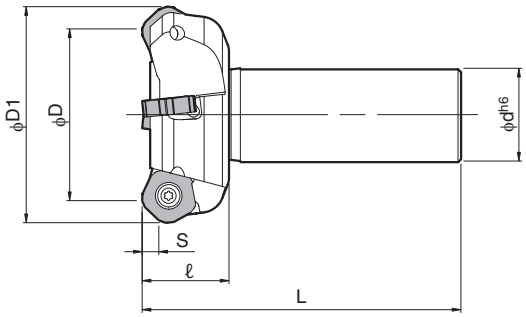
Spare Parts (common to Metric / Inch spec)

Description		Spare Parts							
		Clamp Screw	Wrench TT	Wrench DTM	Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt
Coarse pitch	MFPN 45063R-4T-M	SB-50140TR for Insert Clamp Tightening torque 4.2N·m	TT-15	-	MFPN-45	SPW-7050 for Shim Clamp Tightening torque 6.0N·m	LW-5	MP-1	HH10X30
	MFPN 45080R/L-5T(-M)								HH12X35
	MFPN 45100R/L-6T(-M) ~ 45315R-14T(-M)								-
Fine pitch	MFPN 45063R-5T-M	SB-50140TR for Insert Clamp Tightening torque 4.2N·m	TT-15	-	-	-	-	MP-1	HH10X30
	MFPN 45080R-6T(-M)								HH12X35
	MFPN 45100R-8T(-M) ~ 45315R-18T(-M)								-
Extra fine pitch	MFPN 45063R-6T-M	SB-40140TRN for Insert Clamp Tightening torque 3.5N·m	-	DTM-15	-	-	-	MP-1	HH10X30
	MFPN 45080R-8T(-M)								HH12X35
	MFPN 45100R-10T(-M) ~ 45250R-20T(-M)								-

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

MFPN45 with cylindrical shank





Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) ϕD	ϕD1	ϕd	L	ℓ	S	Rake Angle A.R. (MAX.)	R.R.	Spare Parts Clamp Screw	Wrench	Anti-seize Compound
MFPN	45050R-S32-3T	●	3	50	63	32	110	30	6 (5)	+10°	-12°	SB-50140TR	TT-15	MP-1
	45063R-S32-4T	●	4	63	76						-10°	Tightening torque 4.2N·m		
	45080R-S32-5T	●	5	80	93						-8°			

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

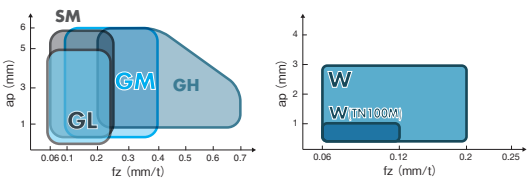
* Dimension S: 6 mm (GM, SM, GH Chipbreakers), 5 mm (GL Chipbreaker), 3 mm (W Chipbreaker)

Applicable Inserts (Common for face mill and end mill)

Description	Applicable Inserts M15						
MFPN45...R-...	PNMU 1205ANER-GM	PNMU 1205ANER-SM	PNMU 1205ANER-GH	PNEU 1205ANER-GL	PNEU 1205ANER-W	-	-
MFPN45...L-...	-	-	-	-	-	PNMU 1205ANEL-GM	PNEU 1205ANEL-GL

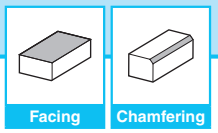
Recommended Cutting Conditions M28

Applicable Chipbreaker Range



● : Std. Item

MFPN45



Cutter type and chipbreaker selection

Milling Purpose	Cutter Type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	W
General milling for steel and alloy steel		●		●				
Steel and alloy steel (at chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) (ap=4mm Over, fz=0.35mm/t Over)	●					●		
Surface finish oriented	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (to prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (for processing efficiency improvement)			●	●				
Cast iron (ap=4mm Over, fz=0.35mm/t Over)	●					●		
Improved Surface Finish in High Efficiency Milling		●	●					●

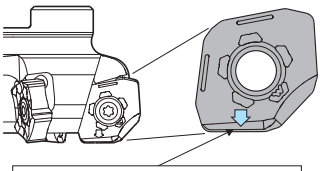
How to use wiper insert

1) Please use one wiper insert on one cutter.
(If you use more than 2 inserts on one cutter, the workpiece surface may be muddy white.)
2) Combination of Wiper Insert with Other Chipbreakers

Combination \ Chipbreaker	GM	SM	W
Recommended Combination	●		●
Recommended Combination		●	●

The combinations of GH+W and GL+W are not recommended.

How to attach wiper inserts on MFPN cutter



The down arrow symbol (↓) indicates wiper cutting edge.
When attaching inserts, make sure that the arrow symbol points downward.

3) For checking the protrusion amount of the wiper insert, use tool presetter. (Appropriate protrusion: 0.1mm)

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)			
			MEGACOAT NANO (MEGACOAT)			CVD Coated Carbide
			PR1535	PR1525 (PR1225)	PR1510 (PR1210)	CA6535
GM	**Carbon Steel**	0.1~**0.2**~0.4	☆120~**180**~250	★120~**180**~250	-	-
	Alloy Steel	0.1~**0.2**~0.4	☆100~**160**~220	★100~**160**~220	-	-
	Mold Steel	0.1~**0.2**~0.35	☆80~**140**~180	★80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.1~**0.2**~0.4	☆100~**160**~200	☆100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.1~**0.2**~0.4	☆150~**200**~250	-	-	☆180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.1~**0.2**~0.3	★90~**120**~150	-	-	-
	Gray Cast Iron	0.1~**0.2**~0.4	-	-	★120~**180**~250	-
	Nodular Cast Iron	0.1~**0.2**~0.35	-	-	★100~**150**~200	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	☆20~**30**~50	-	-	★20~**30**~50
SM *1(GL)	**Carbon Steel**	0.06~**0.12**~0.25	☆120~**180**~250	☆120~**180**~250	-	-
	Alloy Steel	0.06~**0.12**~0.25	☆100~**160**~220	☆100~**160**~220	-	-
	Mold Steel	0.06~**0.1**~0.2	☆80~**140**~180	☆80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.12**~0.25	★100~**160**~200	☆100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.12**~0.25	☆150~**200**~250	-	-	★180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.12**~0.25	☆90~**120**~150	-	-	-
	Gray Cast Iron	0.06~**0.12**~0.25	-	-	☆120~**180**~250	-
	Nodular Cast Iron	0.06~**0.1**~0.2	-	-	☆100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.1**~0.15	☆20~**30**~50	-	-	☆20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.15	★40~**60**~80	-	-	-
*2GH	**Carbon Steel**	0.2~**0.4**~0.7	☆120~**180**~250	☆120~**180**~250	-	-
	Alloy Steel	0.2~**0.4**~0.6	☆100~**160**~220	☆100~**160**~220	-	-
	Mold Steel	0.2~**0.35**~0.5	☆80~**140**~180	☆80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.2~**0.3**~0.4	☆100~**160**~200	☆100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.2~**0.3**~0.4	☆150~**200**~250	-	-	☆180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.2~**0.3**~0.4	☆90~**120**~150	-	-	-
	Gray Cast Iron	0.2~**0.4**~0.7	-	-	☆120~**180**~250	-
	Nodular Cast Iron	0.2~**0.35**~0.5	-	-	☆100~**150**~200	-
	Ni-base heat-resistant alloys	0.2~**0.3**~0.4	☆20~**30**~50	-	-	☆20~**30**~50

· **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
★:1st Recommendation ☆:2nd Recommendation
· Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
*1. GL Chipbreaker is recommended for Surface finish oriented milling.
2.GH Chipbreaker : Fine pitch ⇒ fz≤0.4 (mm/t)
Extra fine pitch ⇒ Not recommended

● Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM (GL)	GH
Coarse pitch (with shim)	✓	✓	✓
Fine pitch (without shim)	✓	✓	△ (Feed rate is recommended under fz=0.4mm/t)
Extra fine pitch (without shim)	✓	✓	N/A

Precautions for use (How to mount an insert)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, while pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten the screw with appropriate torque. Ref. to Fig. 1 and Fig. 2.
   Recommended tightening torque ⇒ The torque for coarse pitch (using M5 screw) is 4.2 N·m
   The torque for extra fine pitch (using M4 screw) is 3.5 N·m.
3. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder and between the insert side surfaces and the constraint surface of the toolholder.
4. To change the cutting edge of the insert, turn the insert counterclockwise (ref. to Fig. 3).
   Insert corner identification number is stamped on the top surface of insert (Fig. 4). To protect the wiper edge, use the corners of insert in the sequence of corner numbers.

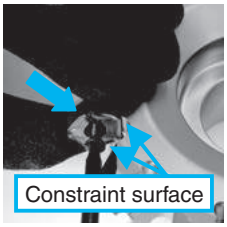


Fig.1

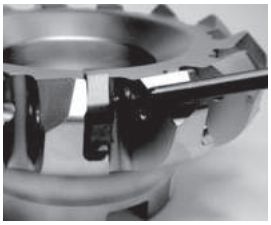


Fig.2

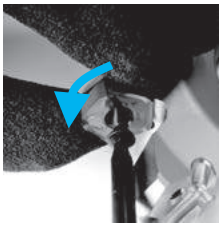


Fig.3

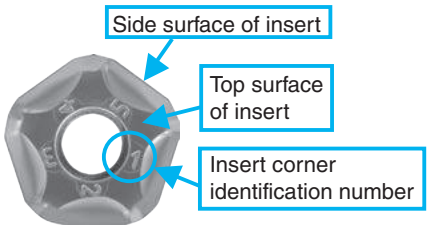


Fig.4 (Right-hand insert)

How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (ref. to Fig. 5) and lightly pressing the shim toward the constraint surface, insert the screw into the hole of the shim and tighten it (ref. to Fig. 6).
   When tightening the screw, make sure that the screw is vertical to the bearing surface. Recommended tightening torque is 6.0 N·m.
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.

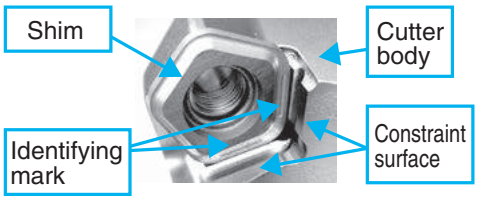


Fig.5

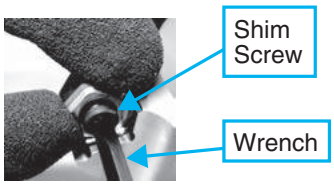


Fig.6

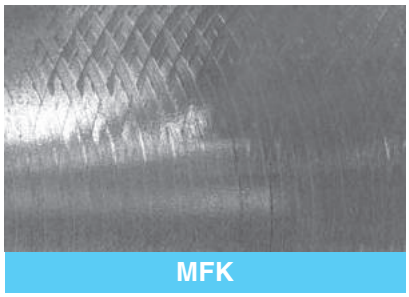
MFK Cutter for Cast Iron NEW

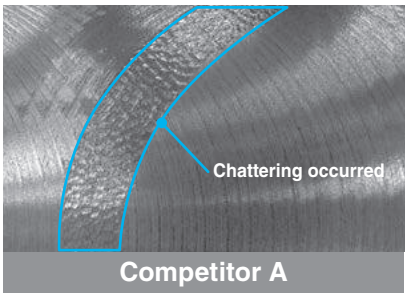
MFK

- Multi edge cutter realizes the high efficiency cast iron machining
- 10-edge pentagonal inserts for stable and economical machining

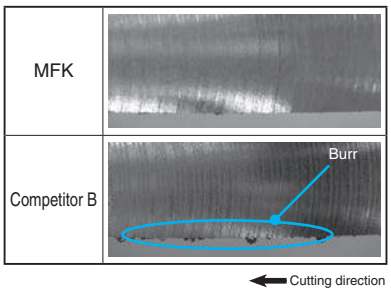
MFK reduces cutting force by good balanced design
Excellent surface finish by controlling chattering

Surface finish comparison





Burr comparison

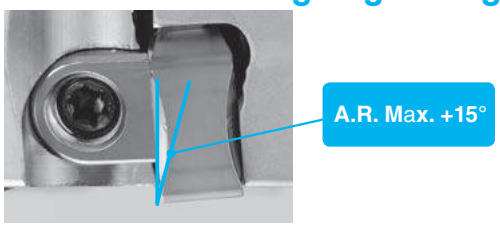


Sharp cutting prevents burr formation

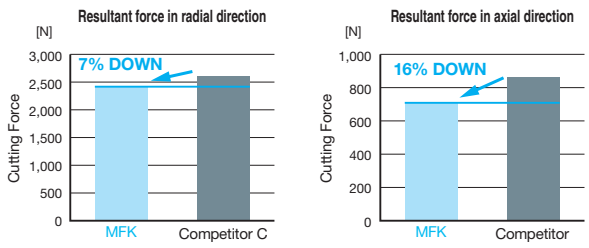
<Cutting Conditions>
Workpiece Material:FCD600, Dry, Vc=180m/min, fz=0.3mm/t, ap×ae=3×78mm

Two points Two special insert structures reduce cutting force and improve edge strength

POINT.1 Low cutting force due to helical cutting-edge design

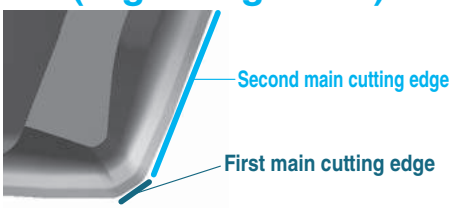


- Cutting Force Comparison

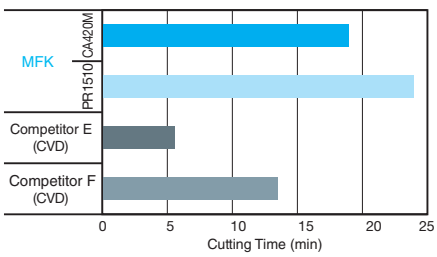


<Cutting Conditions>
Workpiece Material : FCD600, Dry, ϕ125
Vc=180m/min, fz=0.3mm/t, ap×ae=3.0×62mm

POINT.2 Dual Cutting Edge Design (High Toughness)



- Fracture Resistance Comparison



<Cutting Conditions>
Workpiece Material:
FCD450 with 4 bores
Vc=300m/min
fz=0.5mm/t
ap=2.0mm
Wet

Reducing impact load when biting into the workpiece

Toolholder lineup to meet various applications

Fine pitch type and extra fine pitch type are available
Choose most suitable cutter for your application

Fine pitch (Example : ϕ125 12 inserts)

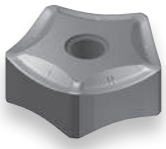
- Recommended for low rigid workpiece
- For wide application range

Extra fine pitch (Example : ϕ125 18 inserts)

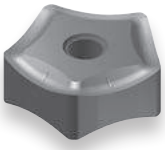
- Recommended for high rigid workpiece
- For high efficiency machining

Applicable to various applications with wide range lineup of chipbreakers

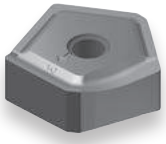
General purpose:
GM Chipbreaker



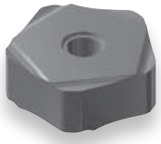
Tough Edge:
GH Chipbreaker



Finishing:
GL Chipbreaker (Ground)



With Wiper Edge:
W Chipbreaker (Ground)



High speed machining :
Ceramic with chipbreaker

New milling CVD grade CA420M realizes long tool life and stable machining

Kyocera's unique crystal control technology and advanced layer adhesion lead CVD coating to the next stage

Longer tool life

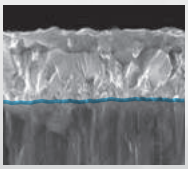
Control α-Al_2O_3 crystal growth for improving wear resistance and fracture resistance

CA420M

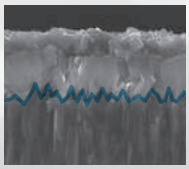
Conventional

Prevents peeling of coating layer

40% improved layer adhesion by optimized interface



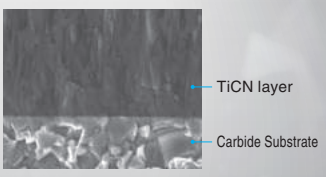
CA420M



Conventional

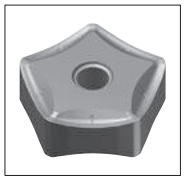
Control chipping

Higher layer strength and fracture resistance with high aspect ratio TiCN



CA420M

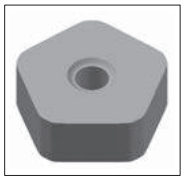
Insert grade lineup



Long tool life
CA420M
(1st recommendation)

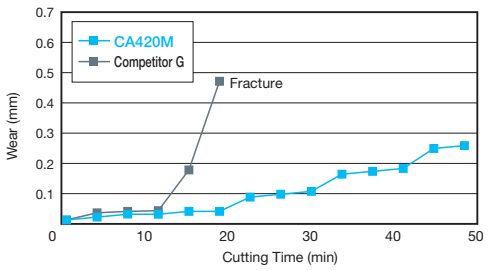
Stable machining
PR1510

Fracture resistance
PR1525



High speed machining
KS6050 / CS7050

Wear Resistance Comparison



<Cutting Conditions>
Workpiece Material : FCD450, Dry
Vc=200m/min, fz=0.3mm/t, ap×ae=2.0×80mm

MFK Face Mill

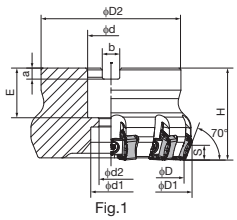


Fig.1

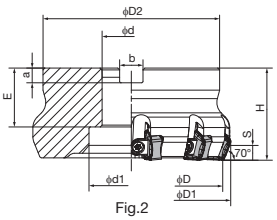


Fig.2

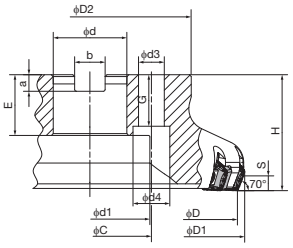


Fig.3

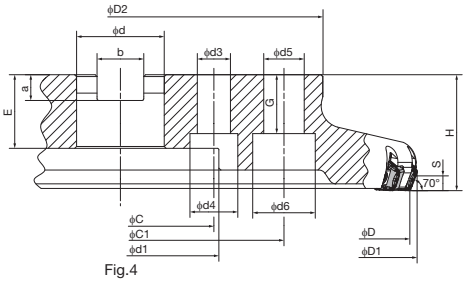


Fig.4

Rake Angle		
Description	A.R.	R.R.
MFK080R-○○	(MAX.) +15°	-7°
MFK100R-○○		-6°
MFK125R-○○ ⋮ MFK315R-○○		-5°

Toolholder Dimensions

Description				Std.	No. of Inserts	Dimension (mm)																	Drawing	Weight (kg)
						φD	φD1	φD2	φd	φd1	φd2	H	E	a	b	s	φd3	φd4	φd5	φd6	φC	φC1	G		
Metric	Fine pitch	MFK	080R-11-8T-M	●	8	80	89	76	27	20	13	63	24	7	12.4	6.0	–	–	–	–	–	–	–	Fig.1	1.87
			100R-11-10T-M	●	10	100	109	96	32	26	17		28	8	14.4										2.99
			125R-11-12T-M	●	12	125	134	100	40	55	–		33	9	16.4									Fig.2	3.56
			160R-11-16T-M	●	16	160	169			70							14	20			66.7		28	Fig.3	4.51
			200R-11-20T-M	●	20	200	209	142	60	110			40	14	25.7		18	26			101.6		32		7.35
			250R-11-24T-M	●	24	250	259																		10.43
			315R-11-28T-M	MTO	28	315	324	220											22	32		177.8		Fig.4	19.41
	Extra fine pitch	MFK	080R-11-10T-M	●	10	80	89	76	27	20	13	63	24	7	12.4	6.0	–	–	–	–	–	–	–	Fig.1	1.81
			100R-11-14T-M	●	14	100	109	96	32	26	17		28	8	14.4										2.86
			125R-11-18T-M	●	18	125	134	100	40	55	–		33	9	16.4									Fig.2	3.38
			160R-11-22T-M	●	22	160	169			70							14	20			66.7		28	Fig.3	4.32
			200R-11-28T-M	●	28	200	209	142	60	110			40	14	25.7		18	26			101.6		32		7.10
			250R-11-36T-M	●	36	250	259																		10.07
			315R-11-44T-M	MTO	44	315	324	220											22	32		177.8		Fig.4	18.92
Bore Dia. Inch spec	Fine pitch	MFK	080R-11-8T	○	8	80	89	76	31.75	26	17	63	32	8	12.7	6.0	–	–	–	–	–	–	–	Fig.1	1.76
			100R-11-10T	○	10	100	109	96																	2.98
			125R-11-12T	○	12	125	134	100	38.1	55	–		38	10	15.9									Fig.2	3.65
			160R-11-16T	○	16	160	169		50.8	70				11	19.1										4.62
			200R-11-20T	○	20	200	209	142	47.625	110			40	14	25.4		18	26			101.6		32	Fig.3	7.65
			250R-11-24T	○	24	250	259																		10.73
			315R-11-28T	MTO	28	315	324	220											22	32		177.8		Fig.4	19.71
	Extra fine pitch	MFK	080R-11-10T	○	10	80	89	76	31.75	26	17	63	32	8	12.7	6.0	–	–	–	–	–	–	–	Fig.1	1.70
			100R-11-14T	○	14	100	109	96																	2.85
			125R-11-18T	○	18	125	134	100	38.1	55	–		38	10	15.9									Fig.2	3.44
			160R-11-22T	○	22	160	169		50.8	70				11	19.1										4.44
			200R-11-28T	○	28	200	209	142	47.625	110			40	14	25.4		18	26			101.6		32	Fig.3	7.40
			250R-11-36T	○	36	250	259																		10.36
			315R-11-44T	MTO	44	315	324	220											22	32		177.8		Fig.4	19.21

Spare Parts and Applicable Inserts

Description	Spare Parts: Wedge	Spare Parts: Wedge screw	Spare Parts: Wrench	Spare Parts: Mounting bolt	Applicable Inserts ➡M14
MFK 080R-11-8T-M 100R-11-10T-M 125R-11-12T-M 160R-11-16T-M 200R-11-20T-M 250R-11-24T-M 315R-11-28T-M	C09N	W6X18N	TT-15	HH12X35 HH16X40 –	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTR-T01020 PNEG1106XNTR-T00515
MFK 080R-11-10T-M 100R-11-14T-M 125R-11-18T-M 160R-11-22T-M 200R-11-28T-M 250R-11-36T-M 315R-11-44T-M	C09N	W6X18N	TT-15	HH12X35 HH16X40 –	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTR-T01020 PNEG1106XNTR-T00515

Description	Spare Parts: Wedge	Spare Parts: Wedge screw	Spare Parts: Wrench	Spare Parts: Mounting bolt	Applicable Inserts ➡M14
MFK 080R-11-8T 100R-11-10T 125R-11-12T 160R-11-16T 200R-11-20T 250R-11-24T 315R-11-28T	C09N	W6X18N	TT-15	HH16X40 –	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTR-T01020 PNEG1106XNTR-T00515
MFK 080R-11-10T 100R-11-14T 125R-11-18T 160R-11-22T 200R-11-28T 250R-11-36T 315R-11-44T	C09N	W6X18N	TT-15	HH16X40 –	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTR-T01020 PNEG1106XNTR-T00515

● : Std. Item
MTO : Made to order

Applicable Inserts

Description	Applicable Inserts ➡ M14			
	General purpose	Tough Edge	Surface-Finish Oriented	2-Edge With Wiper Edge
MFK...-11-...	PNMG1106XNEN-GM	PNMG1106XNEN-GH	PNEG1106XNEN-GL	PNEG1106XNER-W

Description	Applicable Inserts ➡ M14	
	High speed machining	High speed machining (With Chipbreaker)
MFK...-11-...	PNEA1106XNTN-T01020	PNEG1106XNTR-T00515

Recommended Cutting Conditions (Coated Carbide)

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Chipbreaker	fz(mm/t) 0.06 0.1 0.2 0.3 0.4
Cast Iron	**CA420M**	170~**230**~300	GM★	0.25
	PR1510	120~**180**~250	GH☆	0.3
	PR1525		GL	0.12
Nodular Cast Iron	**CA420M**	150~**200**~250	GM★	0.2
	PR1510	100~**150**~200	GH☆	0.25
	PR1525		GL	0.1

★:1st Recommended ☆:2nd Recommended

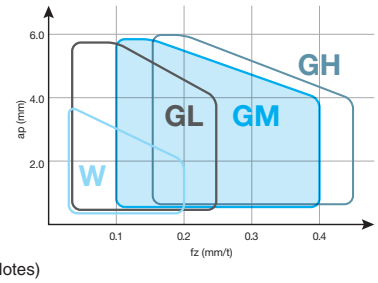
Recommended Cutting Conditions (Ceramic)

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Edge Prep.	fz (mm/t) 0.05 0.1 0.2 0.3 0.4
Cast Iron	KS6050★ CS7050☆	600~**900**~1,200	0.10×20°	0.1
Nodular Cast Iron	KS6050☆ CS7050★	400~**600**~900		

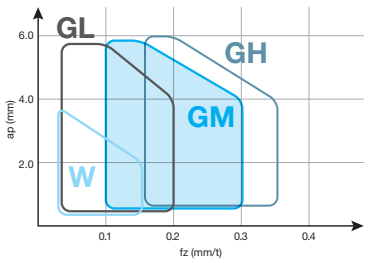
★:1st Recommended ☆:2nd Recommended

Recommended application range

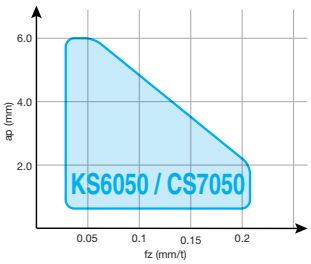
Workpiece Material: Gray Cast iron (Insert Grades : Coated Carbide)



Workpiece Material: Nodular Cast Iron (Insert Grades : Coated Carbide)



Workpiece Material: Gray Cast Iron / Nodular Cast Iron (Insert Grades : Ceramic)



* Notes)
1. When using W type, please use together with GM or GH.
2. If machining over fz=0.2, insert corner will be damaged.
   The main cutting edge of W type insert is receding from that of GM and GH.
   Therefore, the feed rate for the insert next to W type is double of the other inserts.

Facing | Chamfering

MOF45 Face Mill (05 type / 07 type)

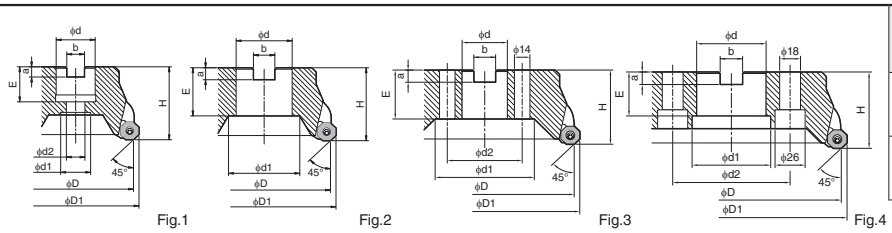


Fig.1 Fig.2 Fig.3 Fig.4

Rake Angle	
A.R.	R.R.
+15°	+5°

Toolholder Dimensions

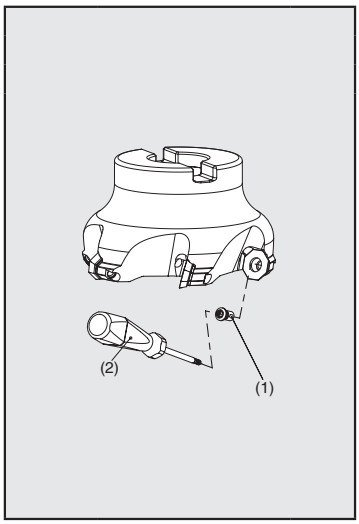
Description			Std.	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Applicable Inserts ➔M21
					ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S			
Metric	MOF	45040R-05-3T-M	●	3	40	49	16	13.5	8.5	40	19	5.6	8.4	-	Fig.1	0.3	OFMT05 type
		45050R-05-4T-M	●	4	50	59	22	17	11		21	6.3	10.4			0.4	
		45063R-05-5T-M	●	5	63	72										0.6	
		45080R-05-6T-M	●	6	80	89	27	20	13	50	24	7	12.4			1.1	
		45100R-05-7T-M	●	7	100	109	32	45	-		32	8	14.4		Fig.2	1.8	
		45125R-05-8T-M	●	8	125	134	40	55		63	33	9	16.4			3.7	
		45160R-05-10T-M	●	10	160	169	40	88	66.7		30				Fig.3	5.1	
		45200R-05-12T-M	●	12	200	209	60	68	101.6		38	14	25.7		Fig.4	8.0	
	MOF	45063R-07-4T-M	●	4	63	75	22	17	11	40	21	6.3	10.4	-	Fig.1	0.6	OFMT07 type
		45080R-07-5T-M	●	5	80	92	27	20	13	50	24	7	12.4			1.2	
		45100R-07-6T-M	●	6	100	112	32	45	-		32	8	14.4		Fig.2	1.9	
		45125R-07-8T-M	●	8	125	137	40	55		63	33	9	16.4			3.7	
		45160R-07-10T-M	●	10	160	172		88	66.7		30				Fig.3	5.1	
		45200R-07-12T-M	●	12	200	212	60	68	101.6		38	14	25.7		Fig.4	8.0	
Bore Dia. Inch spec	MOF	45080R-05-6T	○	6	80	89	25.4	20	13	50	26	6	9.5	-	Fig.1	1.1	OFMT05 type
		45100R-05-7T	○	7	100	109	31.75	45	-		32	8	12.7		Fig.2	1.8	
		45125R-05-8T	○	8	125	134	38.1	55		63	38	10	15.9			3.7	
		45160R-05-10T	○	10	160	169	50.8	88				11	19.1			5.1	
		45200R-05-12T	○	12	200	209	47.625	68	101.6			14	25.4		Fig.4	8.0	
	MOF	45080R-05-5T	○	5	80	92	25.4	20	13	50	26	6	9.5	-	Fig.1	1.2	OFMT07 type
		45100R-07-6T	○	6	100	112	31.75	45	-		32	8	12.7		Fig.2	1.8	
		45125R-07-8T	○	8	125	137	38.1	55		63	38	10	15.9			3.7	
		45160R-07-10T	○	10	160	172	50.8	88				11	19.1			5.1	
		45200R-07-12T	○	12	200	212	47.625	68	101.6			14	25.4		Fig.4	8.0	

Spare Parts

Description		(1) Clamp Screw	(2) Wrench	Mounting bolt
MOF	45040R-05-3T-M	SB-4082TPR	DTP-15	HH8X25
	45050R-05-4T-M			HH10X30M
	45063R-05-5T-M			
	45080R-05-6T-M			HH12X35M
	45100R-05-7T-M			-
	45125R-05-8T-M			
	45160R-05-10T-M			
	45200R-05-12T-M			
MOF	45063R-07-4T-M	SB-50120TRS	DTP-15	HH10X30S
	45080R-07-5T-M			HH12X35M
	45100R-07-6T-M			-
	45125R-07-8T-M			
	45160R-07-10T-M			
	45200R-07-12T-M			
MOF	45080R-05-6T	SB-4082TPR	DTP-15	HH12X35M
	45100R-05-7T			-
	45125R-05-8T			
	45160R-05-10T			
	45200R-05-12T			
MOF	45080R-07-5T	SB-50120TRS	DTP-15	HH12X35M
	45100R-07-6T			-
	45125R-07-8T			
	45160R-07-10T			
	45200R-07-12T			

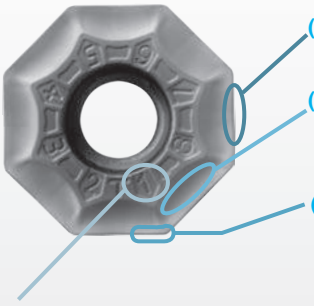
Max. ap and usable edges

Usable edges	MAX. ap	
	OFMT05 type	OFMT07 type
4 edges	7mm	10mm
8 edges	2.5mm	4mm



● : Std. Item

General purpose "SH Chipbreaker", Tough Edge type "GT Chipbreaker"



(1) High Fracture Resistance
Large land is applied

(2) Low Cutting Force
Great effect on high feed ratio range

(3) With Wiper Edge
Having best angle of full profile edge, surface finish is greatly improved

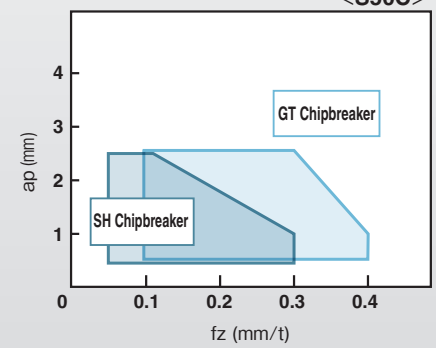
(4) With corner identification mark

	OFMT05 type	OFMT07 type
GT Chipbreaker (Tough Edge)		
SH Chipbreaker (General purpose)		

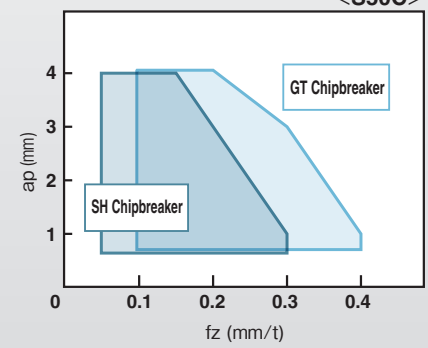
Note 1) OFMT07 type insets cannot be used for MOFX cutters (Ref. to page **M36**).

Applicable Chipbreaker Range

● 05 type



● 07 type



◆ Recommended Cutting Conditions (MOF / MOFX)

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
			MEGACOAT		PVD Coated Carbide
	GT Chipbreaker (Tough Edge)	SH Chipbreaker (General purpose)	**PR1225**	**PR1210**	**PR830**
Carbon Steel	0.10~**0.25**~0.40	0.10~**0.15**~0.30	★ 120~**180**~250	-	☆ 120~**150**~200
Alloy Steel	0.10~**0.25**~0.35	0.10~**0.15**~0.30	★ 100~**160**~220	-	☆ 100~**150**~180
Mold Steel	0.10~**0.20**~0.35	0.08~**0.12**~0.25	★ 80~**140**~180	-	☆ 80~**120**~150
Stainless Steel	-	0.08~**0.12**~0.25	★ 120~**160**~220	-	-
Gray Cast Iron	0.10~**0.25**~0.40	0.10~**0.15**~0.30	-	★ 120~**180**~250	-
Nodular Cast Iron	0.10~**0.20**~0.35	0.08~**0.12**~0.25	-	★ 100~**150**~200	-

★:1st Recommended ☆:2nd Recommended

Facing | Chamfering

MOFX45 Face Mill

Rake Angle	A.R.	+15°
	R.R.	+5°

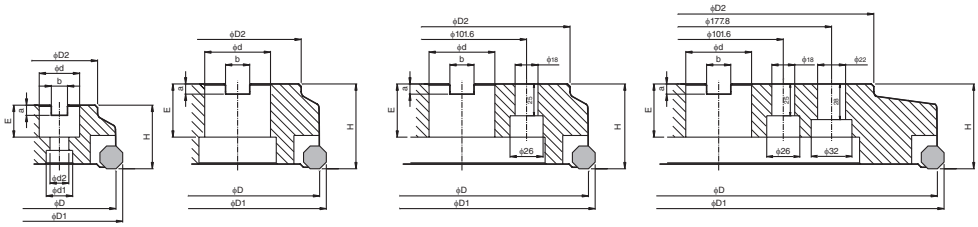
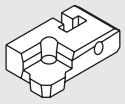
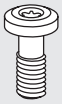


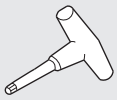
Fig.1 Fig.2 Fig.3 Fig.4

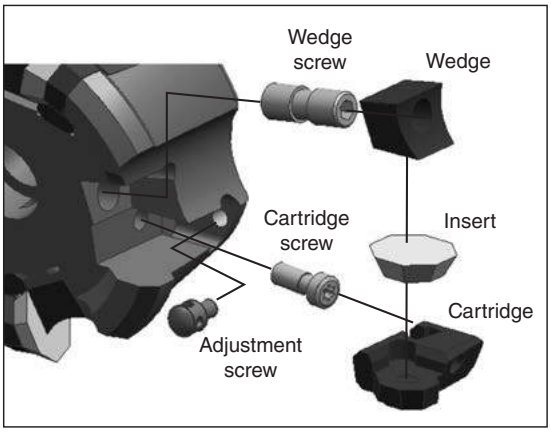
Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Applicable Inserts ➡M21
				ϕD	ϕD1	ϕD2	ϕd	ϕd1	ϕd2	a	b	E	H			
Metric	MOFX 45080R07-5T-MSF	○	5	80	91	70	27	20	14	7	12.4	22	50	Fig.1	1.4	OFMR07 Type
	45100R07-6T-MSF	○	6	100	111	85	32	-	-	8	14.4	28		Fig.2	2.1	
	45125R07-8T-MSF	○	8	125	136	100	40			9	16.4	30	63		3.9	
	45160R07-10T-MSF	○	10	160	171	120				10					6	
	45200R07-12T-MSF	○	12	200	211	140	60			15	25.4	38		Fig.3	7.4	
	45250R07-16T-MSF	○	16	250	261	180									12.6	
	45315R07-20T-MSF	MTO	20	315	326	240								Fig.4	20.7	
Bore Dia. Inch spec	MOFX 45080R-07-5T-SF	○	5	80	91	70	25.4	20	14	6	9.5	25	50	Fig.1	1.4	OFMR07 Type
	45100R-07-6T-SF	○	6	100	111	80	31.75	-	-	8	12.7	32		Fig.2	2.1	
	45125R-07-8T-SF	○	8	125	136	100	38.1			10	15.9	38	63		3.9	
	45160R-07-10T-SF	○	10	160	171	120	50.8			11	19.0				5.8	
	45200R-07-12T-SF	○	12	200	211	130	47.625			14	25.4			Fig.3	7.6	
	45250R-07-16T-SF	○	16	250	261	180									12.9	
	45315R-07-20T-SF	MTO	20	315	326	240								Fig.4	20.7	

Spare Parts

Cartridge	Cartridge screw	Wedge	Wedge screw	Adjustment screw
				
LOF07R	SH-50150TR	WOF07R	W8×21	AJ-412

Wrench (for Wedge)	Wrench (for Cartridge)
	
TH-4	TTC-20

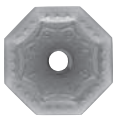


Features

1) The insert is fixed by wedge clamp
2) Good surface finish (Easy edge adjustment)
3) 8-edge insert provides high cost efficiency
4) High axial rake angle and double positive angle on chipbreaker provide low cutting force
5) SH chipbreaker (for general purpose / low cutting force) and GT chipbreaker (Tough edge)

○ : Check Availability
MTO : Made to order

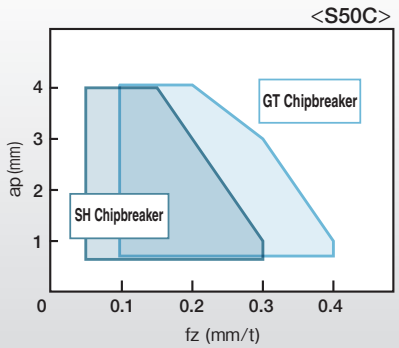
Applicable Inserts

Description	Applicable Inserts ⇒ M21	
		
MOFX45...-SF	OFMR 070405EN-SH	OFMR 070408EN-GT

Recommended Cutting Conditions ⇒ **M35**

Note 1) OFMR0704○○EN-GT / SH is no hand type.
It can be also used for Left-hand (L) type cutter (special order item).
Note 2) Inserts for MOFX cutter cannot be used for MOF cutters (Ref. to page **M34**).

Chipbreaker range



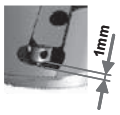
Max. ap and usable edges

Usable edges	Max. ap
	OFMR07 type
4 edges	10mm
8 edges	4mm

How to Adjust Cutting Edge height

1. Set the edge fluctuation adjustment screw

- Set the distance between the bottom of edge fluctuation adjustment screw and the cutter body to approximately 1 mm.



2. Set the cartridge

- Set the cartridge to the cutter body with the cartridge screw.
Recommended torque: 5N·m

3. Set the wedge

- After setting the insert to the cartridge, set the wedge with the wedge screw.
Recommended torque: 6N·m

4. Loosen the screws (Preparation for edge fluctuation adjustment)

- Loosen the wedge screw by approximately 10°.
- Loosen the cartridge screw by approximately 45°.

5. Adjust the front edge fluctuation

- Measure the front edge fluctuation. With reference to the most protruding edge, turn the edge fluctuation adjustment screw counterclockwise to adjust the front edge fluctuation.

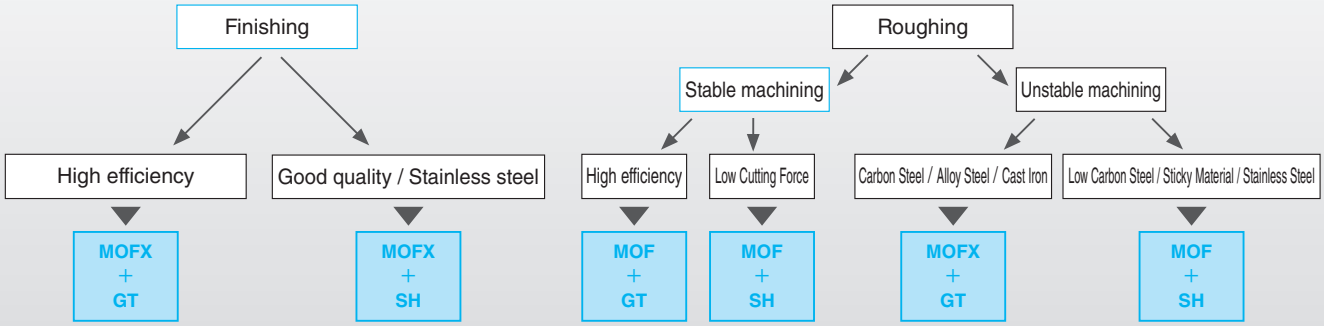
6. Make the final adjustment

- Tighten the cartridge screw
Recommended torque: 5N·m
Tighten the wedge screw
Recommended torque: 6N·m
- Measure the front edge fluctuation again.

Selection of MOFX / MOF Mill

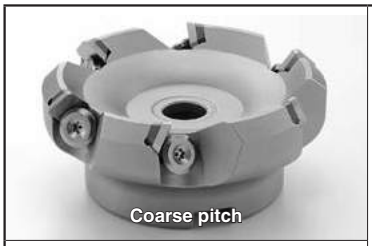
【MOFX】
High durability of cutter body due to the cartridge design.
Best for finishing due to easy edge adjustment.

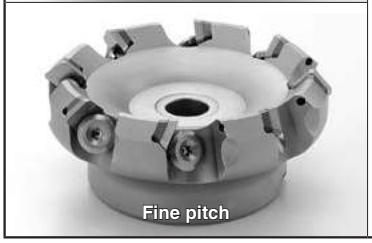
【MOF】(Ref. to page M34)
Excellent chips evacuation when roughing sticky materials such as low carbon steel and stainless steel.



MOFX is suitable for more precious machining and unstable machining.

MSE45 Face Mill (Coarse pitch / Fine pitch)





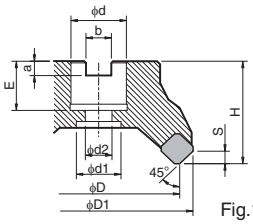


Fig.1

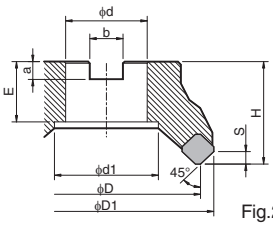


Fig.2

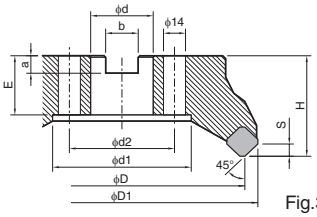


Fig.3

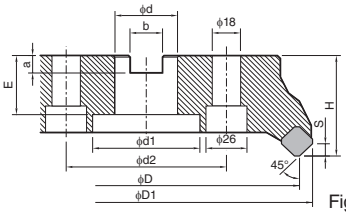


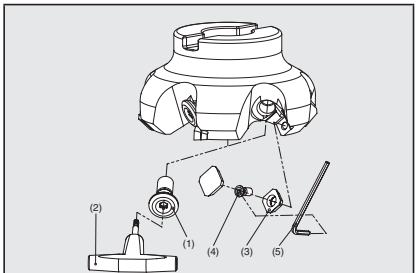
Fig.4

Toolholder Dimensions

Description			Std.	No. of Inserts	Dimension (mm)										Rake Angle		Drawing	Weight (kg)
					ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S	A.R.	R.R.		
Metric	Coarse pitch	MSE 45040R-3T-M	○	3	40	53	16	11.5	8.5	45	20	5.6	8.4	6	+20°	-5.0°	Fig.1	0.4
		45050R-4T-M	○	4	50	63	22	17	11	48	21	6.3	10.4			-5.0°		0.5
		45063R-5T-M	○	5	63	76				40						-10°		0.6
		45080R-6T-M	○	6	80	93	27	20	13	50	24	7	12.4			-8.5°		1.1
		45100R-6T-M	○	6	100	113	32	46	-		32	8	14.4			-7.5°	Fig.2	1.8
		45125R-7T-M	○	7	125	138	40	55		63	33	9	16.4			-6.5°		3.4
		45160R-8T-M	□	8	160	173		88	66.7		30					-5.5°	Fig.3	5.2
		45200R-10T-M	□	10	200	213	60	68	101.6		32	14	25.7			-5.0°	Fig.4	8.6
	Fine pitch	MSE 45040R-4T-M	○	4	40	53	16	11.5	8.5	45	20	5.6	8.4	6	+20°	-5.0°	Fig.1	0.4
		45050R-5T-M	○	5	50	63	22	17	11	48	21	6.3	10.4			-5.0°		0.5
		45063R-6T-M	○	6	63	76				40						-10°		0.6
		45080R-7T-M	○	7	80	93	27	20	13	50	24	7	12.4			-8.5°		1.1
		45100R-8T-M	○	8	100	113	32	46	-		32	8	14.4			-7.5°	Fig.2	1.7
		45125R-9T-M	○	9	125	138	40	55		63	33	9	16.4			-6.5°		3.3
		45160R-10T-M	□	10	160	173		88	66.7		30					-5.5°	Fig.3	5.1
		45200R-13T-M	□	13	200	213	60	68	101.6		32	14	25.7			-5.0°	Fig.4	7.4
Bore Dia. Inch spec	Coarse pitch	MSE 45080R-6T	○	6	80	93	25.4	20	13	50	26	6	9.5	6	+20°	-8.5°	Fig.1	1.1
		45100R-6T	○	6	100	113	31.75	46	-		32	8	12.7			-7.5°	Fig.2	1.8
		45125R-7T	○	7	125	138	38.1	55		63	38	10	15.9			-6.5°		3.4
		45160R-8T	○	8	160	173	50.8	88				11	19.1			-5.5°		5.2
		45200R-10T	□	10	200	213	47.625	68	101.6			14	25.4			-5.0°	Fig.4	8.6
	Fine pitch	MSE 45080R-7T	○	7	80	93	25.4	20	13	50	26	6	9.5	6	+20°	-8.5°	Fig.1	1.1
		45100R-8T	○	8	100	113	31.75	46	-		32	8	12.7			-7.5°	Fig.2	1.7
		45125R-9T	○	9	125	138	38.1	55		63	38	10	15.9			-6.5°		3.3
		45160R-10T	○	10	160	173	50.8	88				11	19.1			-5.5°		5.1
		45200R-13T	□	13	200	213	47.625	68	101.6			14	25.4			-5.0°	Fig.4	7.4

Spare Parts

Description	(1) Clamp Screw	(2) Wrench	(3) Shim	(4) Shim Clamp Screw	(5) Wrench
MSE 45040R-○T-M 45050R-○T-M	CP8X15TL (Left-hand Thread)	TTC-25	MSE-4245S	SP4X9	LW-2 (for Shim Clamp Screw)
MSE 45063R-○T-M ~ 45200R-○○T-M	CP8X23TL (Left-hand Thread)				
MSE 45080R-○T ~ 45200R-○○T					

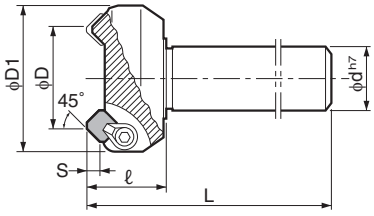


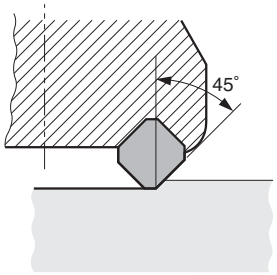
Clamp Screw (1) has Left-hand thread.
Therefore turn the wrench to the right to remove the insert.

· Mounting bolt (SP8X35) is included for MSE45040R-○T-M.
· Mounting bolt (HH10X30S) is included for MSE45050R-○T-M and MSE45063R-○T-M.
· Mounting bolt (HH12X35M) is included for MSE45080R-○T-M and MSE45080R-○T.

○ : Check Availability
□ : Deleted from the next catalogue

MSE45 with Cylindrical shank (High Rake)





Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) φD	φD1	φd	L	ℓ	S	Rake Angle A.R.	R.R.	Spare Parts Clamp Set	Wrench	Shim	Shim Clamp Screw
MSE	**4550**	○	3	50	73	32	120	40	6	+20°	-3°	CPS-6M	LW-3	MSE-4245	SP3X8
	4563	○	4	63	86										
	4580-32	○	4	80	103										

Applicable Inserts

Description	Applicable Inserts ➔ **M10**			Applicable Inserts ➔ **M25**
MSE45○○-○○	SEMR 1203AFER-H	SEKR 1203AFEN-S	SEEN 1203AFTN SEKN 1203AFTN 1203AFFN	SEEN 1203AFFN-NE 1203AFFN (PCD)
MSE45○○○R-○T				
MSE45○○○R-○T-M				

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN100M	MEGACOAT PR1225	PR1210	PVD Coated Carbide PR830	Carbide KW10	PCD KPD001 (KPD010)
Carbon Steel	~0.30	★ 120~200	★ 120~250	-	☆ 120~200	-	-
Alloy Steel	~0.30	★ 100~180	★ 100~220	-	☆ 100~180	-	-
Mold Steel	~0.25	★ 100~180	★ 80~180	-	☆ 80~150	-	-
Stainless Steel	~0.25	☆ 120~200	★ 120~220	-	☆ 120~200	-	-
Cast Iron	~0.30	-	-	★ 100~220	-	☆ 80~150	-
Non-ferrous Metals	~0.20	-	-	-	-	★ 100~300	★ 300~800

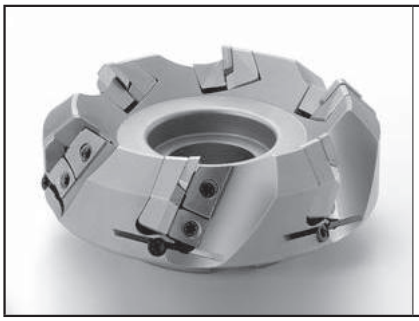
★:1st Recommended ☆:2nd Recommended

○ : Check Availability

Easy edge adjustment MSE45-SF

Facing | Chamfering

MSE45-SF Face Mill (Easy edge adjustment)



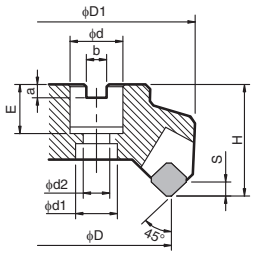


Fig.1

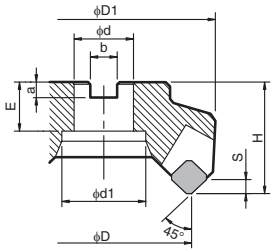


Fig.2

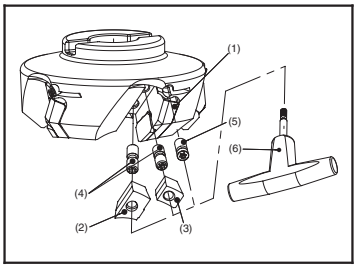
Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)										Rake Angle		Drawing	Weight (kg)
				φD	φD1	φd	φd1	φd2	H	E	a	b	S	A.R.	R.R.		
Metric	MSE 45063R-4T-M-SF	○	4	63	85	22	17	11	50	21	6.3	10.4	6	+20°	-10°	Fig.1	1.2
	45080R-5T-M-SF	○	5	80	101	27	40	13		24	7	12.4			-8.5°		1.5
	45100R-6T-M-SF	○	6	100	119	32	45	-		32	8	14.4			-7.5°	Fig.2	2.2
	45125R-7T-M-SF	○	7	125	143	40	55		63	30	9	16.4			-6.5°		4.0
Bore Dia. Inch spec	MSE 45080R-5T-SF	○	5	80	101	25.4	38	-	50	26	6	9.5	6	+20°	-8.5°	Fig.2	1.5
	45100R-6T-SF	○	6	100	119	31.75	45			32	8	12.7			-7.5°		2.2
	45125R-7T-SF	○	7	125	143	38.1	55		63	38	10	15.9			-6.5°		4.0

Spare Parts

Description	(1) Cartridge	(2) Clamp	(3)Clamp	(4) Clamp Screw	(5) Adjustment Screw	(6) Wrench
MSE 45○○R-○T-M -SF	LSE-445SR	C43R (for Insert)	C44R (for Cartridge)	W6X17	SV-60136TR	TTC-20
MSE 45○○R-○T-SF						

· Mounting bolt (HH10X30S) is included for MSE45063R-4T-M-SF.
· Mounting bolt (HH12X35M) is included for MSE45080R-5T-M-SF.



Applicable Inserts

Description	Applicable Inserts ➔ M10				Applicable Inserts ➔ M25	
				With Wiper Edge		With Wiper Edge
MSE45...-SF	SEMR 1203AFER-H	SEKR 1203AFEN-S	SEEN 1203AFTN SEKN 1203AFTN 1203AFFN	SEEN 1203AFTR-W 1203AFFR-W	SEEN 1203AFFN-NE 1203AFFN (PCD)	SEEN 1203AFFR-W (PCD)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)					
		Cermet	MEGACOAT		PVD Coated Carbide	Carbide	PCD
		TN100M	PR1225	PR1210	PR830	KW10	KPD001 (KPD010)
Carbon Steel	~0.30	★ 120~200	★ 120~250	-	☆ 120~200	-	-
Alloy Steel	~0.30	★ 100~180	★ 100~220	-	☆ 100~180	-	-
Mold Steel	~0.25	★ 100~180	★ 80~180	-	☆ 80~150	-	-
Stainless Steel	~0.25	☆ 120~200	★ 120~220	-	☆ 120~200	-	-
Cast Iron	~0.30	-	-	★ 100~220	-	☆ 80~150	-
Non-ferrous Metals	~0.20	-	-	-	-	★ 100~300	★ 300~800

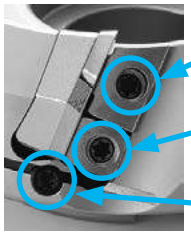
★:1st Recommended ☆:2nd Recommended

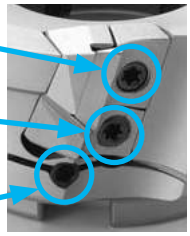
○ : Check Availability

How to Adjust Cutting Edge height

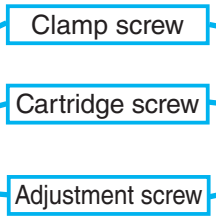
Screw names

MSE45-SF





MTE90-SF



Adjustable height for the cutting edge

· For model MSE45-SF: Approx. 20μm
· For model MTE90-SF: Approx. 50μm
(The difference in adjustable heights varies because of the difference in lead angles.)

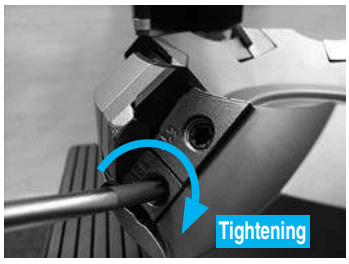
* For the explanations below, refer to the screw names indicated above. Milling Cutter shown here is model MSE45-SF.

1) Partial adjustment of the adjustment screw

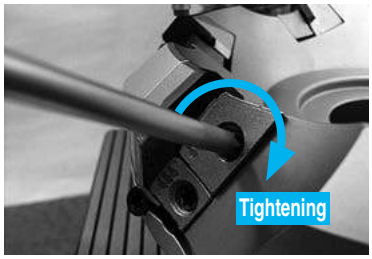
(1) Loosen the edge adjustment screw
(2) Tighten as much as the edge adjustment screw is tensioned

2) Partial tightening of the clamp screw and cartridge screw

(1) Notes) Partial tighten the cartridge screw.



(2) Notes) Partial tighten the clamp screw.

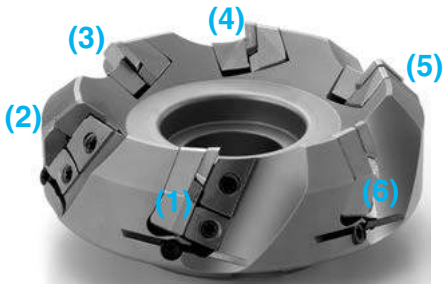


* Perform work with all inserts attached in their correct positions.

Notes) Partial tightening: Tighten the adjustment screw only partially, so that further adjustment is still possible.

3) Measuring the cutting edge fluctuation

Example: Measuring the front cutting edge fluctuation



No.	Measurement results	Results	Edge fluctuation
(1)	0.263mm		-6μm
(2)	0.258mm		-11μm
(3)	0.254mm		-15μm
(4)	0.269mm	Max.	0μm
(5)	0.261mm		-8μm
(6)	0.250mm	Min.	-19μm

Current fluctuation:19μm

(Number (1)~(6) are not indicated on cutter body)

* With each of these screws partial tightened: cartridge screw, clamp screw, adjustment screw, measure the cutting edge fluctuation.

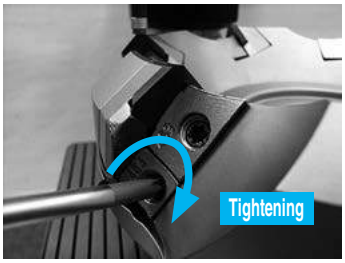
4) Adjusting the fluctuation

Based on the measurement results, adjust the fluctuation.

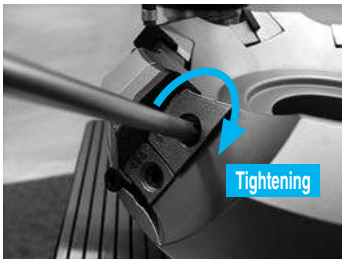
Using the measured amount of fluctuation, adjust so that the fluctuation is adjusted at the highest corner of the cutting edge, then fully tighten the adjusting screw.

5) Firm tightening of the cartridge and insert

(1) Fully tighten the cartridge screw



(2) Fully tighten the clamp screw



Easy edge adjustment MSE45-SF

The usage of SEEN wiper insert

Features of the wiper insert

By installing one wiper insert on the cutter that also has a standard insert attached, the surface roughness can be improved.
The edge geometry of wiper insert is arc style and overhang is slightly prominent to axis direction when cutter is installed.
Finishing with a wiper insert enables better surface quality.

Recommended Cutting Conditions

1) Vc, fz···within recommended cutting conditions
2) ap ≤ 0.5mm

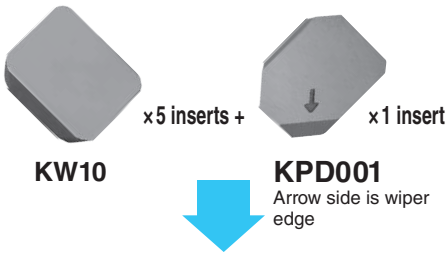
How to attach wiper insert

1) Install only one wiper insert against standard insert.
2) As only one edge of the wiper insert is used, please attach insert arrow " ↓ " that faces to workpiece cutting surface.
3) Check overhang amount for wiper insert using MSE45-SF type.
So you canobtain much more stable surface roughness.

How to set up amount of overhang for wiper edge

1) Please adjust wiper insert overhang within 0.03 to 0.1mm from the largest overhang standard insert. If overhang is larger than this, life of insert should be lower.
2) It is recommended having wiper insert overhang about 0.05mm.

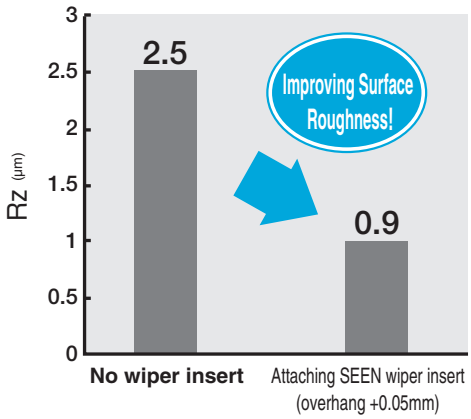
For example, when finishing Aluminum with ϕ125···



Low cost and good cutting surface

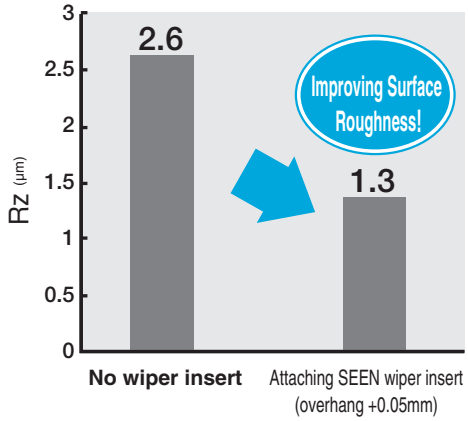
Case Studies

In case of Aluminum (A5052)



Cutting Conditions
·MSE45100R-6T-SF
·Vc=300m/min
·ap=0.2mm
·fz=0.2mm/t
·Wet
·No wiper insert
SEKN1203AFFN (KW10)
6 inserts
·With wiper insert
SEKN1203AFFN (KW10)
5 inserts
SEEN1203AFFR-W (KPD001)
1 insert

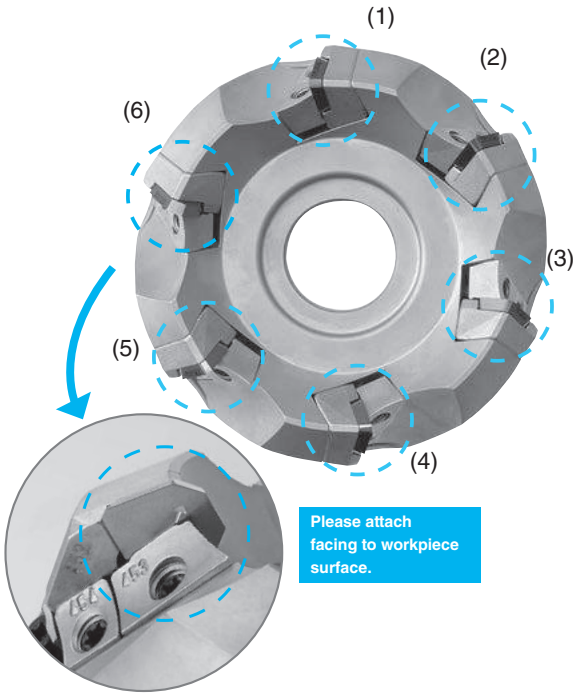
In case of S50C



Cutting Conditions
·MSE45100R-6T-SF
·Vc=200m/min
·ap=0.2mm
·fz=0.1mm/t
·Dry
·No wiper insert
SEKN1203AFTN (TN100M)
6 inserts
·With wiper insert
SEKN1203AFTN (TN100M)
5 inserts
SEEN1203AFTR-W (TN100M)
1 insert

Example of attaching wiper insert

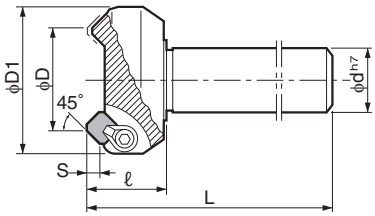
No.	Insert	Edge fluctuation
(1)	Standard	-6μm
(2)	Standard	-11μm
(3)	Standard	-15μm
(4)	Standard	0μm
(5)	Standard	-8μm
(6)	With Wiper Edge	+0.03~+0.1mm

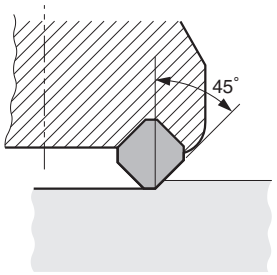


Please attach facing to workpiece surface.

Facing | Chamfering

MSD45 with cylindrical shank





Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)						Rake Angle		Spare Parts				
				φD	φD1	φd	L	ℓ	S	A.R.	R.R.	Clamp Set	Wrench	Shim	Shim Clamp Screw	
MSD	4550	○	3	50	73	32	120	40	6.5	+16°	-3°	CPS-6M	LW-3	MSD-42	SP3X8	
	4563	○	3	63	87											
	4580-32	○	4	80	104											

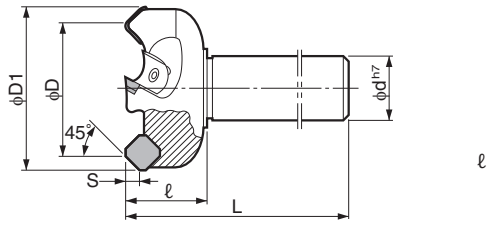
Applicable Inserts

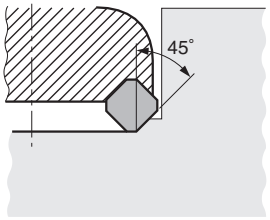
Description	Applicable Inserts ➔ M10			Applicable Inserts ➔ M25
MSD 45...	SDMR 1203AUER-H	SDKR 1203AUEN-S	SDCN 1203AUTN SDKN 1203AUTN 1203AUFN	SDKN 1203AUFN-NE 1203AUFN (PCD)

Recommended Cutting Conditions ➔ M195

○ : Check Availability

MSO45-S with cylindrical shank (High Rake)





Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)						Rake Angle		Spare Parts				
				ϕD	ϕD1	ϕd	L	ℓ	S	A.R.	R.R.	Shim	Shim Clamp Screw	Clamp	Clamp screw	Wrench
MSO	4550-S	○	4	50	66	32	120	40	7.1	+27°	-8°	MSO-4T245	SP3X6	CH-20R	TH8X15	TH-4
	4563-S	○	5	63	79											
	4580-S	○	5	80	96											

MSO45 Face Mill (High Rake)

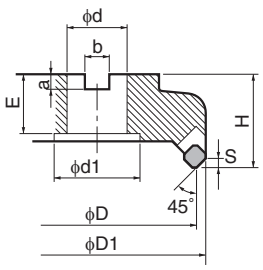


Fig.1

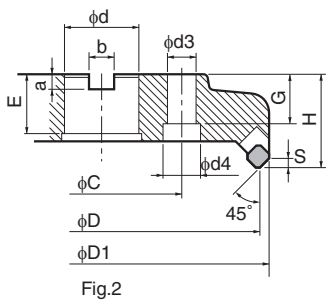
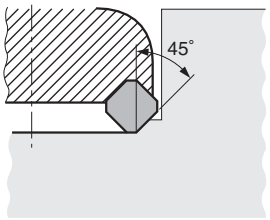


Fig.2

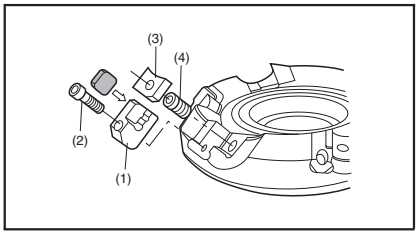


Toolholder Dimensions

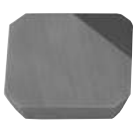
Description		Std.	No. of Inserts	Dimension (mm)														Rake Angle		Drawing	Weight (kg)
				ϕD	ϕD1	ϕd	ϕd1	ϕd2	ϕd3	ϕd4	ϕC	H	E	G	a	b	S	A.R.	R.R.		
MSO	45100R	○	5	100	114.8	31.75	48	-	-	-	-	60	32	-	8	12.7	7.1	+27°	-8°	Fig.1	2.5
	45125R	○	6	125	140.0	38.10	58						38		10	15.9					3.7
	45160R	○	8	160	174.5	50.80	68								11	19.0					5.4
	45200R	○	10	200	214.5	47.625	-		18	26	101.6			32	14	25.4				Fig.2	8.4

Spare Parts

Description	(1)Cartridge	(2)Cartridge Clamp screw	(3)Clamp	(4)Clamp screw	Wrench
MSO 45...R	LSO-445R	HH4X16	CH-20R	TH8X15	TH-4



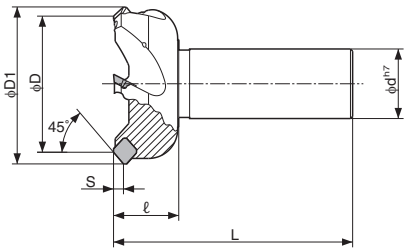
Applicable Inserts

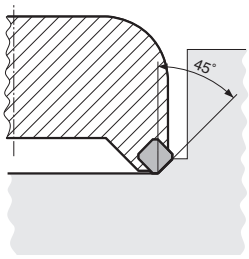
Description	Applicable Inserts ➔ M10		Applicable Inserts ➔ M25
			
MSO 45...	SOKR 13T3AXEN-J	SOKN 13T3AXTN 13T3AXFN	SOKN 13T3AXFN-NE (PCD)

Recommended Cutting Conditions ➔ M195

○ : Check Availability

MSO45-S-09 with cylindrical shank (High Rake)





Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)						Rake Angle		Spare Parts				
				φD	φD1	φd	L	ℓ	S	A.R.	R.R.	Clamp Screw	Wrench			
MSO	4550-S32-09	○	3	50	60	32	110	30	4.2	+27°	-8°	SB-3060TR	DT-10			
	4563-S32-09	○	4	63	73											
	4580-S32-09	○	4	80	90											

Applicable Inserts

Description	Applicable Inserts M22	
MSO45...-09	SOMT 0903AXEN-J	SOMW 0903AXTN 0903AXFN

Recommended Cutting Conditions M195

○ : Check Availability

Face Mill for Heavy Milling MSRS15

Facing

Roughing is processed in one pass.
MSRS15 changes heavy milling! (Max. ap 12 mm)

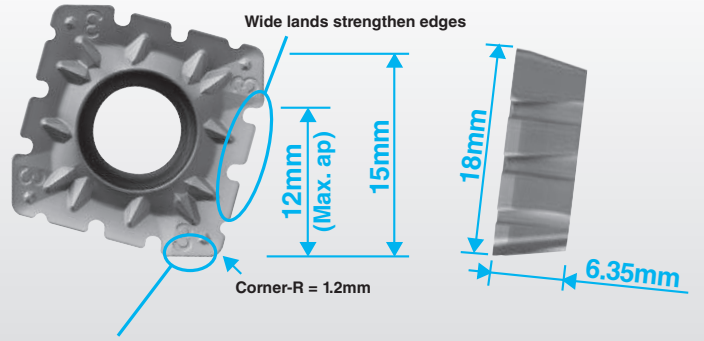
Conventional tools

Chip evacuation per unit time is increased

MSRS15

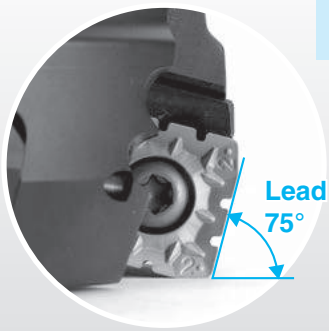
Large depth of cut and high feed rate achieve high efficiency machining.

Recommended ap: 5~10mm



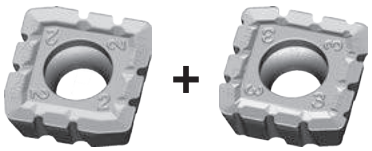
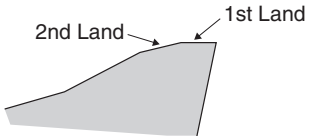
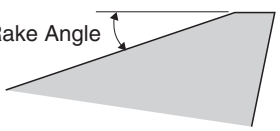
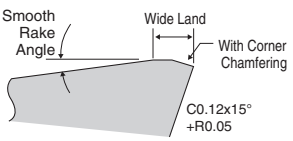
Large wiper edges achieve high feed rate.

Inserts are strengthened with 6.35mm thickness.



A.R. +9°
R.R. –9°(ϕ80)
–5°(more than ϕ100)

Selection of chipbreaker

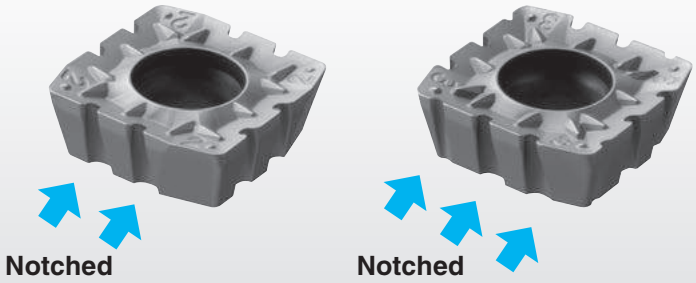
	Low Cutting Force	General purpose	Edge Strength Oriented
Insert Type	**NB2P** (4-Notched) **NB3P** (5-Notched)	**NB2** (2-Notched) **NB3** (3-Notched)	 **NB2T** (2-Notched) **NB3T** (3-Notched)
Applications	When using long arbor or for machining of thin-plate workpieces	General purpose type with good balance of strength and cutting force	For interrupted machining and high load machining When feed rate is increased or workpiece material is Cast Iron
Edge preparation	As many as four (or five) Notches help to alleviate the shock when biting into the workpiece	Strength, edge and chip control are all well balance	Strength is increased by the edge shape and moderate rake angle of the chamfer edge
	 2nd Land 1st Land	 Large Rake Angle	 Smooth Rake Angle, Wide Land, With Corner Chamfering, C0.12x15° +R0.05

A supplemental chipbreaker is used when it is necessary to increase strength and bite while focusing on resistance, as when machining welded areas.

●About insert no. of NB2P (4-Notched) and NB3P (5-Notched)
In order to adjust applicable inserts on marked numbers on toolholders,
"2+" is marked for NB2P (4-Notched) and "3+" is marked on NB3P (5-Notched).

Notched insert reduces cutting force, and enables high feed rates by reducing chattering.

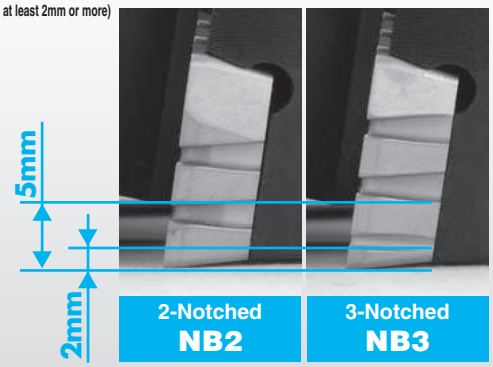
Notched Insert



NB2 | NB3

Notch effect

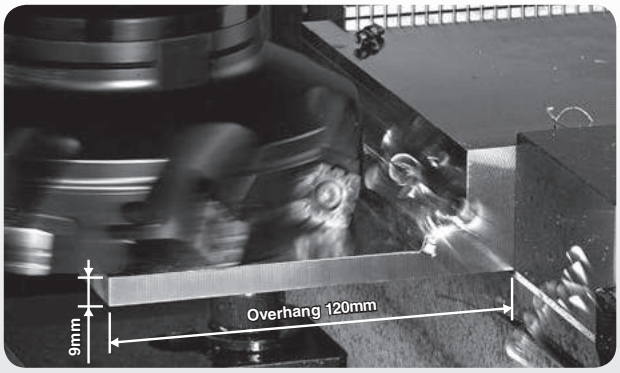
The effects of the notch can be seen at more than 5mm of vertical ap (effects for NB3 appears from at least 2mm or more)



2-Notched NB2 | 3-Notched NB3

Design to suppress chattering with low cutting force

Possible to cut thin-plate workpieces (low rigidity material such as can manufacturing equipment)

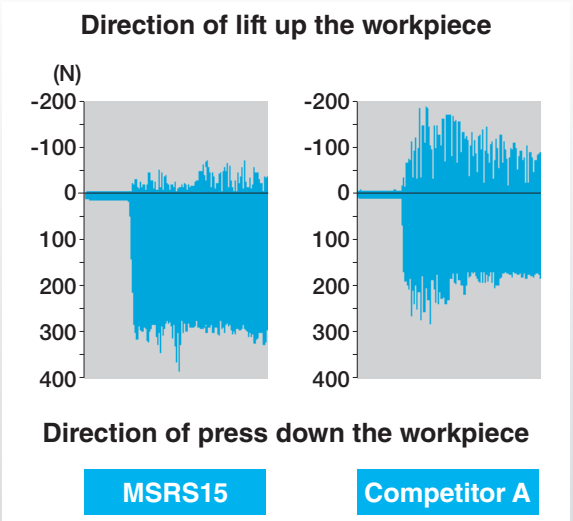


MSRS15160R-8T

Workpiece Material : S50C
Vc=200m/min (n=398min^{-1})
fz=0.15mm/t (Vf=477mm/min), ap×ae=6×100mm
(Machining of overhang from 15mm to 9mm)

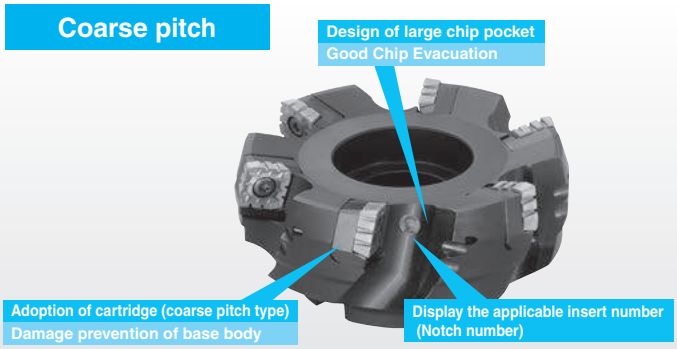
Comparison of cutting force (thrust force)

MSRS15 suppresses chattering since less force to lift workpiece is needed during machining.



Features of Toolholder

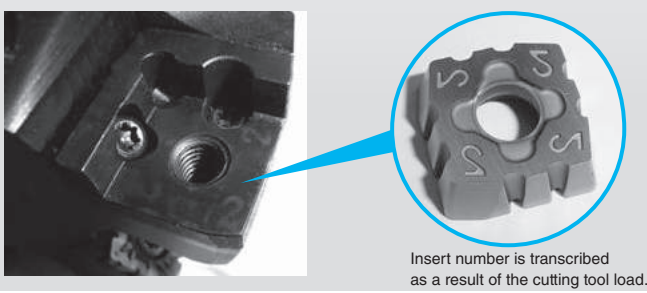
Coarse pitch



Fine pitch

Higher productivity due to fine pitch design

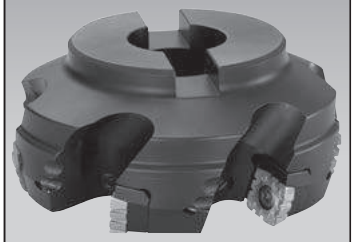
Insert Replacement Identification



Insert number is transcribed as a result of the cutting tool load.

* Depending on the cutting conditions, marks are not transcribed.

MSRS15



(The photo shows the coarse pitch type)

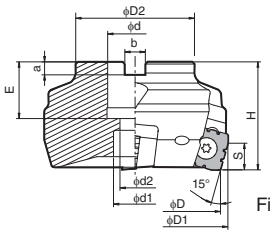


Fig.1

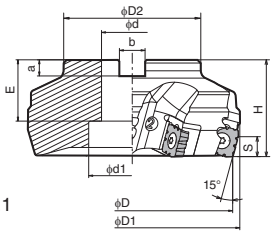


Fig.2

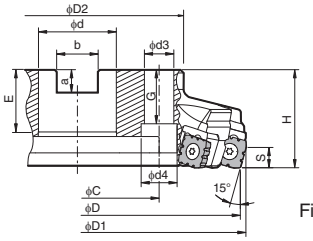


Fig.3

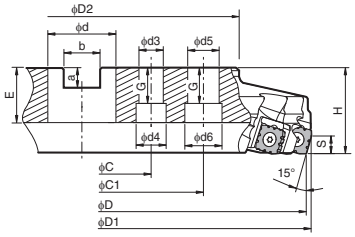


Fig.4

Rake Angle		
Description	A.R.	R.R.
MSRS15080R···	+9°	-9°
MSRS15100R··· ~ MSRS15315R···	+9°	-5°

Toolholder Dimensions (Metric)

Description			Std.	No. of Inserts	Dimension (mm)																	Drawing	Weight (kg)
					ϕD	ϕD1	ϕD2	ϕd	ϕd1	ϕd2	H	E	a	b	S	ϕd3	ϕd4	ϕd5	ϕd6	ϕC	ϕC1	G		
Coarse pitch	MSRS	15080R-4T-M	●	4	80	87	70	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-4T-M	●	4	100	107	85	32	45	-		29	8	14.4									Fig.2	2.0
		15125R-6T-M	●	6	125	132		40	55		60	33	9	16.4				-	-		-			3.6
		15160R-8T-M	●	8	160	167	110		68	-						14	20			66.7		28		5.0
		15200R-10T-M	●	10	200	207	140	60	-			38	15	25.7		18	26			101.6		32	Fig.3	7.7
		15250R-12T-M	●	12	250	257																		12.0
		15315R-14T-M	●	14	315	322	230											22	32		177.8		Fig.4	17.0
Fine pitch	MSRS	15080R-6T-M	●	6	80	87	70	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-6T-M	●	6	100	107	85	32	45	-		29	8	14.4									Fig.2	1.9
		15125R-8T-M	●	8	125	132		40	55		60	33	9	16.4				-	-		-			3.5
		15160R-10T-M	●	10	160	167	110		68	-						14	20			66.7		28		4.9
		15200R-12T-M	●	12	200	207	140	60	-			38	15	25.7		18	26			101.6		32	Fig.3	7.6
		15250R-14T-M	●	14	250	257																		11.9
		15315R-16T-M	MTO	16	315	322	230											22	32		177.8		Fig.4	17.0

· Mounting bolt (HH12X35) is included for MSRS15080R-○T-M.
· Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.

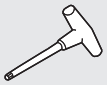
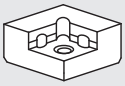
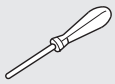
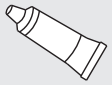
Toolholder Dimensions (Bore Dia. ϕd: Inch spec)

Description			Std.	No. of Inserts	Dimension (mm)																	Drawing	Weight (kg)
					ϕD	ϕD1	ϕD2	ϕd	ϕd1	ϕd2	H	E	a	b	S	ϕd3	ϕd4	ϕd5	ϕd6	ϕC	ϕC1	G		
Coarse pitch	MSRS	15080R-4T	○	4	80	87	55	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-4T	○	4	100	107	70	31.75	42	-		32	8	12.7									Fig.2	2.0
		15125R-6T	○	6	125	132	85	38.1	54		60	38	10	15.9				-	-		-			3.6
		15160R-8T	○	8	160	167	100	50.8	68	-			11	19.0										5.0
		15200R-10T	○	10	200	207	130	47.625	-				14	25.4		18	26			101.6		32	Fig.3	7.7
		15250R-12T	○	12	250	257																		12.0
		15315R-14T	○	14	315	322	220											22	32		177.8	25	Fig.4	17.0
Fine pitch	MSRS	15080R-6T	○	6	80	87	55	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-6T	○	6	100	107	70	31.75	42	-		32	8	12.7									Fig.2	1.9
		15125R-8T	○	8	125	132	85	38.1	54		60	38	10	15.9				-	-		-			3.5
		15160R-10T	○	10	160	167	100	50.8	68	-			11	19.0										4.9
		15200R-12T	○	12	200	207	130	47.625	-				14	25.4		18	26			101.6		32	Fig.3	7.6
		15250R-14T	○	14	250	257																		11.9
		15315R-16T	MTO	16	315	322	220											22	32		177.8	25	Fig.4	17.0

· Mounting bolt (HH12×35) is included for MSRS15080R-○T.
· Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.

● : Std. Item
MTO : Made to order

Spare Parts

Description		Spare Parts						
		Clamp Screw	Wrench	Cartridge	Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
								
Coarse pitch	MSRS 15080R-○○(M)	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	MP-1	HH12X35
	MSRS 15100R-○○(M) ~ 15315R-○○(M)	for Insert Clamp Recommended tightening torque 7.5N·m		for Cartridge Clamp Recommended tightening torque 3.5N·m				-
Fine pitch	MSRS 15080R-○○(M)	SB-60120TR	TT-25L	-	-	-	MP-1	HH12X35
	MSRS 15100R-○○(M) ~ 15315R-○○(M)	for Insert Clamp Recommended tightening torque 7.5N·m						-

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts

Description	Applicable Inserts → M23 [Handed Insert shows Right-hand]			
	2-Notched	3-Notched	2-Notched / Tough Edge	3-Notched / Tough Edge
MSRS… MSRS…M	SPMT 1806EDER-NB2	SPMT 1806EDER-NB3	SPMT 1806EDSR-NB2T	SPMT 1806EDSR-NB3T
For custom-ordered cutter	-	-	SPMT 1806EDSL-NB2T	SPMT 1806EDSL-NB3T

Description	Applicable Inserts → M23		
	4-Notched / Low cutting force	5-Notched / Low cutting force	Without notch
MSRS… MSRS…M	SPMT 1806EDER-NB2P	SPMT 1806EDER-NB3P	SPMT 1806EDER-V

Selection of chipbreaker → M46

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)			Recommended Insert Grades (Cutting Speed Vc:m/min)			
				MEGACOAT			PVD Coated Carbide
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	**PR1225**	**PR1230**	**PR1210**	**PR830**
Carbon Steel	0.15	0.2	0.3	☆ 120~**180**~250	★ 120~**180**~220	-	☆ 120~**170**~220
Alloy Steel	0.15	0.2	0.3	☆ 120~**180**~250	★ 120~**180**~220	-	☆ 120~**170**~220
Mold Steel	0.1	0.15	0.2	☆ 100~**160**~220	★ 100~**160**~200	-	☆ 100~**150**~200
Gray Cast Iron	0.2	0.25	0.35	-	-	★ 120~**180**~250	-
Nodular Cast Iron	0.15	0.2	0.3	-	-	★ 100~**160**~220	-
Stainless Steel	Not recommended						
Aluminum / Copper	Not recommended						

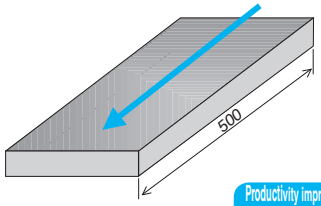
★:1st Recommendation ☆:2nd Recommendation

Case Studies -Improved productivity / Shortened Cutting Time-

SS400

Plate
- Vc=150m/min (n=382min^{-1})
- ap×ae=10×125mm
- fz=0.2mm/t (Vf=458mm/min)
- Dry ·6 inserts
- MSRS15125R-6T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)



Productivity improved by 4.4 times!

MSRS15	Chip Evacuation Rate 572cc/min
Competitor's Cutter A	129cc/min

[Competitor's Cutter A]
ϕ125, 6 inserts
Vc=150m/min (n=382min^{-1})
ap×ae=3×125mm
fz=0.15mm/t (Vf=344mm/min)

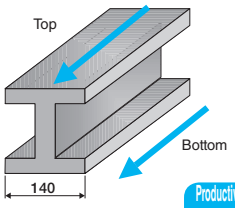
Because conditions can be raised drastically, very effective for time crunch.
Productivity improved by 4.4 times.

(Evaluation by the user)

S50C

Rail
- Vc=150m/min (n=300min^{-1})
- ap×ae=6×140mm
- fz=0.2mm/t (Vf=480mm/min)
- Dry ·8 inserts
- MSRS15160R-8T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)



Productivity improved by 4.7 times!

MSRS15	Chip Evacuation Rate 403cc/min
Competitor's Cutter B	84cc/min

[Competitor's Cutter B]
Machining with 2mm × 3 passes
Vc=150m/min (n=300min^{-1})
ap×ae=2×140mm
fz=0.125mm/t (Vf=300mm/min)

MSRS15 can complete machining with 1 pass for what needed to be cut with 3 passes usually. Still machining sound of MSRS was quiet. Productivity improved by 4.7 times.

(Evaluation by the user)

C12A(Cast Steel)

Industrial Machine Part
- Vc=100m/min (n=200min^{-1})
- ap×ae=10×114mm
- fz=0.4mm/t (Vf=635mm/min)
- Dry ·8 inserts
- MSRS15160R-8T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)

Productivity improved by 2.5 times!

MSRS15	Chip Evacuation Rate 724cc/min
Competitor's Cutter C	290cc/min

[Competitor's Cutter C]
6 inches, 8 inserts
Vc=250m/min (n=522min^{-1})
ap×ae=2.5×114mm
fz=0.25mm/t (Vf=1,016mm/min)

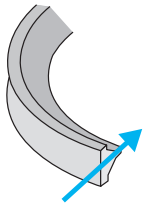
Before ap could not be increased due to high resistance, but MSRS15 can increase ap without increasing load on the main spindle. Productivity improved by 2.5 times.

(Evaluation by the user)

S45C

Gear
- Vc=200m/min (n=255min^{-1})
- ap×ae=10×200mm
- fz=0.17mm/t (Vf=600mm/min)
- Dry ·14 inserts
- MSRS15250R-14T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)



Productivity improved by 2.6 times!

MSRS15	Chip Evacuation Rate 1,200cc/min
Competitor's Cutter D	459cc/min

[Competitor's Cutter D]
ϕ250, 12 inserts
Vc=120m/min (n=153min^{-1})
ap×ae=5×200mm
fz=0.25mm/t (Vf=459mm/min)

Machining noise is quiet even when cutting width is less than 80% of cutter dia.
Productivity improved by 2.6 times.

(Evaluation by the user)

Q&A

Q-1 What amount of cutting width (ae) is necessary in a radial direction?

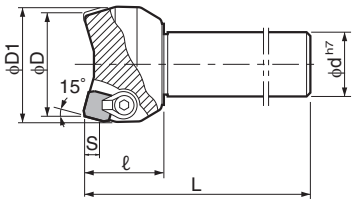
A-1 The estimated amount is 70 to 80% of diameter of the cutting tool.

Q-2 Why does the MSRS15 type have a cutting angle 75°?

A-2 45° cutting angle type can reduce an impact in biting a workpiece but increase a thrust force. On the other hand, 90° cutting angle type can reduce a thrust force but increase an impact in biting a workpiece. 75° cutting angle MSRS15 type can suppress both a thrust force and impact in biting keeping a good balance and enable smooth machining even in large machining.

MSP15 / MSE15

MSP15 with cylindrical shank MSE15 with cylindrical shank (High Rake)



Toolholder Dimensions

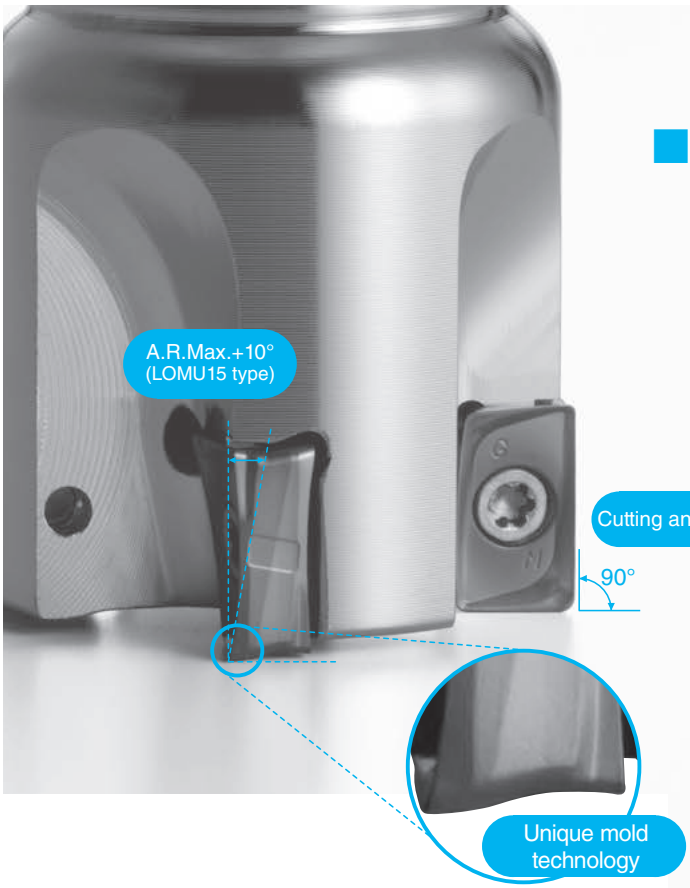
Description		Std.	No. of Inserts	Dimension (mm)						Rake Angle		Spare Parts				
				φD	φD1	φd	L	ℓ	S	A.R.	R.R.	Clamp Set	Wrench	Shim	Shim Clamp Screw	
MSP	**1550**	○	3	50	57	32	120	40	9	+10°	-2°	CPS-6M	LW-3	MSP-42	SP3X8	
	1563	□	3	63	70											
MSE	**1550**	□	3	50	57	32	120	40	8.5	+20°	+3°	CPS-6M	LW-3	MSE-4215	SP3X8	
	1563	□	3	63	71						+6°					
	1580-32	□	4	80	87											

Applicable Inserts

Description	Applicable Inserts ➔ **M11**			Applicable Inserts ➔ **M10**
MSP 15...	SPMR 1203EDER-H	SPKR 1203EDER-S	SPCN 1203EDTR SPKN 1203EDTR 1203EDER 1203EDFR	-
MSE 15...	-	-	-	SEKN 1203EFTR

Recommended Cutting Conditions ➔ **M195**

○ : Check Availability
□ : Deleted from the next catalogue

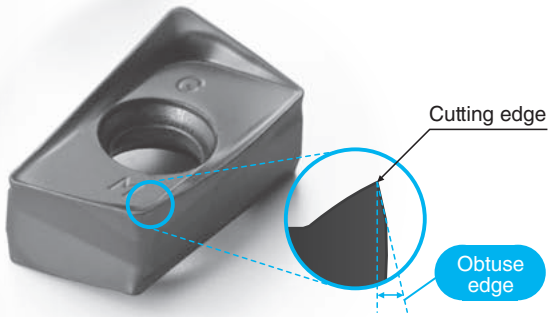


MEW

Double-sided 4-edge insert,
Newly Developed End Mill
Kyocera's unique mold technology
reduces cutting force equivalent to positive inserts

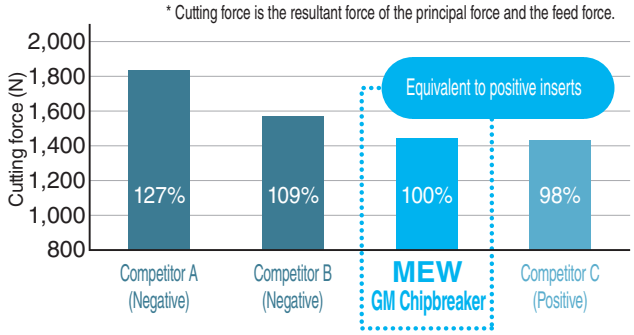
Cutting angle 90°

Obtuse edge increases cutting edge toughness



Low cutting force equivalent to positive inserts

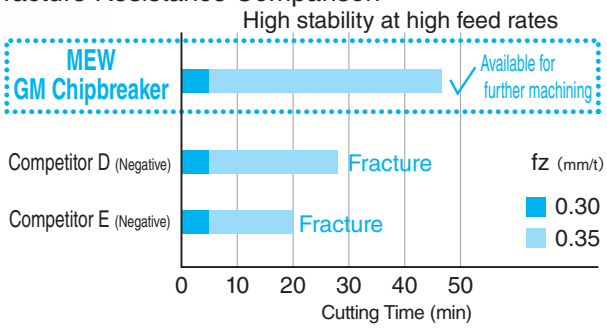
● Cutting Force Comparison



<Cutting Conditions>
Vc=150m/min ap×ae=3×15mm fz=0.15mm/t S50C Cutter dia. ϕ20

(Internal evaluation)

● Fracture Resistance Comparison



<Cutting Conditions>
Vc=120m/min ap×ae=3×10mm fz=0.3~0.35mm/t
SCM440H (37～39HS) Cutter dia. ϕ20

(Internal evaluation)

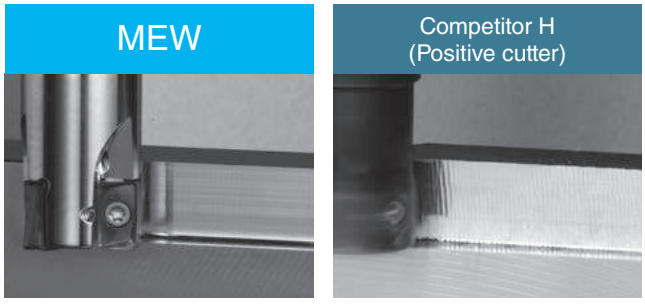
Improved surface finish, minimizing chattering

Sharp cutting and superior resistance to chattering and burrs, due to helical cutting edge and optimum axial rake design

MEW GM Chipbreaker	Competitor F (Negative)	Competitor G (Positive)
+20°	+17°	+17°

Large actual rake angle lowers cutting force

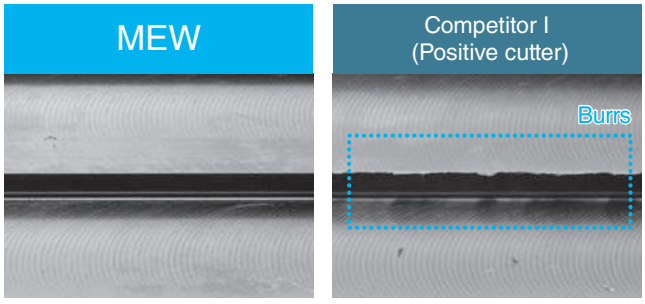
Surface of shoulder wall



Smooth surface of MEW without chattering

<Cutting Conditions>
Vc=240m/min ap×ae=4(3 passes)×5mm fz=0.12mm/t Dry SS400 Cutter dia. ϕ20

Burr comparison with positive cutters



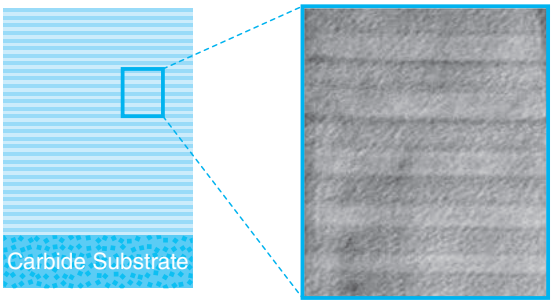
Less burrs than positive cutters due to sharp cutting

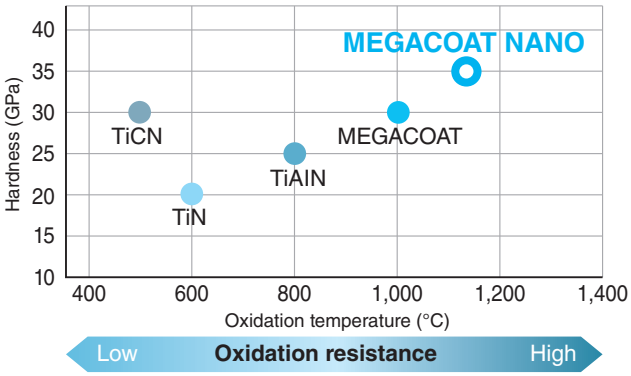
<Cutting Conditions>
Vc=250m/min ap×ae=4×5mm fz=0.1mm/t Dry S50C Cutter dia. ϕ20

Extended Tool Life by New MEGACOAT NANO Technology

Stable and longer tool life by special nano coating layer **"MEGACOAT NANO"**
PR1525 for steel and stainless steel (austenitic related), **PR1510** for cast iron are available.
PR1535 for heat-resistant alloys, titanium and stainless steel (precipitation hardening) are available, too.
CA6535 (CVD coated) for heat-resistant alloys and stainless steel (martensitic) is available, too.

MEGACOAT base multi-layer structure





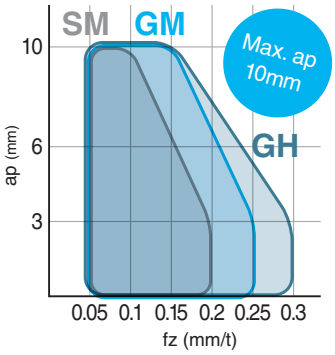
Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C)

Various chipbreaker lineup

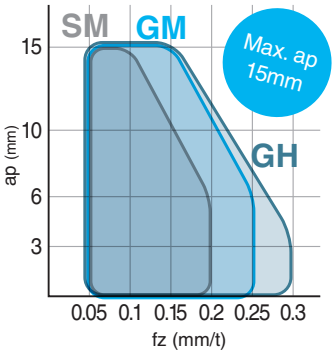
Newly developed 3 chipbreakers for various applications
Applicable to a wide range of application

Chipbreaker	Applications	Insert
GM	General purpose	
SM	Low cutting force	
GH	For Heavy Milling	

● LOMU10 type



● LOMU15 type



<Cutting Conditions> Vc=150m/min ae=ϕD/2mm Workpiece Material : S50C

Chips (slotting)

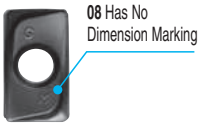
Chips (shouldering)

Lineup of Corner-R(rε)

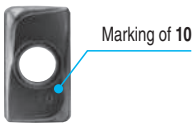
Corner-R(rε) 0.4,1.0,1.2,1.6 and 2.0 added to GM chipbreaker lineup

Marking of **04**

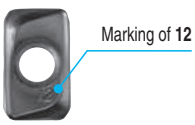
LOMU100404ER-GM
LOMU150504ER-GM


08 Has No Dimension Marking

LOMU100408ER-GM
LOMU150508ER-GM


Marking of **10**

LOMU150510ER-GM


Marking of **12**

LOMU100412ER-GM
LOMU150512ER-GM

Marking of **16**

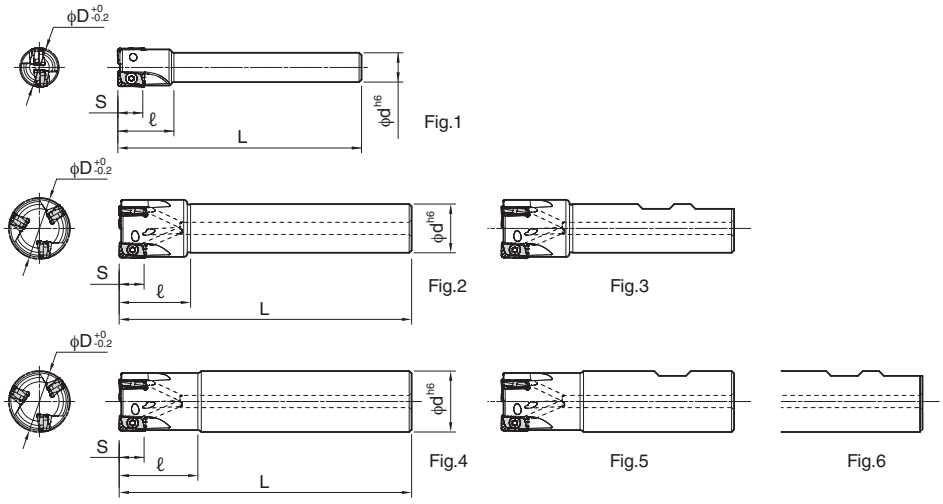
LOMU100416ER-GM
LOMU150516ER-GM

Marking of **20**

LOMU100420ER-GM
LOMU150520ER-GM

MEW End Mill

(Cylindrical)



Toolholder Dimensions

Description				Std.	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Max. Revolution (min^{-1})
						φD	φd	L	ℓ	S	A.R. (MAX.)	R.R.			
Cylindrical	Standard Shank	MEW	16-S12-10-2T	●	2	16	12	100	23	10	+7°	-22°	No	Fig.1	43,750
			18-S16-10-2T	●		18	16		25			-21°	Yes	Fig.2	43,000
			20-S16-10-2T	●		20		110	26			-20°			41,000
			22-S20-10-3T	●	3	22	20								39,600
			25-S20-10-3T	●		25		120	29						37,500
			28-S25-10-3T	●		28	25								35,800
			30-S25-10-4T	●	4	30		130	32						34,800
			32-S25-10-4T	●		32									33,900
			40-S32-10-5T	●	5	40	32	150	50			-19°			30,000
			50-S32-10-5T	●		50		120	40						22,500
	Same Shank	MEW	16-S16-10-2T	●	2	16	16	100	26	10	+7°	-22°	Yes	Fig.4	43,750
			20-S20-10-2T	●		20	20	110	30			-20°			41,000
			20-S20-10-3T	●	3										41,000
			25-S25-10-2T	●	2	25	25	120	32						37,500
			25-S25-10-3T	●	3										37,500
			32-S32-10-3T	●		32	32	130	40						33,900
			32-S32-10-4T	●	4										33,900
	Long Shank	MEW	20-S20-10-150-2T	●	2	20	20	150	40	10	+7°	-20°	Yes	Fig.4	41,000
			25-S25-10-170-2T	●		25	25	170	50						37,500
	Standard Shank	MEW	25-S20-15-2T	●	2	25	20	120	29	15	+10°	-22°	Yes	Fig.2	35,000
			32-S25-15-2T	●		32	25	130	32						30,000
			40-S32-15-3T	●	3	40	32	150	50			-21°			25,000
			40-S32-15-4T	●	4										25,000
			50-S32-15-4T	●		50		120	40						17,000
	Same Shank	MEW	25-S25-15-2T	●	2	25	25	120	32	15	+10°	-22°	Yes	Fig.4	35,000
			32-S32-15-2T	●		32	32	130	40						30,000
			32-S32-15-3T	●	3										30,000
Weldon	Standard Shank	MEW	40-W32-10-5T	●	5	40	32	111	50	10	+7°	-19°	Yes	Fig.3	30,000
		MEW	40-W32-15-4T	●	4					15	+10°	-21°			25,000
	Same Shank	MEW	16-W16-10-2T	●	2	16	16	75	25	10	+7°	-22°	Yes	Fig.5	43,750
			20-W20-10-2T	●		20	20	77				-20°			41,000
			20-W20-10-3T	●	3										41,000
			25-W25-10-2T	●	2	25	25	90	32					Fig.6	37,500
			25-W25-10-3T	●	3										37,500
			32-W32-10-4T	●	4	32	32	102	40						33,900
		MEW	25-W25-15-2T	●	2	25	25	90	32	15	+10°	-22°	Yes	Fig.6	35,000
			32-W32-15-3T	●	3	32	32	102	40						30,000

Max. Revolution
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

● : Std. Item
MTO : Made to order

MEW Face Mill

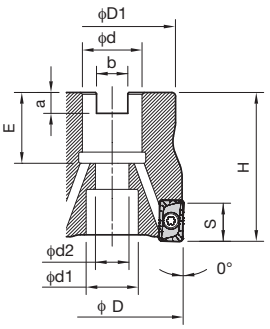


Fig.1

Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S	A.R. (MAX.)	R.R.				
MEW	032R-10-4T-M	●	4	32	30	16	14	9	35	19	5.6	8.4	10	+7°	-20°	Yes	Fig.1	0.1	33,900
	040R-10-5T-M	●	5	40	34				40						-19°			0.2	30,000
	050R-10-5T-M	●		50	45	22	18	11		21	6.3	10.4						0.4	22,500
	063R-10-6T-M	●	6	63	47													0.5	20,500
MEW	040R-15-4T-M	●	4	40	34	16	14	9	40	19	5.6	8.4	15	+10°	-21°	Yes	Fig.1	0.2	25,000
	050R-15-4T-M	●		50	45	22	18	11		21	6.3	10.4						0.3	17,000
	063R-15-5T-M	●	5	63	47													0.5	14,500
	080R-15-6T-M	●	6	80	60	27	20	13	50	25	7	12.4			-20°			1.0	12,000
	080R-15-6T	●				25.4				27	6	9.5						1.0	12,000

Max. Revolution
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Spare Parts and Applicable Inserts (end mill / face mill)

Description		Spare Parts				Applicable Inserts ⇨ M13		
		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt	General purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
MEW	...-10-_T	SB-3065TRP for Insert Clamp Recommended tightening torque 1.2N·m	DTPM-8	MP-1	-	LOMU100404ER-GM	LOMU100408ER-SM	LOMU100408ER-GH
MEW	032R-10_-M				HH8X25	LOMU100408ER-GM		
	040R-10_-M					LOMU100412ER-GM		
	050R-10_-M				HH10X30	LOMU100416ER-GM		
	063R-10_-M					LOMU100420ER-GM		
MEW	...-15-_T	SB-4090TRP for Insert Clamp Recommended tightening torque 3.5N·m	DTPM-15	MP-1	-	LOMU150504ER-GM	LOMU150508ER-SM	LOMU150508ER-GH
MEW	040R-15_-M				HH8X25	LOMU150508ER-GM		
	050R-15_-M				HH10X30	LOMU150510ER-GM		
	063R-15_-M					LOMU150512ER-GM		
	080R-15_(-M)				HH12X35	LOMU150516ER-GM		
						LOMU150520ER-GM		

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ⇨ M60

About wrench specifications

Wrenches and clamp screws are "Torx Plus".

1) Ref. to Fig. 2 for "Torx Plus" Wrench. (Purple grip)
2) Ref. to Fig. 3 for "Torx" Wrench. (Black grip)

A "Torx Plus" Wrench and a "Torx" Wrench have different top shapes.
Please use a "Torx Plus" Wrench.

* If a "Torx" Wrench is used to tighten, the screw head might become damaged and then the screw cannot be removed.

Fig. 2 "Torx Plus" Wrench (For MEW)

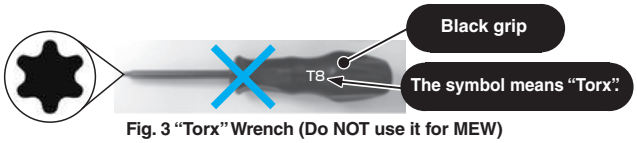
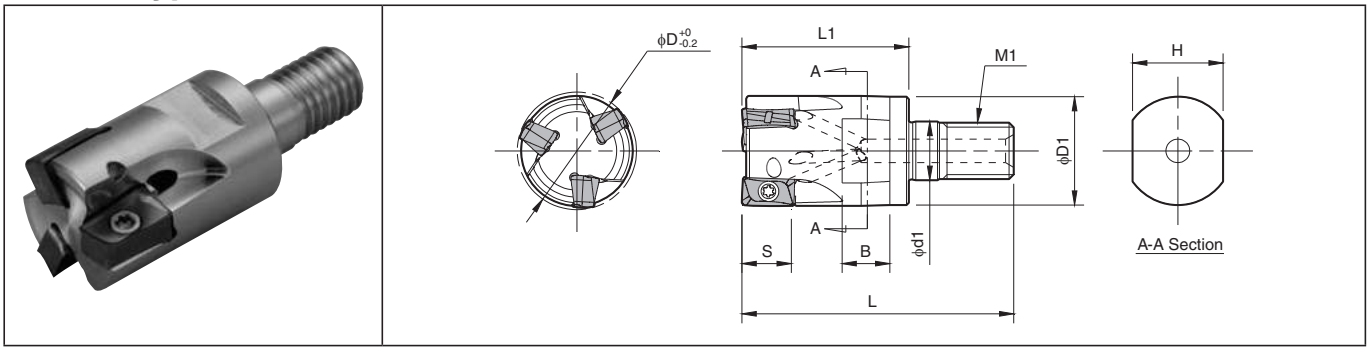


Fig. 3 "Torx" Wrench (Do NOT use it for MEW)

● : Std. Item

MEW type Head



Dimensions

Description		Std.	No. of Inserts	Dimension (mm)									Rake Angle		Coolant Hole	Applicable Inserts ➔ M13	Max. Revolution (min^{-1})
				φD	φD1	φd1	L	L1	M1	H	B	S	A.R. (MAX.)	R.R.			
MEW	16-M08-10-2T	●	2	16	14.7	8.5	43	25	M8×P1.25	12	8	10	+7°	-22°	Yes	LOMU1004	43,750
	20-M10-10-2T	●		20	18.7	10.5	49	30	M10×P1.5	15	9			-20°			41,000
	20-M10-10-3T	●	3														41,000
	25-M12-10-3T	●		25	23	12.5	57	35	M12×P1.75	19	10						37,500
	32-M16-10-4T	●	4	32	30	17	63	40	M16×P2.0	24	12						33,900
MEW	25-M12-15-2T	●	2	25	23	12.5	57	35	M12×P1.75	19	10	15	+10°	-22°	Yes	LOMU1505	35,000
	32-M16-15-3T	●	3	32	30	17	63	40	M16×P2.0	24	12						30,000

Max. Revolution

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Ref. to page ➔ **M58** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts and Applicable Inserts

Description		Spare Parts			Applicable Inserts ➔ M13		
		Clamp Screw	Wrench	Anti-seize Compound	General purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
MEW	16-M08-10-2T 20-M10-10-2T 20-M10-10-3T 25-M12-10-3T 32-M16-10-4T	SB-3065TRP	DTPM-8	MP-1	LOMU100404ER-GM LOMU100408ER-GM LOMU100412ER-GM LOMU100416ER-GM LOMU100420ER-GM	LOMU100408ER-SM	LOMU100408ER-GH
		for Insert Clamp Recommended tightening torque 1.2N·m					
MEW	25-M12-15-2T 32-M16-15-3T	SB-4090TRP	DTPM-15	MP-1	LOMU150504ER-GM LOMU150508ER-GM LOMU150510ER-GM LOMU150512ER-GM LOMU150516ER-GM LOMU150520ER-GM	LOMU150508ER-SM	LOMU150508ER-GH
		for Insert Clamp Recommended tightening torque 3.5N·m					

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Modular End Mill Head Identification System

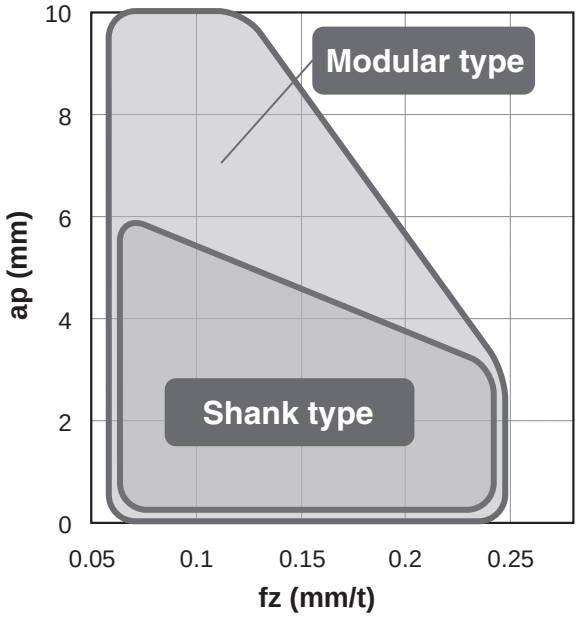
MEW 16 - M08 - 10 - 2T

- MEW: Series
- 16: Cutting Dia.
- M08: Thread Size for Clamping
- 10: Insert Size
- 2T: No. of Inserts

● : Std. Item

Feature of Modular type

Applicable to a wide range of applications



<Cutting Conditions>

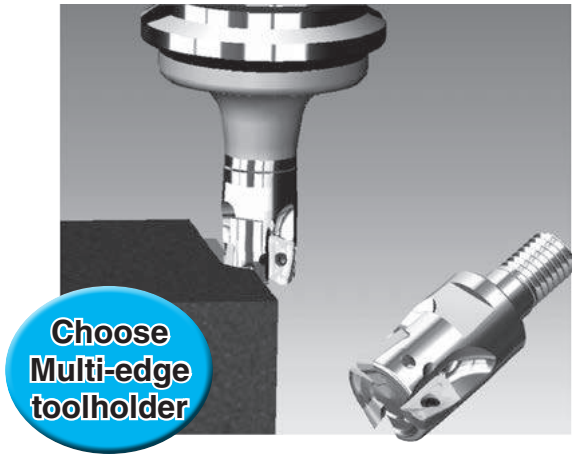
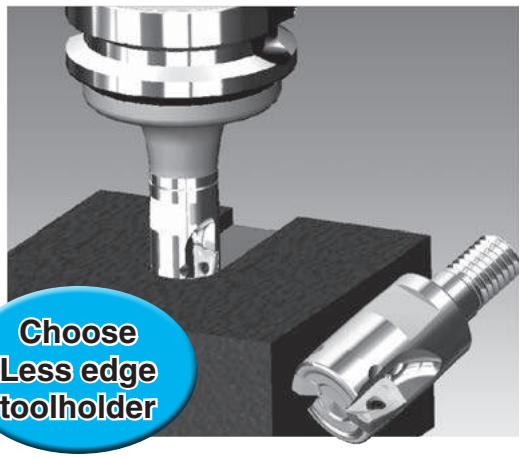
- Cutting Speed : Vc=150m/min (n=2,390min^{-1})
- Width of Cut : ae=10mm (Shouldering)
- Workpiece Material : S55C, Dry
- **Machine : BT30 M/C**

<Cutting Tool>

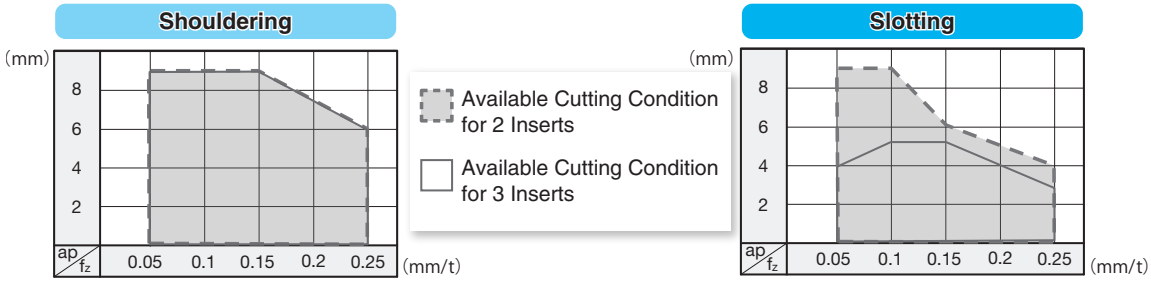
- Modular type
  - Head : MEW20-M10-10-3T
  - Arbor : BT30K-M10-45
  - Insert : LOMU100408ER-GM (PR1525)
- Shank type
  - Toolholder : MEW20-S20-10-3T
  - Arbor : BT30 Milling Chuck (Double-face clamping)
  - Insert : LOMU100408ER-GM (PR1525)

A wide range of applications even in BT30 M/C due to the superior anti-chattering performance.

How to select Multi-edge or Less edge toolholder

Shouldering (ae=10mm)	Slotting
	
Choose Multi-edge toolholder	Choose Less edge toolholder

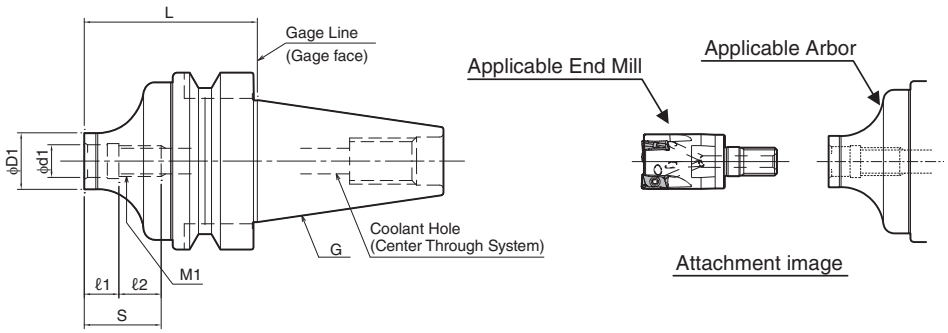
・Available Cutting Condition of Modular type



Choose Multi-edge toolholder for shouldering; higher efficiency in machining by higher feed rate. For grooving, choose less edge toolholder to lower cutting force.

BT Arbor for Modular End Mill

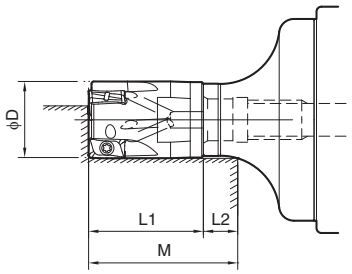
BT Arbor (for exchangeable head / double-face clamping spindle)



Dimensions

Description		Std.	Dimension (mm)							Coolant Hole	Arbor (Double-face clamping)	
			L	ϕD1	ϕd1	S	ℓ1	ℓ2	M1		G	
BT30K-	M08-45	●	45	14.7	8.5	20	9	11	M8×P1.25	Yes	BT30	(MEW/MEC/MFH/MRX)..-M08-..
	M10-45	●		18.7	10.5	21		12	M10×P1.5			(MEW/MEC/MFH/MRX)..-M10-..
	M12-45	●		23	12.5	24		15	M12×P1.75			(MEW/MEC/MFH/MRX)..-M12-..
BT40K-	M08-55	●	55	14.7	8.5	20	9	11	M8×P1.25	Yes	BT40	(MEW/MEC/MFH/MRX)..-M08-..
	M10-60	●	60	18.7	10.5	21		12	M10×P1.5			(MEW/MEC/MFH/MRX)..-M10-..
	M12-55	●	55	23	12.5	24		15	M12×P1.75			(MEW/MEC/MFH/MRX)..-M12-..
	M16-65	●	65	30	17	25		16	M16×P2.0			(MEW/MEC/MFH/MRX)..-M16-..

Actual End Mill depth



Arbor Description		Applicable End Mill (Head)			Actual End Mill depth(mm)	
		Description	Cutting Dia.(mm) ϕD	Dimension (mm) L1	M	L2
BT30K-	M08-45	...16-M08-...	ϕ16	25	31.8	6.8
		...17-M08-...	ϕ17		33.2	8.2
		...18-M08-...	ϕ18		34.2	9.2
	M10-45	...20-M10-...	ϕ20	30	36.8	6.8
		...22-M10-...	ϕ22		39.2	9.2
	M12-45	...25-M12-...	ϕ25	35	42.8	7.8
		...28-M12-...	ϕ28		45.5	10.5
BT40K-	M08-55	...16-M08-...	ϕ16	25	31.7	6.7
		...17-M08-...	ϕ17		33.2	8.2
		...18-M08-...	ϕ18		34.3	9.3
	M10-60	...20-M10-...	ϕ20	30	38.7	8.7
		...22-M10-...	ϕ22		44.5	14.5
	M12-55	...25-M12-...	ϕ25	35	44.6	9.6
		...28-M12-...	ϕ28		47.6	12.6
	M16-65	...32-M16-...	ϕ32	40	51.2	11.2
		...35-M16-...	ϕ35		60.2	20.2
		...40-M16-...	ϕ40		64	24

● : Std. Item

● **Arbor Identification System**

BT30 K - M08 - 45

BT30	K	M08	45
Arbor Size	Double-face clamping spindle	Thread Size for Clamping	Length from Gauge Line

How to Attach Head

(1) When clamping the head on the arbor, make sure there is no dust or chips inside (Fig. 1).
Do NOT put lubricant on the clamping portion.

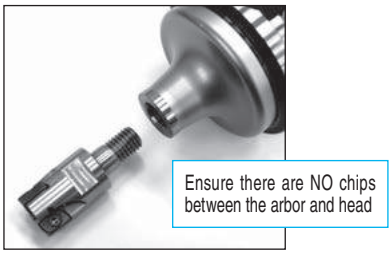


Fig.1

(2) Attach the head on the arbor and fix it using the wrench (Fig. 2).
Ref. to the Table 1 for Recommended tightening
Note) The wrench is NOT included in the products.

Table1 Recommended Head Tightening Torque

Thread Size for Clamping	Wrench Double width [mm]	Recommended tightening torque [N·m]
M8	12	23
M10	15	46
M12	19	80
M16	24	90

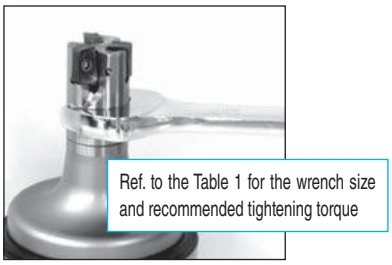


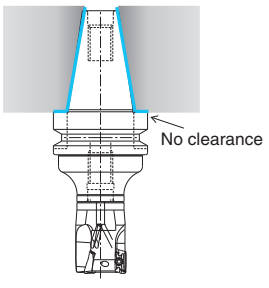
Fig.2

(3) Confirm that the head is fixed firmly on the arbor (Fig. 3).

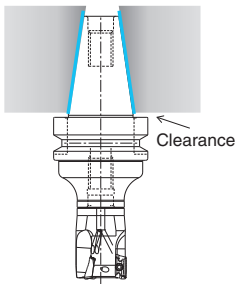
Fig.3

Frequently Asked Question

Q: Can the double-face clamping arbor be mounted on a general BT spindle?
A: Yes. It can be used as a general BT arbor with a general BT spindle.



Double-face clamping arbor mounted on double-face clamping spindle



Double-face clamping arbor mounted on general spindle

It can be used as a general BT arbor, though the advantage of the double-face clamping will not be shown.

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp Screw
   (1) Apply anti-seize compound on portion of taper and thread of clamp screw.
   (2) Attach the screw (magnetic head) to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1.)
   Tighten M3 screws (SB-3065TRP) slightly inclined from the insert surface.(Ref. to Fig. 2.)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended tightening torque Ref. to page M55,M56
4. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder.
   If there is any clearance, remove the insert and mount it again according to the above steps.

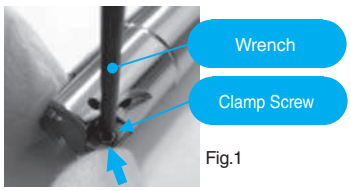


Fig.1

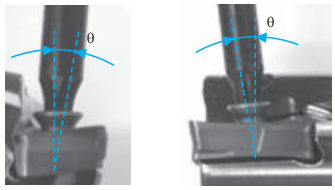


Fig.2

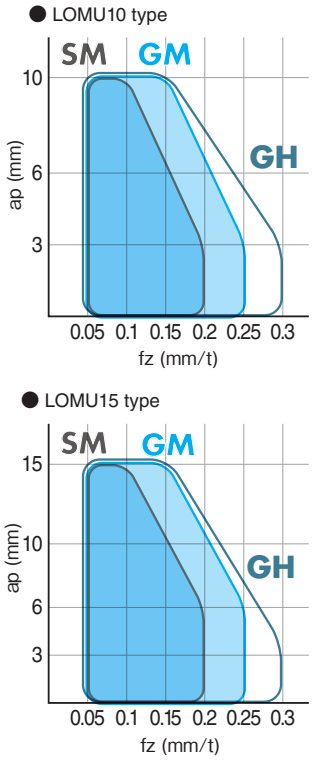
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t) Toolholder Description: MEW16~MEW18	fz (mm/t) Toolholder Description: MEW20~MEW40 MEW040R~MEW080R	Recommended Insert Grades (Cutting SpeedVc:m/min) MEGACOAT NANO: PR1535	PR1525	PR1510	CVD Coated Carbide: CA6535
GM	Carbon Steel	0.06~**0.1**~0.2	0.08~**0.15**~0.25	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.1**~0.14	0.08~**0.15**~0.2	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 100~**160**~200	☆ 100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 150~**200**~250	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	★ 90~**120**~150	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.17	0.08~**0.18**~0.25	-	-	★ 120~**180**~250	-
	Nodular Cast Iron	0.06~**0.08**~0.12	0.08~**0.15**~0.2	-	-	★ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 20~**30**~50	-	-	★ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	0.08~**0.15**~0.2	☆ 40~**60**~80	-	☆ 30~**50**~70	-
SM * (GL)	Carbon Steel	0.06~**0.1**~0.17	0.08~**0.15**~0.2	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.08**~0.12	0.08~**0.12**~0.18	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.06~**0.08**~0.12	0.08~**0.1**~0.15	☆ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	0.08~**0.1**~0.15	★ 100~**160**~200	☆ 100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.12	0.08~**0.1**~0.15	☆ 150~**200**~250	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.12	0.08~**0.1**~0.15	☆ 90~**120**~150	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 20~**30**~50	-	-	★ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	0.08~**0.12**~0.15	★ 40~**60**~80	-	☆ 30~**50**~70	-
GH	Carbon Steel	0.06~**0.1**~0.2	0.08~**0.2**~0.3	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.1**~0.14	0.08~**0.2**~0.25	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.06~**0.08**~0.12	0.08~**0.15**~0.22	☆ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 100~**160**~200	☆ 100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 150~**200**~250	-	-	☆ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 90~**120**~150	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.2	0.08~**0.22**~0.3	-	-	☆ 120~**180**~250	-
	Nodular Cast Iron	0.06~**0.08**~0.15	0.08~**0.18**~0.25	-	-	☆ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 20~**30**~50	-	-	☆ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	0.08~**0.15**~0.2	☆ 40~**60**~80	-	☆ 30~**50**~70	-

* **The bold-faced number** indicates a center value of recommended cutting condition.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
* GL Chipbreaker is recommended for Surface finish oriented milling.

★ :1st Recommendation ☆ :2nd Recommendation

Applicable Chipbreaker Range (Shouldering)

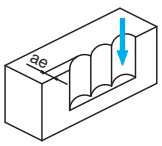


<Cutting Conditions>
Vc=150m/min ae=ϕD/2mm Workpiece Material : S50C

Ramping, Helical milling and Vertical milling (Plunging)

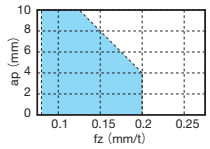
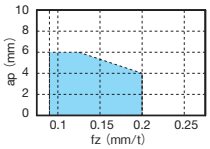
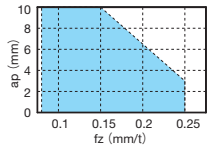
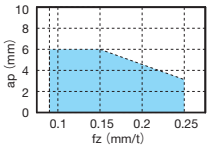
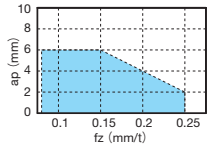
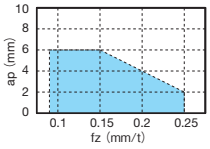
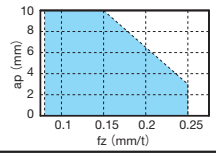
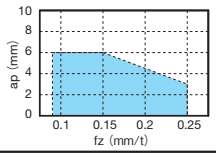
1. Available for vertical milling (plunging).
2. NOT available for ramping and helical milling, because interference between workpiece and insert may occur.

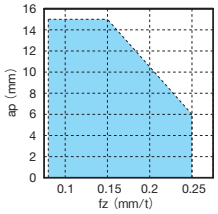
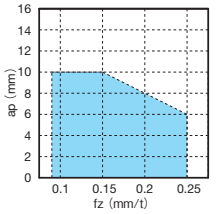
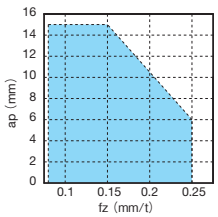
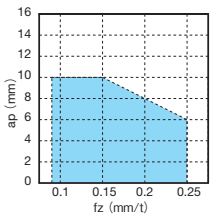
Vertical Milling (Plunging)



Insert Description	Max. Width of Cut (ae)
LOMU10	5mm
LOMU15	7mm

Cutting Performance

Description	Shouldering (Cutting width ae = ϕD/2)	Slotting
MEW16…-10 **MEW18…-10**		
MEW20…-10 ≀ **MEW50…-10**		
MEW20-S20 **-10-150-2T** **MEW25-S25** **-10-170-2T** (Long Shank)		
MEW032R...-10 ≀ **MEW063R...-10**		

Description	Shouldering (Cutting width ae = ϕD/2)	Slotting
MEW25…-15 ≀ **MEW50…-15**		
MEW040R...-15 ≀ **MEW080R...-15**		

<Cutting Conditions>
- Vc=180m/min
- GM Chipbreaker
- Workpiece Material：S50C
- Overhang Length
  1. End mill: Same length as ℓ of the dimension
  2. Face mill: H of the dimension + minimum overhang length of the arbor

Case Studies

SS400

- Construction machine part
- Vc=250m/min
- ap×ae=4×20mm
- fz=0.14mm/t（Vf=1,350mm/min）
- Wet
- MEW32-S32-10-4T (4 inserts)
- LOMU100408ER-GM（PR1525）

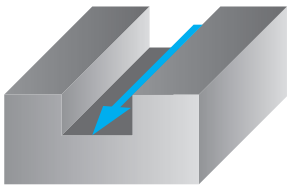
PR1525	Chip Evacuation Rate =108cc/min
Competitor A (Positive Cutter)	Chip Evacuation Rate =72cc/min

MEW showed stable milling without chattering at higher feed, improving the machining efficiency by 150%.
Burrs are prevented and excellent surface finish is achieved.

(Evaluation by the user)

SS400

- Machine Part
- Vc=250m/min
- ap×ae=3×20mm (Slotting)
- fz=0.2mm/t（Vf=2,390mm/min）
- Dry
- MEW20-S20-10-3T (3 inserts)
- LOMU100408ER-GM（PR1525）



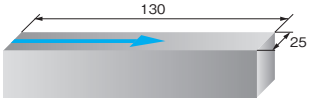
PR1525	Chip Evacuation Rate = 144cc/min (Stable milling)
Competitor B (Positive Cutter)	Chip Evacuation Rate = 114cc/min (Unstable)

No chattering with MEW, while Competitor B chattered at the same cutting conditions.
No burrs with MEW and excellent surface finish is gained.

(Evaluation by the user)

15-5PH (42HRC)

- Aircraft Part
- Vc=180m/min
- ap×ae=2×25mm
- fz=0.1mm/t（Vf=716mm/min）
- Wet
- MEW32-S32-10-4T (4 inserts)
- LOMU100408ER-GM（PR1525）



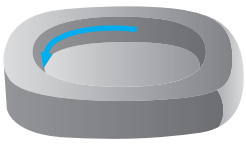
PR1525	Chip Evacuation Rate = 35.8cc/min (Further Machining Possible)
Competitor C (Positive Cutter)	Chip Evacuation Rate = 26.8cc/min (Unable to continue machining)

No chattering and more stable milling is possible with MEW.
Despite the milling difficulty because of the properties of the material, PR1525 kept good cutting edge form, minimizing wear and adhesion.

(Evaluation by the user)

SKD61 (45HRC)

- Mold Part
- Vc=100m/min
- ap×ae=3.5×30mm
- fz=0.1mm/t（Vf=400mm/min）
- Dry
- MEW32-S32-10-4T (4 inserts)
- LOMU100408ER-GH（PR1525）

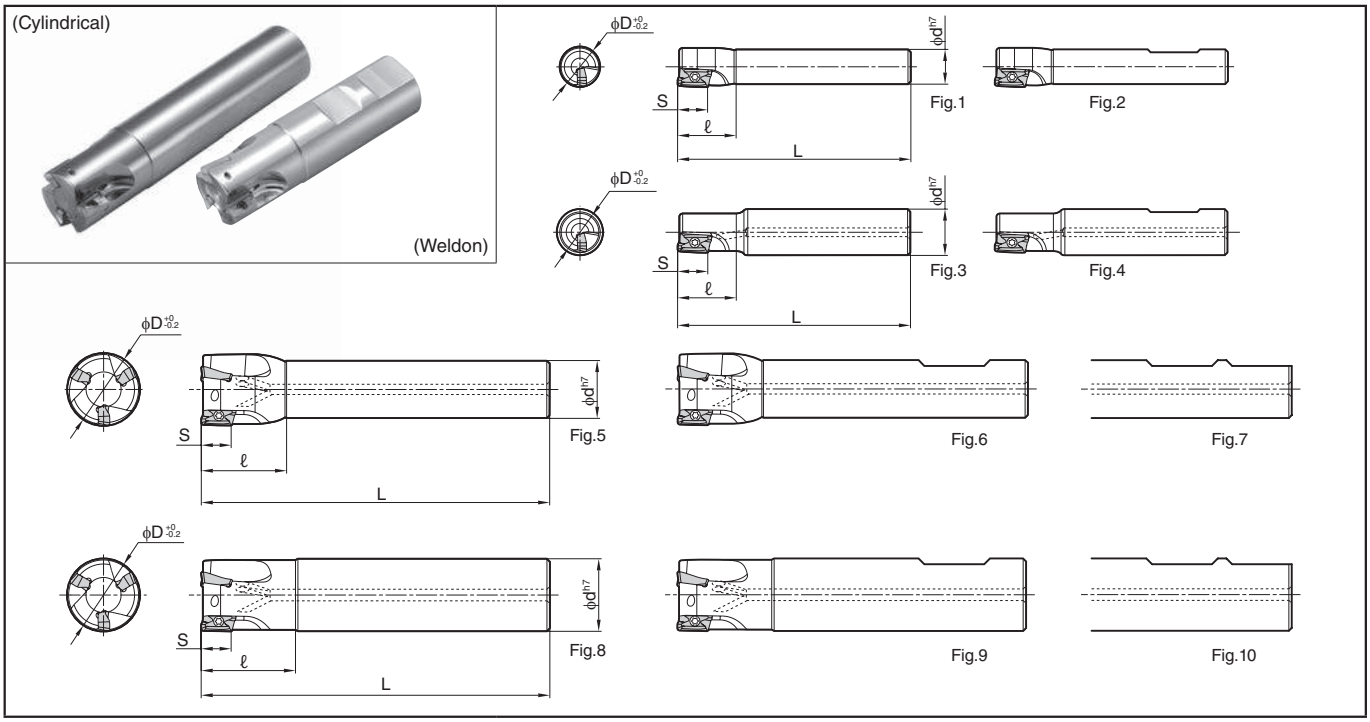


PR1525	Chip Evacuation Rate = 42cc/min (Further Machining Possible)
Competitor D (Positive Cutter)	Chip Evacuation Rate = 21cc/min (Unable to continue machining)

MEW doubled machining efficiency. Furthermore, MEW inserts have double number of edges (4-edge), which enables a drastic cost reduction.

(Evaluation by the user)

MEC End Mill



Toolholder Dimensions

Description				Std.	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min-1)
						ϕD	ϕd	L	ℓ	S	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	
Cylindrical	Standard Shank	MEC	10-S10-11	●	1	10	10	80	17	10	+10°	-24°	No	Fig.1	SB-2545TR	DTM-8	54,800
			10-S16-11	●			16						Yes	Fig.3			
			12-S10-11	●		12	10		20		+12°	-21°	No	Fig.1			50,800
			12-S12-11	●			12						Yes	Fig.3			
			12-S16-11	●			16										
			13-S12-11	●		13	12					-19°	No	Fig.1			49,200
			14-S12-11	●		14											47,700
			14-S16-11	●			16						Yes	Fig.3			
		MEC	16-S12-11T	●	2	16	12	100	23	10	+18°	-14°	No	Fig.1	SB-2555TRG	DTM-8	43,750
			17-S16-11T	●		17	16					-13°	Yes	Fig.5			43,500
			18-S16-11T	●		18					+19°						43,000
			19-S16-11T	●	3	19		110	26		+20°	-10°					42,000
			20-S16-11T	●		20						-9°					41,000
			21-S20-11T	●		21	20										40,300
			22-S20-11T	●		22					+21°	-10°					39,600
			24-S20-11T	●		24		120	29								38,200
			25-S20-11T	●		25											37,500
			28-S25-11T	●		28	25				+22°	-9°					35,800
			30-S25-11T	●	4	30		130	32		+23°						34,800
			32-S25-11T	●		32											33,900
			40-S32-11T	●	5	40	32	150	50			-8°					30,000
			50-S32-11T	●		50						-7°					22,500
	Same Shank	MEC	16-S16-11T	●	2	16	16	100	30	10	+18°	-14°	Yes	Fig.8	SB-2555TRG	DTM-8	43,750
			20-S20-11T	●	3	20	20	110			+20°	-10°					41,000
			25-S25-11T	●		25	25	120	32		+21°						37,500
			32-S32-11T	●	4	32	32	130	40		+23°	-9°					33,900
	Long Shank	MEC	20-S18-170-11T	●	2	20	18	170	30	10	+20°	-10°	Yes	Fig.5	SB-2555TRG	DTM-8	41,000
			20-S20-140-11T	●			20	140	60					Fig.8			
			20-S20-170-11T	●				170									
			22-S20-170-11T	●		22			30		+21°			Fig.5			39,600
			25-S23-210-11T	●		25	23	210	32								37,500
			25-S25-160-11T	●			25	160	60					Fig.8			
			25-S25-210-11T	●				210									
			28-S25-210-11T	●		28			32		+22°	-9°		Fig.5			35,800
			32-S30-250-11T	●		32	30	250	40		+23°						33,900
			32-S32-200-11T	●			32	200	65					Fig.8			
			32-S32-250-11T	●				250									
			35-S32-250-11T	●		35			40					Fig.5			32,600
			40-S32-240-11T	●		40		240	65			-8°					30,000

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Max. Revolution

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force. For more details, see "Warning" on page M67.

● : Std. Item

Toolholder Dimensions

		Description		Std.	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min^{-1})
						ϕD	ϕd	L	ℓ	S	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	
Cylindrical	Long Shank	MEC	20-S20-150-11T-3	●	3	20	20	150	60	10	+20°	-10°	Yes	Fig.8	SB-2555TRG	DTM-8	41,000
		MEC	25-S25-170-11T-3	●		25	25	170	60		+21°						37,500
		MEC	30-S25-180-11T-3	●		30	25	180	32		+23°	-9°		Fig.5			34,800
		MEC	32-S32-200-11T-3	●		32	32	200	65					Fig.8			33,900
		MEC	32-S32-200-11T-4	●	4												
	Standard	MEC	25-S20-17	●	2	25	20	120	36	15.7	+16°	-11°	Yes	Fig.5	SB-4070TRN	DTM-15	35,000
		MEC	32-S25-17	●	3	32	25	130	40		+17°	-7°					30,000
		MEC	40-S32-17	●	4	40	32	150	50		+19°						25,000
		MEC	50-S32-17	●		50											17,000
	Same Shank	MEC	25-S25-17	●	2	25	25	120	36	15.7	+16°	-11°	Yes	Fig.8	SB-4070TRN	DTM-15	35,000
		MEC	32-S32-17	●	3	32	32	130	40		+17°	-7°					30,000
	Long Shank	MEC	25-S25-160-17	●	2	25	25	160	60	15.7	+16°	-11°	Yes	Fig.8	SB-4070TRN	DTM-15	35,000
		MEC	25-S25-210-17	●				210									
		MEC	28-S25-210-17	●		28			36					Fig.5			32,500
		MEC	32-S32-200-17	●		32	32	200	65		+17°	-7°		Fig.8			30,000
		MEC	32-S32-250-17	●				250									
		MEC	35-S32-250-17	●		35			40					Fig.5			27,700
		MEC	40-S32-240-17	●		40		240	65		+19°						25,000
		MEC	32-S32-250-17-3	●	3	32	32	250	65	15.7	+17°	-7°	Yes	Fig.8	SB-4070TRN	DTM-15	30,000
		MEC	40-S32-250-17-3	●		40					+19°			Fig.5			25,000
		MEC	40-S32-250-17-4	●	4												
		MEC	50-S42-250-17-4	●		50	42		64			-6°					17,000
Weldon	Standard Shank	MEC	10-W10-1103	●	1	10	10	60	17	10	+10°	-24°	No	Fig.2	SB-2545TR	DTM-8	54,800
		MEC	10-W16-1103-H	●			16	68					Yes	Fig.4			
		MEC	12-W10-1103	●		12	10	60	20		+12°	-21°	No	Fig.2			50,800
		MEC	12-W16-1103-H	●			16	68					Yes	Fig.4			
		MEC	14-W12-1103	●		14	12				+12°	-19°	No	Fig.2			47,700
		MEC	14-W16-1103-H	●			16						Yes	Fig.4			
		MEC	16-W12-11T3	●	2	16	12	68	23	10	+18°	-14°	No	Fig.2	SB-2555TRG	DTM-8	43,750
		MEC	18-W16-11T3-H	●		18	16				+19°	-13°	Yes	Fig.6			43,000
		MEC	20-W16-11T3-H	●	3	20			25		+20°	-10°					41,000
		MEC	22-W20-11T3-H	●		22	20	81	26		+21°						39,600
		MEC	25-W20-11T3-H	●		25			29								37,500
		MEC	28-W25-11T3-H	●		28	25	88			+22°	-9°		Fig.7			35,800
		MEC	30-W25-11T3-H	●	4	30			32		+23°						34,800
		MEC	32-W25-11T3-H	●		32											33,900
		MEC	40-W32-11T3-H	●	5	40	32	110	50			-8°					30,000
	Same Shank	MEC	16-W16-11T3-H	●	2	16	16	68	25	10	+18°	-14°	Yes	Fig.9	SB-2555TRG	DTM-8	43,750
		MEC	20-W20-11T3-H	●	3	20	20	81	30		+20°	-10°					41,000
		MEC	25-W25-11T3-H	●		25	25	88	32		+21°			Fig.10			37,500
		MEC	32-W32-11T3-H	●	4	32	32	100	40		+23°	-9°					33,900
	Standard	MEC	25-W20-1704-H	●	2	25	20	86	36	15.7	+16°	-11°	Yes	Fig.6	SB-4070TRN	DTM-15	35,000
		MEC	32-W25-1704-H	●	3	32	25	92			+17°	-7°		Fig.7			30,000
		MEC	40-W32-1704-H	●	4	40	32	110	50		+19°						25,000
	Same Shank	MEC	25-W25-1704-H	●	2	25	25	92	36	15.7	+16°	-11°	Yes	Fig.10	SB-4070TRN	DTM-15	35,000
		MEC	32-W32-1704-H	●	3	32	32	100	40		+17°	-7°					30,000

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts

Description	Applicable Inserts ➡ M18, M19			Applicable Inserts ➡ M25
MEC·····-11 **MEC·····-1103**	BDMT 1103 ○○ ER-JT	BDMT 1103 ○○ ER-JS	-	-
MEC·····-11T **MEC·····-11T03**	BDMT 11T3 ○○ ER-JT	BDMT 11T3 ○○ ER-JS	BDGT 11T3 ○○ FR-JA	BDMT 11T3 ○○ FR
MEC·····-17 **MEC·····-1704**	BDMT 1704 ○○ ER-JT	BDMT 1704 ○○ ER-JS	BDGT 1704 ○○ FR-JA	BDMT 1704 ○○ FR

Recommended Cutting Conditions ➡ M66, M67

● : Std. Item
MTO : Made to order

MEC Face Mill

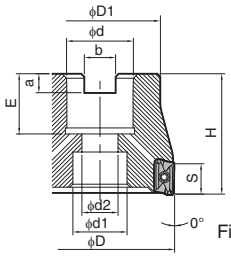


Fig.1

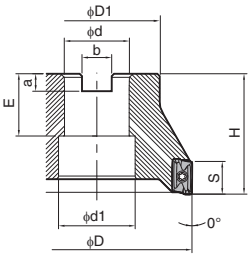


Fig.2

Rake Angle
11 type A.R.(Max.):+23° R.R. :-7°
17 type A.R.(Max.):+19° R.R. :-7°

Toolholder Dimensions

Description				Std.	No. of Inserts	Dimension (mm)									Coolant Hole	Drawing	Weight (kg)	Spare Parts		Max. Revolution (min⁻¹)
						ϕD	ϕd	ϕd1	ϕd2	H	E	a	b	S				Clamp screw	Wrench	
Metric	Coarse pitch	MEC	040R-11-5T-M	●	5	40	16	14	8.5	40	20	5.5	8.5	10	Yes	Fig.1	0.2	SB-2555TRG	DTM-8	30,000
			050R-11-5T-M	●	5	50	22	18	12		22	6.3	10.4				0.3			22,500
			063R-11-6T-M	●	6	63											0.7			20,500
			080R-11-7T-M	●	7	80	27	20	14	50	26	7	12.4				1.0			18,500
			100R-11-9T-MN	●	9	100	32	26	17.6	55		8	14.4				1.6			17,000
			125R-11-11T-M	●	11	125	40	45	32	63	33	9.5	16.4				3.1			15,000
			160R-11-14T-M	●	14	160		68	-						No	Fig.2	4.5			13,900
	Coarse pitch	MEC	040R-17-4T-M	●	4	40	16	14	8.5	40	20	5.5	8.5	15.7	Yes	Fig.1	0.3	SB-4070TRN	DTM-15	25,000
			050R-17-4T-M	●	4	50	22	18	12		22	6.3	10.4				0.4			17,000
			063R-17-5T-M	●	5	63											0.6			14,500
			080R-17-6T-M	●	6	80	27	20	14	50	26	7	12.4				1.0			12,000
			100R-17-7T-MN	●	7	100	32	26	17.6	55		8	14.4				1.8			10,500
			125R-17-9T-M	●	9	125	40	45	32	63	33	9.5	16.4				3.1			8,900
			160R-17-12T-M	●	12	160		68	-						No	Fig.2	4.5			7,400
Bore Dia. Inch spec	Coarse pitch	MEC	063R-11-6T	○	6	63	25.4	20	14	50	26	6	9.5	10	Yes	Fig.1	0.8	SB-2555TRG	DTM-8	20,500
			080R-11-7T	○	7	80											1.0			18,500
			100R-11-9TN	○	9	100	31.75	26	17.6	63	32	8	12.7				1.8			17,000
			125R-11-11T	○	11	125	38.1	45	32		38	10	15.9				3.4			15,000
			160R-11-14T	○	14	160	50.8	70	-		47	10	19.1			Fig.2	4.4			13,900
	Fine pitch	MEC	063R-11-8T	○	8	63	25.4	20	14	50	26	6	9.5	10	Yes		0.8	SB-2555TRG	DTM-8	20,500
			080R-11-10T	○	10	80											1.0			18,500
	Coarse pitch	MEC	063R-17-5T	○	5	63	25.4	20	14	50	26	6	9.5	15.7	Yes	Fig.1	0.8	SB-4070TRN	DTM-15	14,500
			080R-17-6T	○	6	80											1.0			12,000
			100R-17-7TN	○	7	100	31.75	26	17.6	63	32	8	12.7				1.8			10,500
			125R-17-9T	○	9	125	38.1	45	32		38	10	15.9				3.4			8,900
			160R-17-12T	○	12	160	50.8	70	-		47	10	19.1			Fig.2	4.5			7,400
	Fine pitch	MEC	063R-17-6T	○	6	63	25.4	20	14	50	26	6	9.5	15.7	Yes	Fig.1	0.8	SB-4070TRN	DTM-15	14,500
			080R-17-8T	○	8	80											1.0			12,000
			100R-17-9TN	○	9	100	31.75	26	17.6	63	32	8	12.7				1.8			10,500

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ **M66, M67**

■ Max. Revolution

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force. For more details, see "Warning" on page **M67**.

When using Center-through Air / Coolant / Mist

If Center Through air (Coolant, Mist) is used, please use appropriate arbor and clamp with mounting bolt. (Table1)

For good shoulder finishes by MEC multistage ap.

In order to obtain smooth machining wall surfacel by multiple passes of MEC Milling Cutter, please keep ap less than 5.5mm for 11T3 type and also keep ap less than 9mm for 1704 type.

Table1

Description	Mounting bolt (Attachment)	Wrench
MEC040R·····M	HH8X25H	LW-5 (Double width 5mm)
MEC050R·····M MEC063R·····M	HH10X30H	LW-6 (Double width 6mm)
MEC063R···· MEC080R····	HH12X35H	LW-8 (Double width 8mm)
MEC100R·····N	HH16X52H	LW-12 (Double width 12mm)
MEC125R····	HF20X53H	LW-14 (Double width 14mm)
MEC160R····	HF24X60H	LW-17 (Double width 17mm)

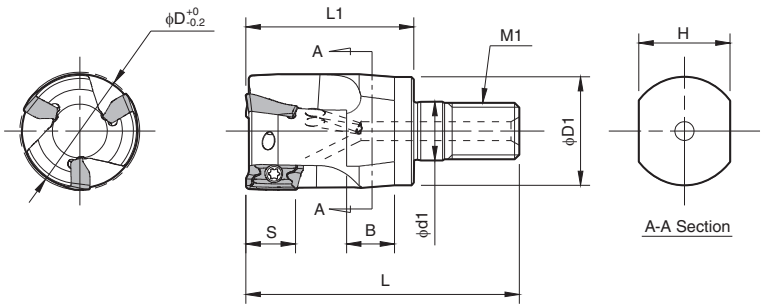
Wrench is not attached. Please purchase it separately.

Applicable Inserts

Description	Applicable Inserts ➔ **M18, M19**			Applicable Inserts ➔ **M25**
MEC··R-11	BDMT11T3 ○○ ER-JT	BDMT11T3 ○○ ER-JS	BDGT11T3 ○○ FR-JA	BDMT11T3 ○○ FR
MEC··R-17	BDMT1704 ○○ ER-JT	BDMT1704 ○○ ER-JS	BDGT1704 ○○ FR-JA	BDMT1704 ○○ FR

● : Std. Item

MEC type Head



Dimensions

Description		Std.	No. of Inserts	Dimension (mm) φD	φD1	φd1	L	L1	M1	H	B	S	Rake Angle A.R. (MAX.)	R.R.	Coolant Hole	Applicable Inserts ➔ M18,M19 M25	Max. Revolution (min-1)
MEC	16-M08-11T-2T	●	2	16	14.7	8.5	43	25	M8×P1.25	12	8	10	+18°	-14°	Yes	BDMT11T3 BDGT11T3	43,750
	20-M10-11T-2T	●	2	20	18.7	10.5	49	30	M10×P1.5	15	9		+20°	-10°			41,000
	20-M10-11T-3T	●	3	20	18.7	10.5	49	30	M10×P1.5	15	9		+20°	-10°			41,000
	25-M12-11T-3T	●	3	25	23	12.5	57	35	M12×P1.75	19	10		+21°	-10°			37,500
	32-M16-11T-4T	●	4	32	30	17	63	40	M16×P2.0	24	12		+23°	-9°			33,900
MEC	25-M12-17-2T	●	2	25	23	12.5	57	35	M12×P1.75	19	10	15.7	+16°	-11°	Yes	BDMT1704 BDGT1704	35,000
	32-M16-17-3T	●	3	32	30	17	63	40	M16×P2.0	24	12		+17°	-7°			30,000

■ **Max. Revolution**

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Recommended Cutting Conditions ➔ **M66, M67**

Ref. to page ➔ **M58** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts

Description		Spare Parts Clamp Screw	Wrench	Anti-seize Compound
MEC	16-M08-11T-2T	SB-2555TRG for Insert Clamp Recommended tightening torque 1.2N·m	DTM-8	MP-1
	20-M10-11T-2T			
	20-M10-11T-3T			
	25-M12-11T-3T			
	32-M16-11T-4T			
MEC	25-M12-17-2T	SB-4070TRN for Insert Clamp Recommended tightening torque 3.5N·m	DTM-15	MP-1
	32-M16-17-3T			

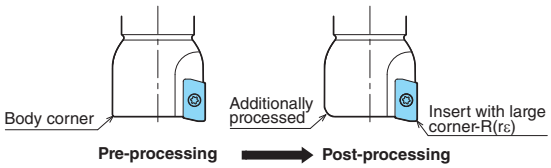
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

■ **When using inserts with corner-R(rε)1.6 or larger, additional modifications of the cutter body will be necessary.**
Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(rε) is 1.2mm or less.)

Insert Corner-R(rε) (mm)	Additional Processing Dimension to Body Corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

* Round- shaped additional processing is recommended.
When applying chamfer shaped additional processing, do not cut away too much.



◆ Recommended Cutting Conditions

·JT Chipbreaker

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc : m/min)					
	Toolholder Description		Cermet	MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
	MEC10~MEC19	MEC20~MEC40 MEC040R~MEC160R	TN100M	PR1535	PR1225	PR1210	PR830	CA6535
Carbon Steel	0.06~**0.1**~0.15	0.08~**0.15**~0.25	☆ 120~**160**~200	☆ 120~**180**~250	★ 120~**180**~250	-	☆ 120~**160**~200	-
Alloy Steel	0.06~**0.1**~0.12	0.08~**0.15**~0.2	☆ 100~**140**~180	☆ 100~**160**~220	★ 100~**160**~220	-	☆ 100~**140**~180	-
Mold Steel	0.06~**0.08**~0.1	0.08~**0.12**~0.2	☆ 80~**120**~150	☆ 80~**140**~180	★ 80~**140**~180	-	☆ 80~**120**~150	-
Stainless Steel (Austenitic related)	0.06~**0.08**~0.1	0.08~**0.12**~0.15	-	☆ 100~**160**~200	☆ 100~**160**~200	-	☆ 100~**140**~180	-
Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	0.08~**0.12**~0.2	-	☆ 150~**200**~250	-	-	-	★ 180~**240**~300
Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	0.08~**0.12**~0.2	-	★ 90~**120**~150	-	-	-	-
Gray Cast Iron	0.06~**0.1**~0.15	0.08~**0.18**~0.25	-	-	-	★ 120~**180**~250	-	-
Nodular Cast Iron	0.06~**0.08**~0.1	0.08~**0.15**~0.2	-	-	-	★ 100~**150**~200	-	-
Ni-base heat-resistant alloys	0.06~**0.08**~0.1	0.08~**0.12**~0.15	-	☆ 20~**30**~50	-	-	-	★ 20~**30**~50
Titanium Alloys	0.06~**0.08**~0.1	0.08~**0.15**~0.2	-	☆ 40~**60**~80	-	☆ 30~**50**~70	-	-

* **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★:1st Recommendation ☆:2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

·JS Chipbreaker

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc : m/min)				
	Toolholder Description		MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
	MEC10~MEC19	**MEC20~MEC40 MEC040R~MEC160R**	**PR1535**	**PR1225**	**PR1210**	**PR830**	**CA6535**
Carbon Steel	0.06~**0.1**~0.12	0.08~**0.15**~0.18	☆ 120~**180**~250	★ 120~**180**~250	-	☆ 120~**160**~200	-
Alloy Steel	0.06~**0.08**~0.1	0.08~**0.12**~0.15	☆ 100~**160**~220	★ 100~**160**~220	-	☆ 100~**140**~180	-
Mold Steel	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	☆ 80~**120**~150	-
Stainless Steel (Austenitic related)	0.06~**0.08**~0.1	0.08~**0.1**~0.12	★ 100~**160**~200	☆ 100~**160**~200	-	☆ 100~**140**~180	-
Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 150~**200**~250	-	-	-	★ 180~**240**~300
Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 90~**120**~150	-	-	-	-
Ni-base heat-resistant alloys	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 20~**30**~50	-	-	-	★ 20~**30**~50
Titanium Alloys	0.06~**0.08**~0.1	0.08~**0.1**~0.12	★ 40~**60**~80	-	-	-	-

* **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★:1st Recommendation ☆:2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

·JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)	
		DLC Coated Carbide	Carbide
		PDL025	**GW25**
Aluminum Alloy (Si13% or less)	0.05~0.3	200~1,000	200~800
Aluminum Alloy (Si13% and over)	0.05~0.2	200~300	200~300

·PCD

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)
		PCD
		KPD230 (KPD001)
Aluminum Alloy (Si 13% or less)	0.05~0.2	500~1,500
Aluminum Alloy (Si13% and over)	0.05~0.15	300~1,000

⚠ Warning **Please observe below precautions fully. Failure to observe the precautions may cause serious damage to human body.**

Warning about Max. Revolution indicated on main body

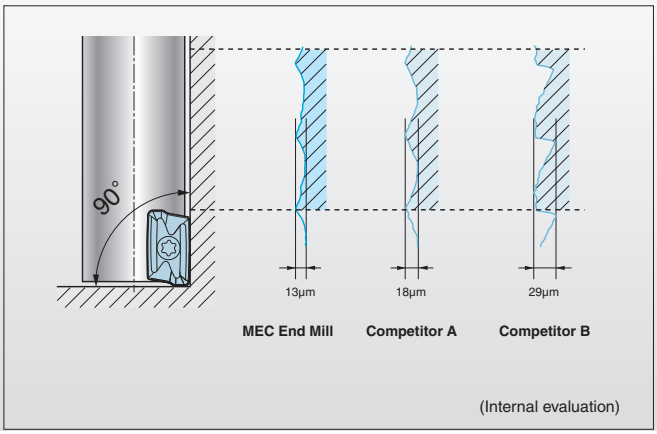
1. When running the end mill and the face mill at revolutions exceeding the maximum revolution limit, the inserts or toolholder may be damaged due to the centrifugal force.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over 10,000min^{-1}), refer to the table to adjust the balance of MEC and suitable arbor.

Revolution (min^{-1})	Balance quality grade G ISO1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

Features of MEC

Good squareness

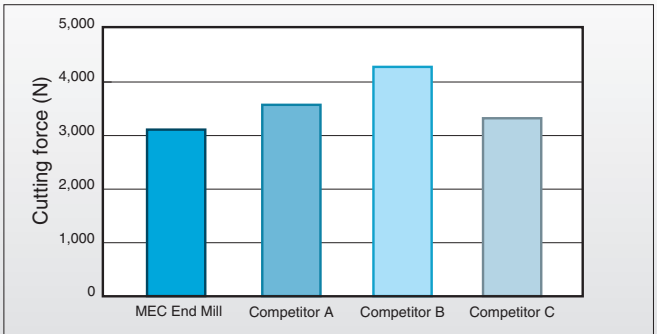
<Cutting Surface Comparison>



(Internal evaluation)

Low cutting force

<Cutting Force Comparison>

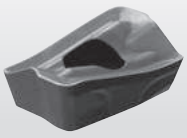


Tool Dia. ϕ20 S50C
Vc=100m/min Shouldering ap×ae=9×10mm
fz=0.2mm/t Dry

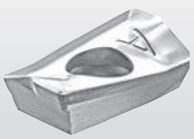
(Internal evaluation)

Chipbreaker

JT Chipbreaker (General Purpose)

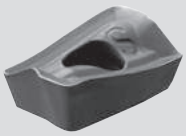


JA Chipbreaker (For Aluminum)



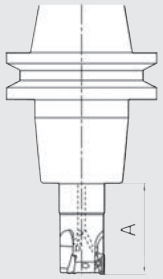
JS chipbreaker (Low cutting force)

Cutting force 20% lower

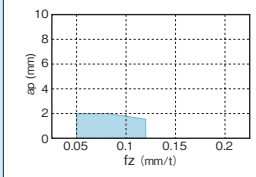
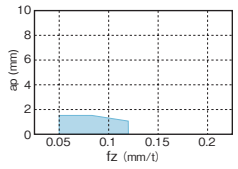
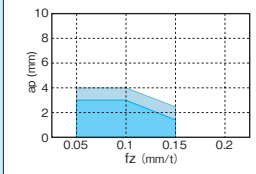
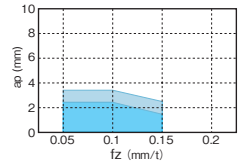
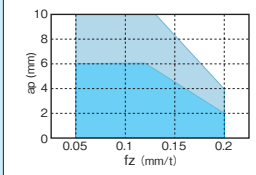
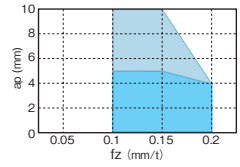
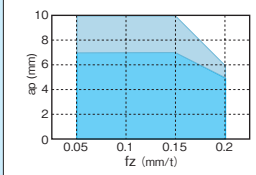
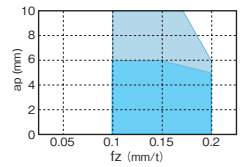
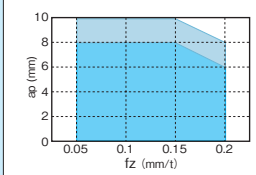
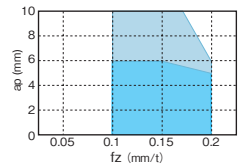
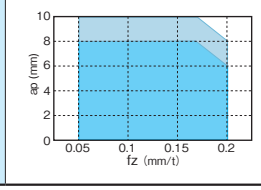
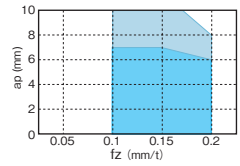


Cutting Performance of MEC End Mill

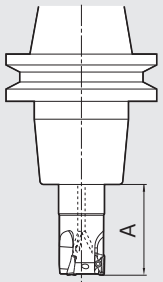
(1) Cutting edge length 10mm type (Standard / Same Shank)

Cutting Dia.	Description	Overhang Length A (mm)		Shape
ϕ10	**MEC10-S10-11**	17	-	
ϕ12	**MEC12-S16-11**	20	30	
ϕ16	**MEC16-S16-11T**	30	45	
ϕ20	**MEC20-S20-11T**	30	45	
ϕ25	**MEC25-S25-11T**	32	48	
ϕ32	**MEC32-S32-11T**	40	60	

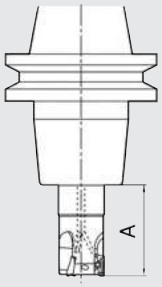
〔JT Chipbreaker Vc=120m/min Workpiece Material：S50C〕

Description	■Shouldering (Cutting width ae = ϕD/2)	■Slotting ■Ramping and Helical Milling
MEC10-S10-11		
MEC12-S16-11		
MEC16-S16-11T		
MEC20-S20-11T		
MEC25-S25-11T		
MEC32-S32-11T		

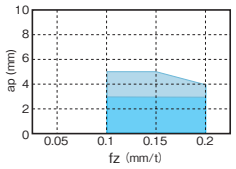
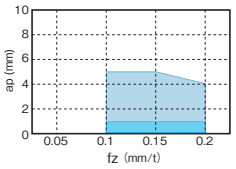
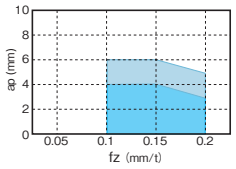
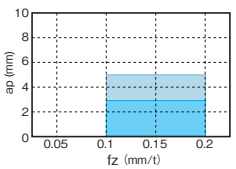
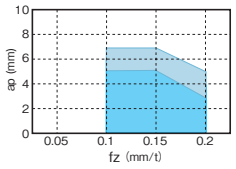
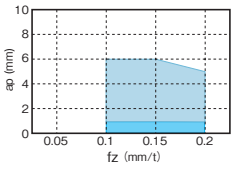
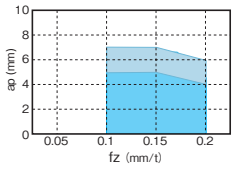
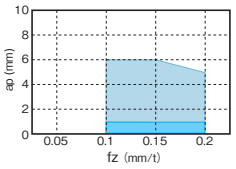
(2) Cutting edge length 10mm type (Long Shank)

Cutting Dia.	Description	Overhang Length A (mm)		Shape
ϕ20 Long Shank	MEC20-S20-140-11T	60	90	
ϕ25 Long Shank	MEC25-S25-160-11T	60	100	
ϕ32 Long Shank	MEC32-S32-200-11T	100	130	
ϕ40 Long Shank	MEC40-S32-240-11T	100	130	

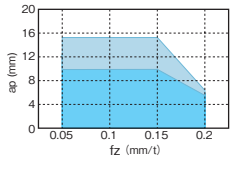
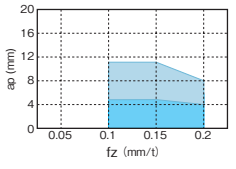
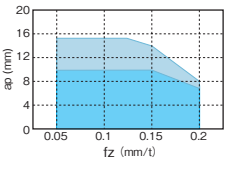
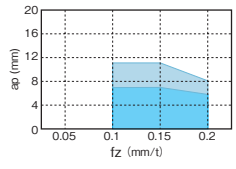
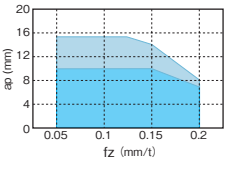
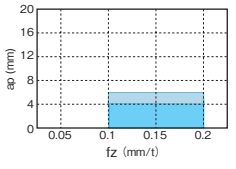
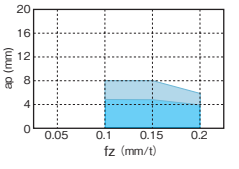
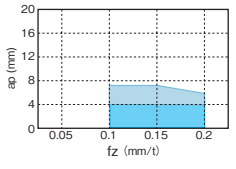
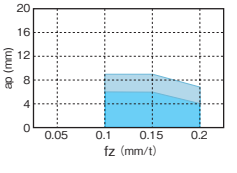
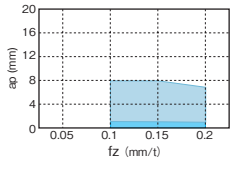
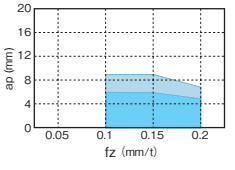
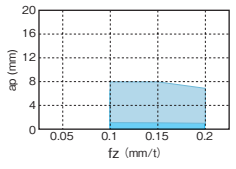
(3) Cutting edge length 15.7mm type

Cutting Dia.	Description	Overhang Length A (mm)		Shape
ϕ25	MEC25-S25-17	36	54	
ϕ32	MEC32-S32-17	40	60	
ϕ40	MEC40-S32-17	50	75	
ϕ25 Long Shank	MEC25-S25-160-17	60	100	
ϕ32 Long Shank	MEC32-S32-200-17	100	130	
ϕ40 Long Shank	MEC40-S32-240-17	100	130	

〔JT Chipbreaker Vc=120m/min Workpiece Material：S50C〕

Description	■Shouldering (Cutting width ae = ϕD/2)	■Slotting ■Ramping and Helical Milling
MEC20 -S20-140-11T Long Shank		
MEC25 -S25-160-11T Long Shank		
MEC32 -S32-200-11T Long Shank		
MEC40 -S32-240-11T Long Shank		

〔JT Chipbreaker Vc=120m/min Workpiece Material：S50C〕

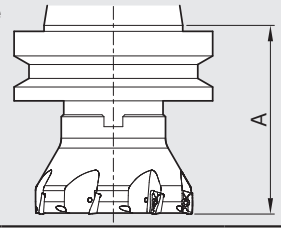
Description	■Shouldering (Cutting width ae = ϕD/2)	■Slotting ■Ramping and Helical Milling
MEC25-S25-17		
MEC32-S32-17		
MEC40-S32-17		
MEC25 -S25-160-17 Long Shank		
MEC32 -S32-200-17 Long Shank		
MEC40 -S32-240-17 Long Shank		

Cutting Performance of MEC Face Mill

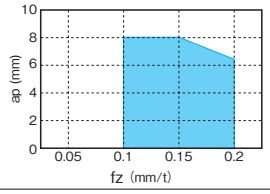
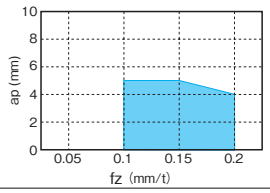
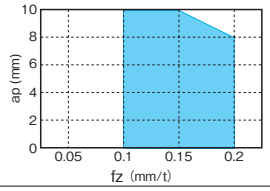
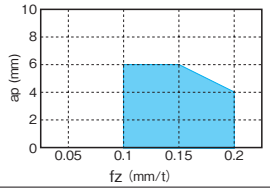
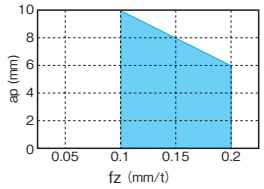
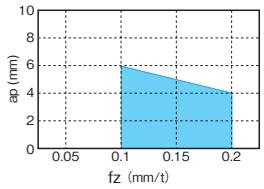
Cutting edge length 10 mm type

Cutting Dia.	Description	Overhang Length A (mm)
ϕ40	MEC040R-11-5T-M	115
ϕ50	MEC050R-11-○T-M	100
ϕ63	MEC063R-11-○T	95
	MEC063R-11-○T-M	
ϕ80	MEC080R-11-○T	95
ϕ100	MEC100R-11-9TN	108
ϕ125	MEC125R-11-11T	
ϕ160	MEC160R-11-14T	

Shape



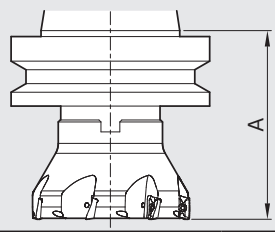
〔JT Chipbreaker Vc=120m/min Workpiece Material : S50C〕

Description	■Shouldering (Cutting width ae = ϕD/2)	■Slotting
MEC040R -11-5T-M		
MEC050R -11-○T-M ～ MEC100R -11-9TN		
MEC125R -11-11T MEC160R -11-14T		

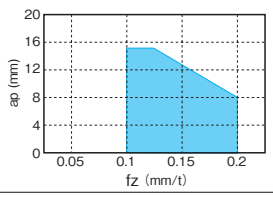
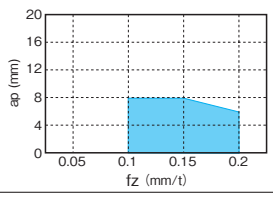
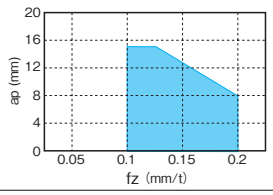
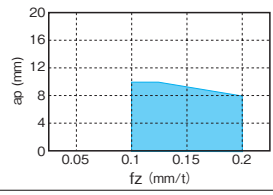
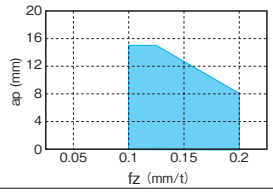
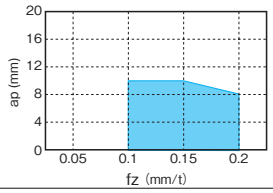
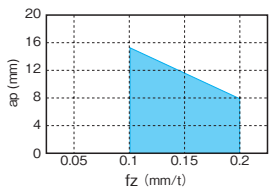
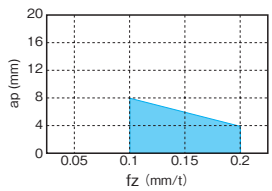
Cutting edge length 15.7mm type

Cutting Dia.	Description	Overhang Length A (mm)
ϕ40	MEC040R-17-4T-M	115
ϕ50	MEC050R-17-○T-M	100
ϕ63	MEC063R-17-○T	95
	MEC063R-17-○T-M	
ϕ80	MEC080R-17-○T	95
ϕ100	MEC100R-17-○TN	108
ϕ125	MEC125R-17-9T	
ϕ160	MEC160R-17-12T	

Shape



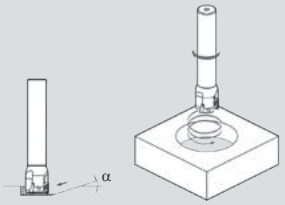
〔JT Chipbreaker Vc=120m/min Workpiece Material : S50C〕

Description	■Shouldering (Cutting width ae = ϕD/2)	■Slotting
MEC040R -17-4T-M		
MEC050R -17-○T-M		
MEC063R -17-○T(-M) ～ MEC100R -17-○TN		
MEC125R -17-9T MEC160R -17-12T		

Ramping, Helical milling and Vertical milling (Plunging)

Ramping / Helical Milling

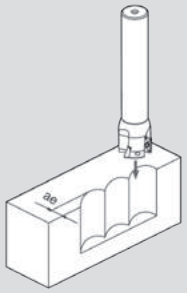
- Ramping angle is recommended under α°.
- Refer to each tool's cutting performance list for depth of helical milling per one revolution. Use compressed air during machining.



Cutting Dia.	Applicable Inserts	Max. ramping angle (α°)
ϕ16~ϕ18	BDMT11T3 type BDGT11T3 type	3°
ϕ19~ϕ21		5°
ϕ22~ϕ25		2.5°
ϕ28~ϕ32		1.5°
ϕ40		0.7°
ϕ50 and over		Not recommended
ϕ25	BDMT1704 type BDGT1704 type	8°
ϕ32		5°
ϕ40		2.5°
ϕ50 and over		Not recommended

BDMT1103 type is not recommended for ramping and helical milling.

Vertical Milling (Plunging)



Cutting Dia.	Applicable Inserts	Max. Width of Cut (ae)
ϕ16 ~ ϕ19	BDMT11T3 type BDGT11T3 type	1.5mm
ϕ20 ~ ϕ160	BDMT11T3 type BDGT11T3 type	5mm
ϕ25 ~ ϕ160	BDMT1704 type BDGT1704 type	8mm

BDMT1103 type is not recommended for vertical milling (plunging).

Guidance of minimum cutting dia. by helical milling

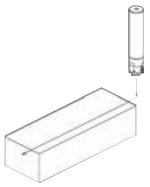
MEC	Cutting Dia.	ϕ16	ϕ18	ϕ20	ϕ22	ϕ25	ϕ28	ϕ30	ϕ32	ϕ40	ϕ50
BD_T11T3 type	Guidance of minimum cutting dia. by helical milling	ϕ21	ϕ25	ϕ29	ϕ33	ϕ39	ϕ45	ϕ49	ϕ53	ϕ69	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ϕ28	ϕ32	ϕ36	ϕ40	ϕ46	ϕ52	ϕ56	ϕ60	ϕ76	

MEC	Cutting Dia.	ϕ25	ϕ32	ϕ40	ϕ50
BD_T1704 type	Guidance of minimum cutting dia. by helical milling	ϕ34	ϕ48	ϕ64	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ϕ46	ϕ60	ϕ76	

Case Studies

RC55 (Pre-hardened Tool Steel)

·Test piece (54~56HRC)
·Vc=50m/min (n=800min^{-1})
·ap×ae=2×14mm
·fz=0.125mm/t (Vf=300mm/min)
·Dry
·MEC20-S20-11T
·3 inserts
·BDMT11T308ER-JT (PR830)



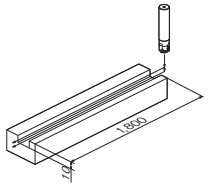
MEC	Chip Removal Amount = 71.3cm^3 (Further Machining Possible)
Competitor's End Mill A	Chip Removal Amount = 2.9cm^3 (Chipping occurred)

Competitor's End Mill A [ϕ25 (2 inserts) Vc=40m/min fz=0.075mm/t apxae= 2x3mm] had chipping occurred in 10 minutes and had loud machining sound. MEC could increase the feed rate, and the cutting edge remained in extremely good condition and is still sustainable for further machining.

(Evaluation by the user)

SS400

·Plate
·Vc=88m/min (n=1,400min^{-1})
·ap=5mm×2 passes
·fz=0.12mm/t (Vf=500mm/min)
·Dry
·MEC20-S20-11T
·3 inserts
·BDMT11T308ER-JT (PR830)



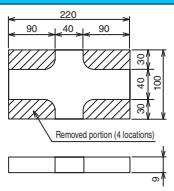
MEC	23pcs/edge
Competitor's End Mill B	10~11pcs/edge

MEC extended the tool life for more than twice.

(Evaluation by the user)

SUS304

·Plate
·Vc=125m/min (n=1,600min^{-1})
·ap=9.0mm
·fz=0.1mm/t (Vf=320mm/min)
·Dry
·MEC25-S25-17
·2 inserts
·BDMT170408ER-JT (PR830)



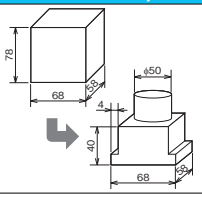
MEC	4pcs/edge or more
Competitor's End Mill C	1pcs/edge or less

Competitor's End mill C (indexable end mill) had high cutting force and had insert breakage, but MEC had no insert breakage and was still usable for further machining, after machining 4 pieces (16 points)

(Evaluation by the user)

DAC10 (Hot Work Tool Steel)

·Mold
·Vc=130m/min (n=1,040min^{-1})
·ap×ae=(~3)×(~5)
(Varies depending on machining point)
·fz=0.18mm/t (Vf=936mm/min)
·Dry (Air blow)
·MEC40-S32-11T- 5 inserts
·BDMT11T308ER-JT (PR830)



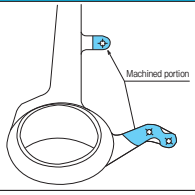
MEC	2 hours (Small Wear: Extendible)
Competitor's End Mill D	2 hours (halted due to insert breakage)

MEC had better cutting performance / insert life comparing to Competitor's End Mill D, and the insert had only small wear and was usable for further machining after used for machining of the same duration as Competitor's End Mill D. Competitor's End Mill D (6 inserts type) was used with Vf=936mm/min (fz=0.15mm/t).

(Evaluation by the user)

SCM420

·Knuckle Steering
·Vc=150m/min (n=1,200min^{-1})
·ap=0.5~5mm (Shouldering)
·fz=0.1mm/t (Vf=478mm/min)
·Dry
·MEC40-S32-17
·4 inserts
·BDMT170408ER-JT (PR830)



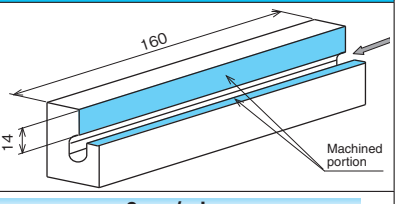
MEC	150pcs/edge
Competitor's End Mill E	40pcs/edge

MEC had a better finished surface comparing to Competitor's End mill E and also improved the tool life by more than 3 times.

(Evaluation by the user)

Ni-base heat-resistant alloys

·Turbine parts
·Vc=15m/min (n=120min^{-1})
·ap=0.5mm
·fz=0.08mm/t (Vf=38mm/min)
·Wet
·MEC040R-17-4T-M
·4 inserts
·BDMT170408ER-JS (PR1025)



MEC	9pcs/edge
Competitor's End Mill F	1pcs/edge or less

Competitor's End Mill F (Coated Carbide Insert) could not finish machining of 1 workpiece, but MEC could cut 9pcs/edge and the finished surface was good.

(Evaluation by the user)

MECX End Mill

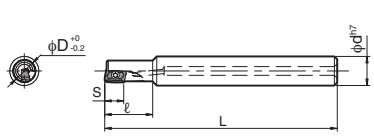


Fig.1

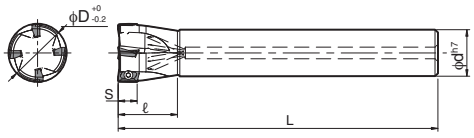


Fig.3

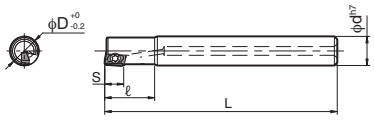


Fig.2

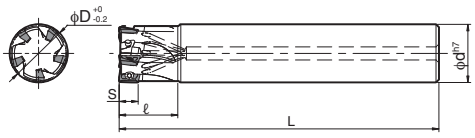


Fig.4

Toolholder Dimensions

Description			Std.	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min^{-1})
					φD	φd	L	ℓ	S	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	
Standard Shank	Standard	MECX 08-S10-07-1T	●	1	8	10	80	16	6	11.7°	-24.0°	Yes	Fig.1	SB-2035TRG	DTM-6	48,100
		14-S12-07-2T	●	2	14	12		18		16.3°	-12.1°		Fig.3			44,800
		17-S16-07-3T	●	3	17	16	100	20			-11.0°			SB-2042TRG		42,400
		18-S16-07-3T	●		18						-10.9°					41,600
		20-S16-07-4T	●	4	20		110				-10.4°					40,200
		21-S20-07-4T	●		21	20					-10.1°					39,500
		25-S20-07-5T	●	5	25		120	25			-9.7°					37,000
		26-S25-07-5T	●		26	25					-9.5°					36,500
		33-S32-07-6T	●	6	33	32	130	30			-8.8°					33,100
	Fine pitch	MECX 20-S16-07-5T	●	5	20	16	110	20	6	16.3°	-10.4°	Yes	Fig.3	SB-2042TRG	DTM-6	40,200
		25-S20-07-7T	●	7	25	20	120	25			-9.7°					37,000
Same Shank	Standard	MECX 10-S10-07-1T	●	1	10	10	80	17	6	12.8°	-18.7°	Yes	Fig.2	SB-2035TRG	DTM-6	47,100
		12-S12-07-2T	●	2	12	12		18		14.3°	-13.7°		Fig.4			46,200
		16-S16-07-3T	●	3	16	16	100	20		16.3°	-11.3°			SB-2042TRG		43,200
		20-S20-07-4T	●	4	20	20	110				-10.4°					40,200
		25-S25-07-5T	●	5	25	25	120	25			-9.7°					37,000
		32-S32-07-6T	●	6	32	32	130	30			-8.9°					33,600
	Fine pitch	MECX 16-S16-07-4T	●	4	16	16	100	20	6	16.3°	-11.3°	Yes	Fig.4	SB-2042TRG	DTM-6	43,200
		20-S20-07-5T	●	5	20	20	110				-10.4°					40,200
		25-S25-07-7T	●	7	25	25	120	25			-9.7°					37,000
		32-S32-07-8T	●	8	32	32	130	30			-8.9°					33,600
Long Shank	Standard	MECX 17-S16-130-07-3T	●	3	17	16	130	20	6	16.3°	-11.0°	Yes	Fig.3	SB-2042TRG	DTM-6	42,400
		21-S20-140-07-4T	●	4	21	20	140				-10.1°					39,500
		26-S25-160-07-5T	●	5	26	25	160	25			-9.5°					36,500
		33-S32-200-07-6T	●	6	33	32	200	30			-8.8°					33,100
Weldon	Standard	MECX 16-W16-07-3T	●	3	16	16	68	20	6	16.3°	-11.3°	Yes		SB-2042TRG	DTM-6	43,200
		20-W20-07-4T	●	4	20	20	81				-10.4°					40,200
		25-W25-07-5T	●	5	25	25	88	25			-9.7°					37,000
	Fine pitch	MECX 16-W16-07-4T	●	6	16	16	68	20	6	16.3°	-11.3°	Yes		SB-2042TRG	DTM-6	43,200
		20-W20-07-5T	●	5	20	20	81				-10.4°					40,200
		25-W25-07-7T	●	7	25	25	88	25			-9.7°					37,000

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M74

■ **Max. Revolution**

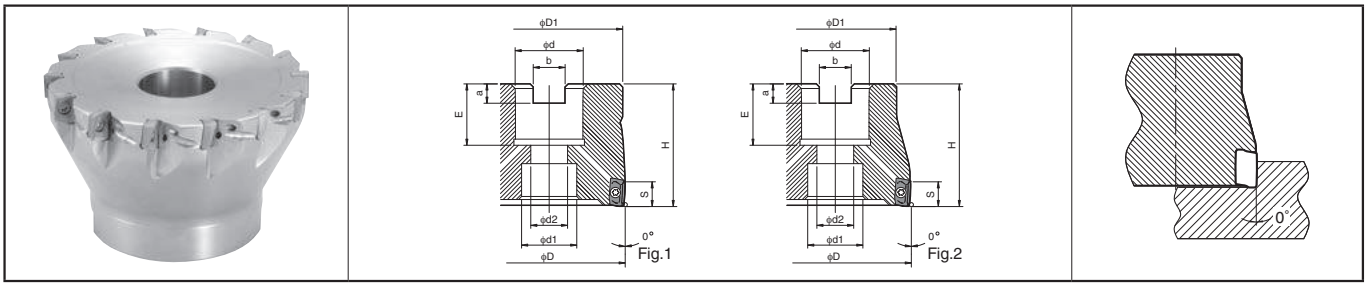
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
For more details, "Warning" in the next page.

■ **For good shoulder finishes by MECX multistage ap.**

In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.

● : Std. Item

MECX Face Mill



Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)									Rake Angle		Coolant Hole	Drawing	Weight (kg)	Spare Parts		Max. Revolution (min^{-1})
				ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S	A.R. (MAX.)	R.R.				Clamp Screw	Wrench	
MECX	032R-07-8T-M	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+7°	-8.9°	Yes	Fig.1	0.15	SB-2042TRG	DTM-6	33,600
	040R-07-10T-M	●	10	40	38	22	18	12		22	6.3	10.4			-8.4°			0.25			30,500
	050R-07-12T-M	●	12	50	40										-8.3°		Fig.2	0.35			27,700
	063R-07-14T-M	●	14	63											-7.9°			0.50			24,900

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ M74

■ **Max. Revolution**
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force. For more details, see "Warning" below.

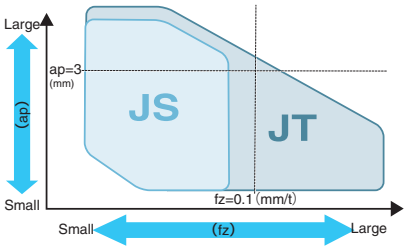
■ **For good shoulder finishes by MECX multistage ap.**
In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.

■ **MECX032R comes with mounting bolt (HH8X25H) and MECX040R/050R/063R comes with mounting bolt (HH10X30H).**

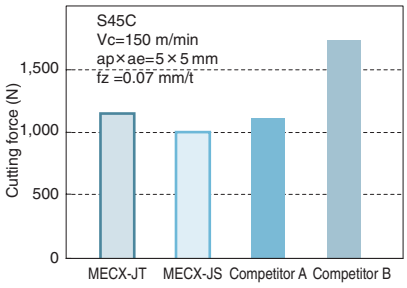
Applicable Inserts

Description	Applicable Inserts ➔ M18	
MECX...-07..	BDMT 0703 ○○ ER-JT	BDMT 0703 ○○ ER-JS

Chipbreaker selection



Cutting Force Comparison



Warning **Please observe below precautions fully. Failure to observe the precautions may cause serious damage to human body.**

Warning about Max. Revolution indicated on main body

1. When running the end mill and the face mill at revolutions exceeding the maximum revolution limit, the inserts or toolholder may be damaged due to the centrifugal force.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over 10,000min^{-1}), refer to the table to adjust the balance of MECX and suitable arbor.

Revolution (min^{-1})	Balance quality grade G ISO1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

● : Std. Item

Recommended Cutting Conditions

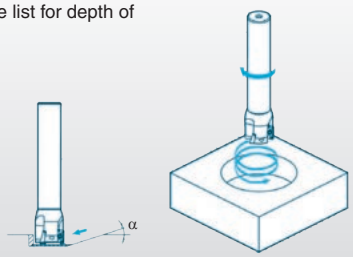
Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc : m/min)				
	JS Chipbreaker	JT Chipbreaker	MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
			PR1535	**PR1225**	**PR1210**	**PR830**	**CA6535**
Carbon Steel	0.04~0.08~0.1	0.06~0.1~0.12	☆ 120~180~250	★ 120~180~250	-	☆ 120~150~180	-
Alloy Steel	0.04~0.06~0.08	0.06~0.08~0.1	☆ 100~160~220	★ 100~160~220	-	☆ 100~140~180	-
Mold Steel	0.04~0.06~0.08	0.06~0.08~0.1	☆ 80~140~180	★ 80~140~180	-	☆ 80~120~150	-
Stainless Steel (Austenitic related)	0.03~0.04~0.05	0.05~0.06~0.07	★ 100~160~200	☆ 100~160~200	-	-	-
Stainless Steel (Martensitic related)	0.03~0.04~0.05	0.05~0.06~0.1	☆ 150~200~250	-	-	-	★ 180~240~300
Stainless Steel (Precipitation Hardening)	0.03~0.04~0.05	0.05~0.06~0.1	★ 90~120~150	-	-	-	-
Gray Cast Iron	0.04~0.08~0.1	0.08~0.1~0.15	-	-	★ 120~180~250	-	-
Nodular Cast Iron	0.04~0.06~0.08	0.08~0.1~0.12	-	-	★ 100~150~200	-	-
Ni-base heat-resistant alloys	0.03~0.04~0.05	0.05~0.06~0.07	☆ 20~30~50	-	-	-	★ 20~30~50
Titanium Alloys	0.04~0.06~0.08	0.08~0.1~0.12	★ 40~60~80	-	☆ 30~50~70	-	-

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★:1st Recommendation ☆:2nd Recommendation

Ramping / Helical Milling

- Ramping angle is recommended under α°.
- Refer to each tool's cutting performance list for depth of helical milling per one revolution.
  Use compressed air during machining.



Cutting Dia.	Applicable Inserts	Max. ramping angle (α°)
ϕ8	**BDMT0703** type	Not recommended
ϕ10		1.5°
ϕ12, ϕ14		2°
ϕ16		3°
ϕ17, ϕ18		1.5°
ϕ20		2°
ϕ21		1.8°
ϕ25		1.3°
ϕ26		1.2°
ϕ32		0.8°
ϕ33		0.5°

Guidance of minimum cutting dia. by helical milling

MECX	Cutting Dia.	ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ17	ϕ18	ϕ20
BDMT0703 type	Guidance of minimum cutting dia. by helical milling	Helical milling is not recommended.	ϕ14	ϕ18	ϕ22	ϕ26	ϕ28	ϕ30	ϕ34
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.		ϕ17	ϕ21	ϕ25	ϕ29	ϕ31	ϕ33	ϕ37

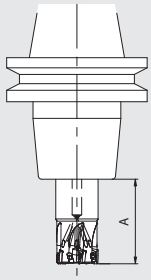
MECX	Cutting Dia.	ϕ21	ϕ25	ϕ26	ϕ32	ϕ33
BDMT0703 type	Guidance of minimum cutting dia. by helical milling	ϕ36	ϕ44	ϕ46	ϕ58	ϕ60
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ϕ39	ϕ47	ϕ49	ϕ61	ϕ63

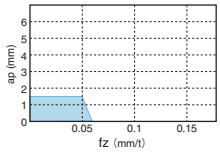
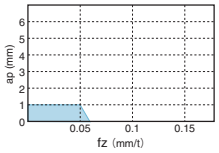
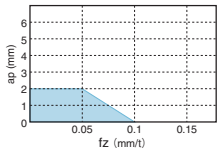
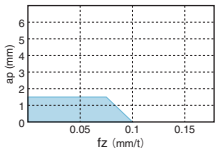
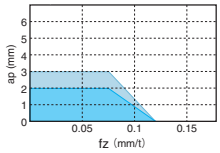
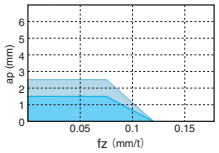
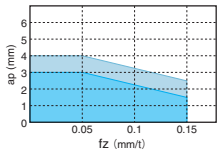
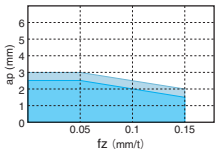
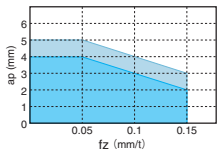
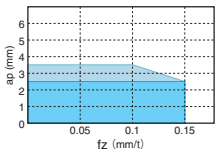
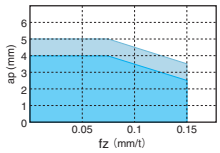
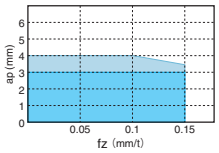
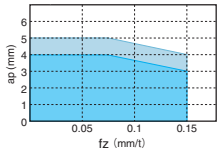
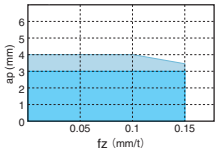
Cutting Performance of MECX End Mill

〔JT Chipbreaker Vc=150m/min Workpiece Material：S50C〕

Cutting Dia.	Description	Overhang Length A (mm)	
ϕ8	MECX08-S10-07-1T	16	-
ϕ10	MECX10-S10-07-1T	17	-
ϕ12	MECX12-S12-07-2T	18	30
ϕ16	MECX16-S16-07-3T	20	40
ϕ20	MECX20-S20-07-4T	20	40
ϕ25	MECX25-S25-07-5T	25	50
ϕ32	MECX32-S32-07-6T	30	50

Shape



Description	■Shouldering (Cutting width ae = ϕD/2)	■Slotting ■Ramping and Helical Milling
MECX08-S10-07-1T		
MECX10-S10-07-1T		
MECX12-S12-07-2T		
MECX16-S16-07-3T		
MECX20-S20-07-4T		
MECX25-S25-07-5T		
MECX32-S32-07-6T		

* Machining with extended overhang length is not recommended for ϕ8 and ϕ10.

* The cutting performance list shows applicable range of JT Chipbreaker (PR830) with Standard flute-number type.
For Multi-Edge type, use with 70% or less of ap.

*** Cutting conditions of JS Chipbreaker**

(1) For MECX08~MECX12
Decrease the feed rate by 25% according to cutting capability list.

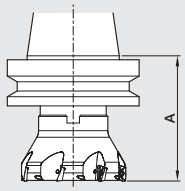
(2) For MECX16 and over
Decrease the feed rate and ap by 30% according to cutting capability list.

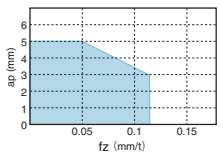
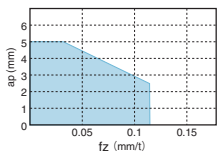
Cutting Performance of MECX Face Mill

〔JT Chipbreaker Vc=150m/min Workpiece Material：S50C〕

Cutting Dia.	Description	Overhang Length A (mm)
ϕ32	MECX032R-07-8T-M	100
ϕ40	MECX040R-07-10T-M	
ϕ50	MECX050R-07-12T-M	
ϕ63	MECX063R-07-14T-M	

Shape



Description	■Shouldering (Cutting width ae = ϕD/2)
MECX032R-07-8T-M MECX040R-07-10T-M	
MECX050R-07-12T-M MECX063R-07-14T-M	

* Slotting is not recommended.

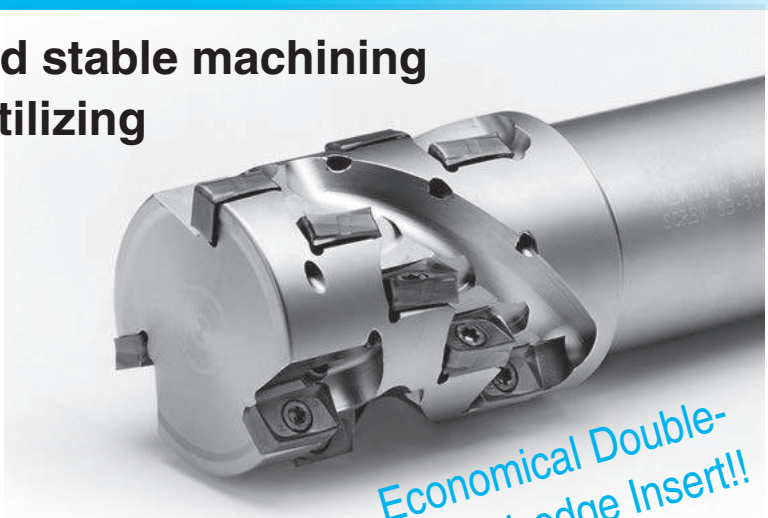
Shouldering | *Slotting | Facing

* Only for 2 flute type

High quality and stable machining with heavy milling

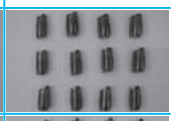
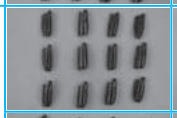
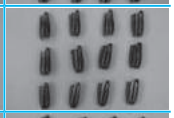
Helical End Mill MEWH

Excellent surface finish and stable machining due to toolholder design utilizing advantages of MEW



Economical Double-sided 4-edge Insert!!

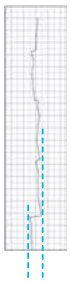
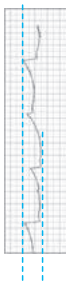
Chip Evacuation

	Chipbreaker	Workpiece Material	fz=0.15mm/t	fz=0.2mm/t
	GM	SCM435		
	GM	SS400		
	SM			

Vc=120m/min
ap×ae=20×15mm
Dry

Chips are evacuated constantly to the opposite direction of cutter feed without causing clogging

Surface Finish Comparison

MEWH	Competitor A
	

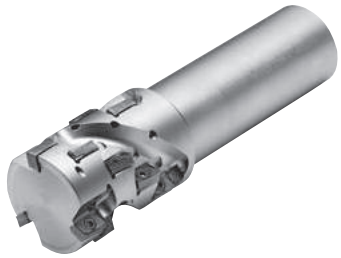
SCM435
Vc=120m/min
ap×ae=45×5mm
fz=0.1mm/t
Dry

Better surface quality than competitor A

● **Corner-R(rε) 0.4,1.0,1.2,1.6 and 2.0 added to GM chipbreaker lineup**

Marking of **04**	08 Has No Dimension Marking	Marking of **10**	Marking of **12**	Marking of **16**	Marking of **20**
LOMU100404ER-GM **LOMU150504ER-GM**	**LOMU100408ER-GM** **LOMU150508ER-GM**	**LOMU150510ER-GM**	**LOMU100412ER-GM** **LOMU150512ER-GM**	**LOMU100416ER-GM** **LOMU150516ER-GM**	**LOMU100420ER-GM** **LOMU150520ER-GM**

MEWH End Mill (with coolant hole for bottom insert)



Rake Angle	A.R. (Max.)	R.R.
	+13°	-20°

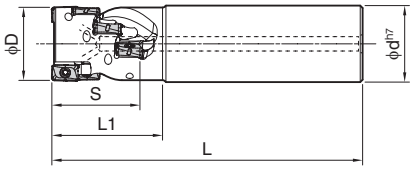


Fig.1

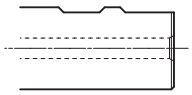


Fig.3

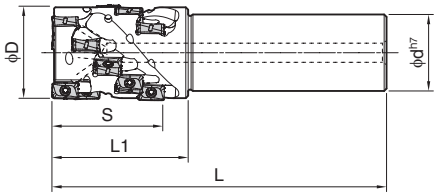


Fig.2

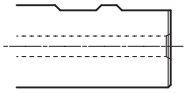


Fig.4

Toolholder Dimensions

Description		Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) ϕD	ϕd	L	L1	S	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Anti-seize Compound	Applicable Inserts ➔ M13
MEWH	025-S25-10-3-2T	●	2	3	6	25	25	120	37	28	Yes	Fig.1	SB-3065TRP	DTPM-8	MP-1	LOMU1004··
	032-S32-10-4-2T	●		4	8	32	32	130	46	37			for Insert Clamp Recommended tightening torque 1.2N·m			
	040-S32-10-5-2T	●		5	10	40		140	57	46		Fig.2				
	040-S32-10-5-3T	●	3		15											
MEWH	040-S32-15-4-2T	●	2	4	8	40	32	160	63	53	Yes	Fig.2	SB-4090TRP	DTPM-15	MP-1	LOMU1505··
	050-S42-15-4-2T	●				50	42						for Insert Clamp Recommended tightening torque 3.5N·m			
	050-S42-15-4-3T	●	3		12											
MEWH	025-W25-10-3-2T	●	2	3	6	25	25	95	37	28	Yes	Fig.3	SB-3065TRP	DTPM-8	MP-1	LOMU1004··
	032-W32-10-4-2T	●		4	8	32	32	108	46	37			for Insert Clamp Recommended tightening torque 1.2N·m			
	040-W32-10-5-2T	●		5	10	40		119	57	46		Fig.4				
	040-W32-10-5-3T	●	3		15											
MEWH	040-W32-15-4-2T	●	2	4	8	40	32	125	63	53	Yes	Fig.4	SB-4090TRP	DTPM-15	MP-1	LOMU1505··
	050-W40-15-4-2T	●				50	40	135					for Insert Clamp Recommended tightening torque 3.5N·m			
	050-W40-15-4-3T	●	3		12											

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ M79

● : Std. Item

MEWH Shell Mill (without coolant hole)

Rake Angle	A.R. (Max.)	R.R.
	+13°	-20°

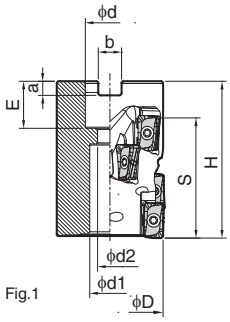


Fig.1

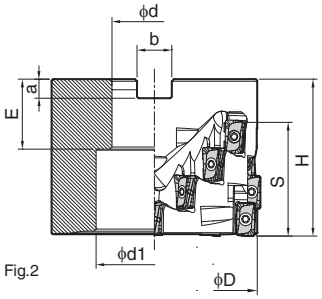


Fig.2

Toolholder Dimensions

Description	Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) ϕD	ϕd	ϕd1	ϕd2	H	E	a	b	S	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt	Applicable Inserts ➡ M13
MEWH 040R-10-4-3T-M	●	3	4	12	40	16	15	9	53	19	5.6	8.4	37	Fig.1	SB-3065TRP	DTPM-8	MP-1	HH8X25	LOMU1004··
050R-10-5-3T-M	●		5	15	50	22	18	11	64	21	6.3	10.4	46		for Insert Clamp Recommended tightening torque 1.2N·m			HH10X30	
MEWH 050R-15-4-3T-M	●	3	4	12	50	22	18	11	70	21	6.3	10.4	53	Fig.1	SB-4090TRP	DTPM-15	MP-1	HH10X30	LOMU1505··
063R-15-3-3T-M	●		3	9	63	27	20	13	58	24	7	12.4	41		for Insert Clamp Recommended tightening torque 3.5N·m			HH12X35	
080R-15-4-4T-M	●	4	4	16	80	32	26	18	70	28	8	14.4	53					HH16X45	
100R-15-4-5T-M	●	5		20	100	40	55	-	74	33	9	16.4		Fig.2				-	

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M79

Applicable Inserts

Description	Applicable Inserts ➡ M13		
	General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MEWH...-10-...	LOMU1004..ER-GM	LOMU100408ER-SM	LOMU100408ER-GH
MEWH...-15-...	LOMU1505..ER-GM	LOMU150508ER-SM	LOMU150508ER-GH

Recommended Cutting Conditions ➡ M79

Guidance of applicable inserts for MEWH

Insert Location Indication	Toolholder Description										
	MEWH···10···					MEWH···15···					
	Corner-R(rε)(mm)					Corner-R(rε)(mm)					
Bottom inserts	0.4	0.8	1.2	1.6	2.0	0.4	0.8	1.0	1.2	1.6	2.0
*Middle inserts	0.4/0.8	0.4/0.8	0.4/0.8	0.4	0.4	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6

* For Middle inserts, It is not recommended to use the insert with larger corner-R(rε) than shown in the table, because it will make finished surface uneven.

● : Std. Item

Recommended Cutting Conditions

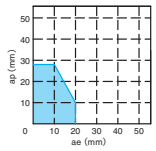
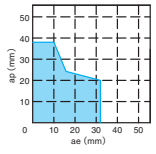
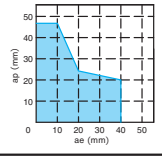
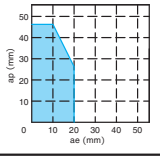
Chipbreaker	Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)			
		Toolholder Description	MEGACOAT NANO			CVD Coated Carbide
		MEWH025~MEWH050 (Helical End Mill)	PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel	0.06~**0.1**~0.2	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.1**~0.14	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.06~**0.08**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	☆ 100~**160**~200	☆ 100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	☆ 150~**200**~250	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	★ 90~**120**~150	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.17	-	-	★ 120~**180**~250	-
	Nodular Cast Iron	0.06~**0.08**~0.12	-	-	★ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	☆ 20~**30**~50	-	-	★ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	☆ 40~**60**~80	-	☆ 30~**50**~70	-
SM	Carbon Steel	0.06~**0.1**~0.17	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.08**~0.12	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.06~**0.08**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	★ 100~**160**~200	☆ 100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	☆ 150~**200**~250	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	☆ 90~**120**~150	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	☆ 20~**30**~50	-	-	★ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	★ 40~**60**~80	-	☆ 30~**50**~70	-
GH	Carbon Steel	0.06~**0.1**~0.2	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.1**~0.14	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.06~**0.08**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	☆ 100~**160**~200	☆ 100~**160**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	☆ 150~**200**~250	-	-	☆ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	☆ 90~**120**~150	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.2	-	-	☆ 120~**180**~250	-
	Nodular Cast Iron	0.06~**0.08**~0.15	-	-	☆ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	☆ 20~**30**~50	-	-	☆ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	☆ 40~**60**~80	-	☆ 30~**50**~70	-

★:1st Recommendation ☆:2nd Recommendation

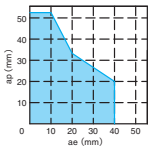
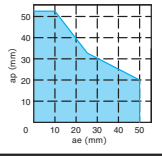
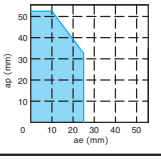
* **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Stainless Steel, Ni-base heat-resistant alloys and titanium alloys with MEWH.

Cutting Performance

● LOMU1004 type

Cutting Dia.	Description	2 Flute ap×ae	Description	3 Flute ap×ae
ϕ25	MEWH025 -S25-10-3-2T		–	–
ϕ32	MEWH032 -S32-10-4-2T		–	–
ϕ40	MEWH040 -S32-10-5-2T		MEWH040 -S32-10-5-3T	

● LOMU1505 type

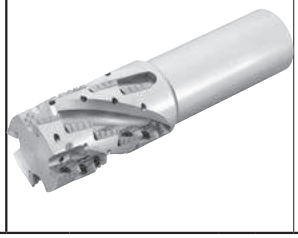
Cutting Dia.	Description	2 Flute ap×ae	Description	3 Flute ap×ae
ϕ40	MEWH040 -S32-15-4-2T		–	–
ϕ50	MEWH050 -S42-15-4-2T		MEWH050 -S42-15-4-3T	

<Cutting Conditions>
·Vc=120m/min
·fz=0.08~0.12mm/t
·GM Chipbreaker
·Workpiece Material: SCM435
·Overhang Length
End mill: Overhang length is "L1" of the dimension list

Shouldering | *Slotting | Facing

* Only for 2 flute type

MECH End Mill (with coolant hole for bottom insert)



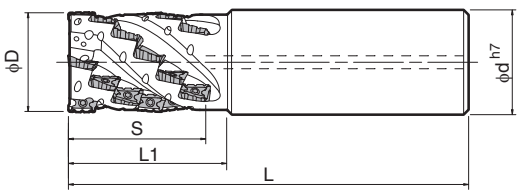


Fig.1

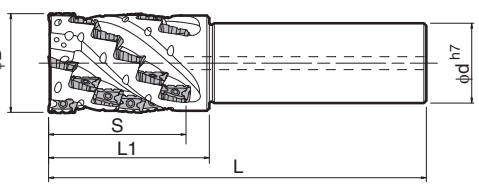


Fig.2

Toolholder Dimensions

	Description	Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) ϕD	ϕd	L	L1	S	Rake Angle A.R. (MAX.)	R.R.	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ➔ M19
Cylindrical	MECH 025-S25-11-4-2T	●	2	4	8	25	25	120	46	37	+21°	-10°	Fig.1	SB-2555TRG	DTM-8	MP-1	BDMT11T308ER-N2 BDMT11T308ER-N3
	032-S32-11-5-2T	●		5	10	32	32	140	55	46	+23°	-9°					
	032-S32-11-5-4T	●	4		20												
	040-S32-11-6-4T	●		6	24	40		150	64	55		-8°	Fig.2				
	040-S42-11-6-4T	●					42	160					Fig.1				
	050-S42-11-7-4T	●		7	28	50		172	75	64		-7°	Fig.2				
	050-S42-11-7-6T	●	6		42												
	MECH 040-S32-17-4-2T	●	2	4	8	40	32	160	73	59	+19°	-7°	Fig.2	SB-4070TRN	DTM-15	MP-1	BDMT170408ER-N3 BDMT170408ER-N4
	040-S42-17-4-2T	●					42	170					Fig.1				
	050-S42-17-5-4T	●	4	5	20	50		185	88	74		-6°	Fig.2				
Weldon	MECH 025-W25-11-4-2T	●	2	4	8	25	25	104	46	37	+21°	-10°		SB-2555TRG	DTM-8	MP-1	BDMT11T308ER-N2 BDMT11T308ER-N3
	032-W32-11-5-2T	●		5	10	32	32	117	55	46	+23°	-9°					
	032-W32-11-5-4T	●	4		20												
	040-W32-11-6-4T	●		6	24	40		126	64	55		-8°					
	050-W40-11-7-4T	●		7	28	50	40	147	75	64		-7°					
	050-W40-11-7-6T	●	6		42												
	MECH 040-W32-17-4-2T	●	2	4	8	40	32	136	73	59	+19°	-7°		SB-4070TRN	DTM-15	MP-1	BDMT170408ER-N3 BDMT170408ER-N4
	050-W40-17-5-4T	●	4	5	20	50	40	161	88	74							

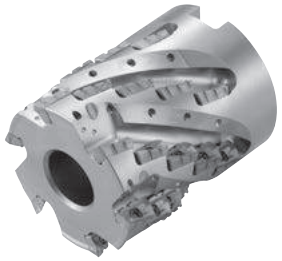
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Head exchangeable type MECH

MECH

● : Std. Item

MECH Shell Mill (without coolant hole)



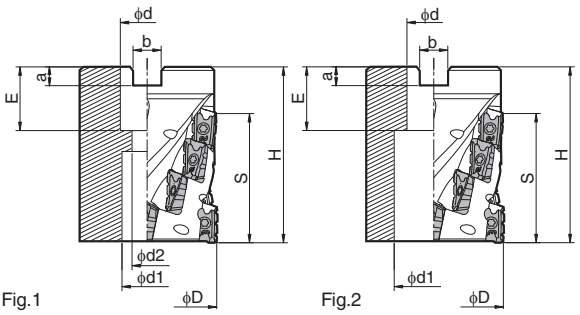


Fig.1 Fig.2

Rake Angle		
Description	A.R. (Max.)	R.R.
MECH•••-11-	+23°	-8°
MECH•••-17-	+19°	-7°

Dimensions

Description	Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) φD	φd	φd1	φd2	H	E	a	b	S	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt	Applicable Inserts ➔ M19
MECH 040R-11-4-4T-M	●	4	4	16	40	16	15	9	50	19	5.6	8.4	37	Fig.1	SB-2555TRG	DTM-8	MP-1	HH8X25	BDMT11T308ER-N2 BDMT11T308ER-N3
050R-11-5-6T-M	●	6	5	30	50	22	18	11	63	21	6.3	10.4	46					HH10X30	
MECH 050R-17-2-4T-M	●	4	2	8	50	22	18	11	52	21	6.3	10.4	30		SB-4070TRN	DTM-15	MP-1	HH10X30	BDMT170408ER-N3 BDMT170408ER-N4
050R-17-4-4T-M	●		4	16					78				59					HH10X40	
063R-17-3-4T-M	●	4	3	12	63	27	20	14	70	24	7	12.4	45					HH12X35	
080R-17-4-6T-M	●	6	4	24	80	32	26	18	85	28	8	14.4	59					HH16X45	
100R-17-4-6T-M	●	6	4	24	100	40	56	-	85	30	9	16.4	59	Fig.2				-	
MECH 063R-17-3-4T	●	4	3	12	63	25.4	20	14	70	26	6	9.5	45	Fig.1	SB-4070TRN	DTM-15	MP-1	HH12X35	
080R-17-4-6T	●	6	4	24	80	31.75	26	18	85	32	8	12.7	59					HH16X45	
100R-17-4-6T	●	6	4	24	100	38.1	56	-	85	38	10	15.9	59	Fig.2				-	

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

MECH-BT50 (Integral Arbor type, without coolant hole)

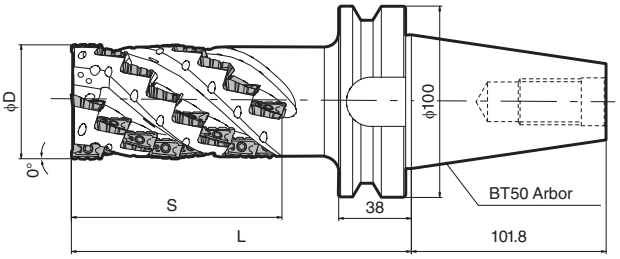


Fig.1

Rake Angle		
Description	A.R. (Max.)	R.R.
MECH•••-11-	+23°	-7°
MECH•••-17-	+19°	-7°

Dimensions

Description	Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) φD	L	S	Drawing	Weight (kg)	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ➔ M19
MECH 050R11-8-4T-BT50	●	4	8	32	50	143	73	Fig.1	4.8	SB-2555TRG	DTM-8	MP-1	BDMT11T308ER-N2 BDMT11T308ER-N3
MECH 050R17-7-4T-BT50	●	4	7	28	50	173	104		4.9	SB-4070TRN	DTM-15	MP-1	BDMT170408ER-N3 BDMT170408ER-N4
063R17-7-4T-BT50	●				63				5.9				
080R17-7-4T-BT50	●				80				7.8				
100R17-7-6T-BT50	●	6		42	100				10.2				

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

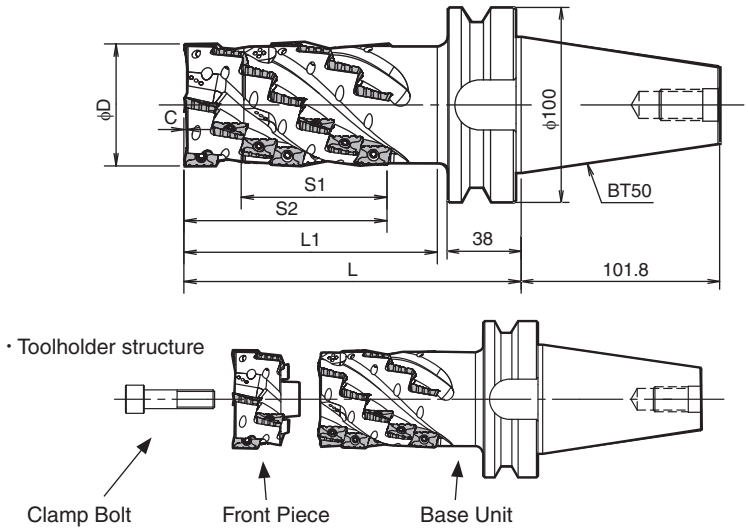
Applicable Inserts

Description	Applicable Inserts ➔ M19			
	2-Notched	3-Notched	3-Notched	4-Notched
MECH•••-11-	**BDMT 11T308ER-N2**	**BDMT 11T308ER-N3**	–	–
MECH•••-17-	–	–	**BDMT 170408ER-N3**	**BDMT 170408ER-N4**

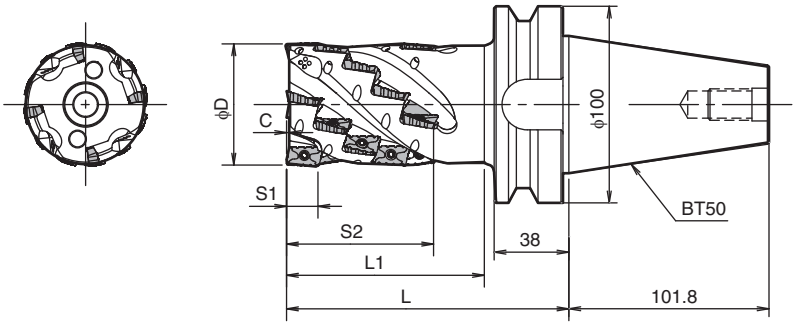
● : Std. Item

Recommended Cutting Conditions ➔ M85

MECH-BT50SA (without coolant hole) Arbor Integral Type (Base Unit + 1 Front Piece + Clamp Bolt)



MECH-BT50-A (without coolant hole) Base Unit



Toolholder Dimensions

Description			Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)						Rake Angle		Weight (kg)
							φD	L	L1	C	S1	S2	A.R.	R.R.	
Arbor Integral Type	MECH	050R11-4T-BT50SA	MTO	4	8	32	50	143	99	0.7	55	73	+23°	-7°	4.8
		063R17-4T-BT50SA	MTO		7	28	63	173	130	1.3	75	104	+19°	-7°	5.8
		080R17-4T-BT50SA	MTO				80								7.6
		100R17-6T-BT50SA	MTO	6	7	42	100								9.8
Base Unit	MECH	050R11-4T-BT50-A	MTO	4	6	24	50	125	81	0.7	10	55	+23°	-7°	4.6
		063R17-4T-BT50-A	MTO		5	20	63	143	100	1.3	16	75	+19°	-7°	5.4
		080R17-4T-BT50-A	MTO				80								6.8
		100R17-6T-BT50-A	MTO	6	5	30	100								8.5

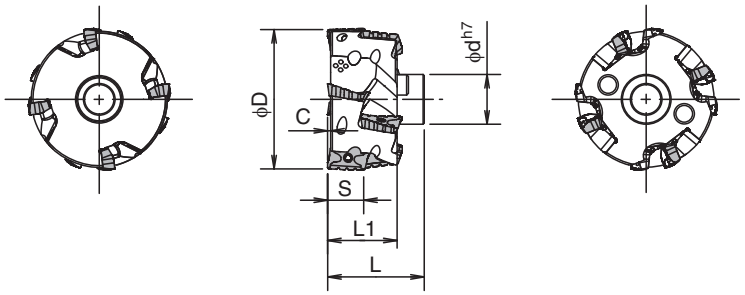
Recommended Cutting Conditions ➔ M85

Toolholder structure

End Mill			Base Unit ➔ M82	Front Piece (1pcs) ➔ M83	Clamp Bolt
MECH	050R11-4T-BT50SA	=	MECH050R11-4T-BT50-A	MECH050R11-4T-F	HH12X35
	063R17-4T-BT50SA		MECH063R17-4T-BT50-A	MECH063R17-4T-F	HH12X40
	080R17-4T-BT50SA		MECH080R17-4T-BT50-A	MECH080R17-4T-F	HH16X40
	100R17-6T-BT50SA		MECH100R17-6T-BT50-A	MECH100R17-6T-F	HH20X40

MTO : Made to order

MECH-F (without coolant hole) Front Piece



Toolholder Dimensions

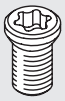
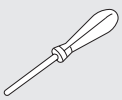
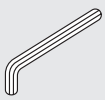
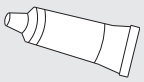
Description		Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)						Rake Angle		Weight (kg)
						φD	φd	L	L1	C	S	A.R.	R.R.	
MECH	050R11-4T-F	●	4	2	8	50	22	32	18	0.7	10	+23°	-7°	0.2
	063R17-4T-F	●				63	22	44	30	1.3	16	+19°	-7°	0.4
	080R17-4T-F	●				80	32							0.8
	100R17-6T-F	●	6	2	12	100	45							1.3

Applicable Inserts

End Mill		Base Unit ➡ M82	Front Piece ➡ M83	Applicable Inserts ➡ M19
MECH	050R11-4T-BT50SA	MECH050R11-4T-BT50-A	MECH050R11-4T-F	BDMT11T308ER-N2 BDMT11T308ER-N3
	063R17-4T-BT50SA	MECH063R17-4T-BT50-A	MECH063R17-4T-F	BDMT170408ER-N3 BDMT170408ER-N4
	080R17-4T-BT50SA	MECH080R17-4T-BT50-A	MECH080R17-4T-F	
	100R17-6T-BT50SA	MECH100R17-6T-BT50-A	MECH100R17-6T-F	

· For installation of notched insert, ref. to page ➡ M85.

Spare Parts

Description			Spare Parts				
			Clamp Screw	Wrench (for Clamp Screw)	Clamp Bolt	Wrench (for Clamp Bolt)	Anti-seize Compound
							
Arbor Integral Type (Set)	MECH	050R11-4T-BT50SA	SB-2555TRG	DTM-8	HH12X35	LW-10	MP-1
		063R17-4T-BT50SA	SB-4070TRN	DTM-15	HH12X40	LW-10	
		080R17-4T-BT50SA			HH16X40	LW-14	
		100R17-6T-BT50SA			HH20X40	LW-17	
Base Unit	MECH	050R11-4T-BT50-A	SB-2555TRG	DTM-8	HH12X35	LW-10	
		063R17-4T-BT50-A	SB-4070TRN	DTM-15	HH12X40	LW-10	
		080R17-4T-BT50-A			HH16X40	LW-14	
		100R17-6T-BT50-A			HH20X40	LW-17	
Front Piece	MECH	050R11-4T-F	SB-2555TRG	-	-	-	
		063R17-4T-F	SB-4070TRN				
		080R17-4T-F					
		100R17-6T-F					

· If you purchased the front piece only, wrench (for clamp screw) / clamp bolt and wrench (for clamp bolt) is not included.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

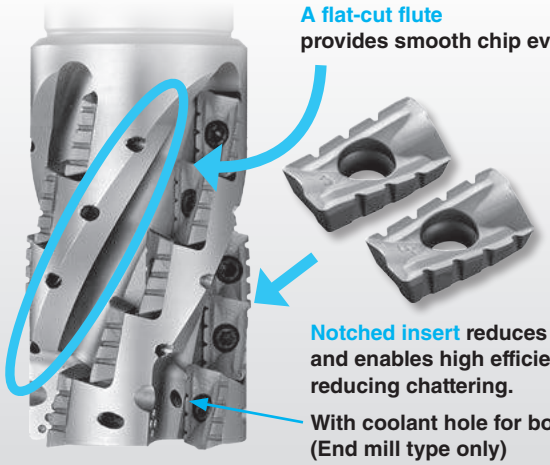
● : Std. Item

Smooth Chip Evacuation

Smooth Chip Evacuation

Notched insert breaks chips into small pieces

Workpiece Material:SS400
Vc=120m/min
apxae=40mm×10mm
fz=0.12mm/t
MECH032-S32-11-5-4T



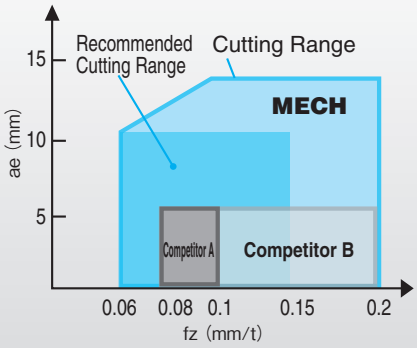
A flat-cut flute
provides smooth chip evacuation

Notched insert reduces cutting force, and enables high efficiency machining by reducing chattering.

With coolant hole for bottom insert (End mill type only)

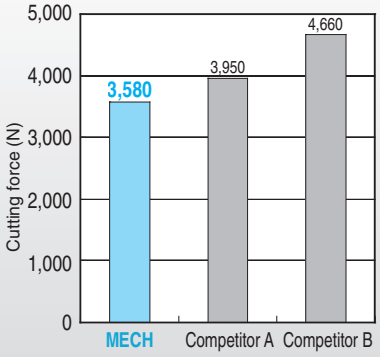
Low Cutting Force

Low Cutting Force due to Notched Inserts



Workpiece Material:S50C
Vc=120m/min
apxae=40mm×5~13mm
fz=0.06~0.2mm/t
MECH032-S32-11-5-4T

Cutting Force Comparison (principal force)



Workpiece Material:S50C
Vc=120m/min
apxae=40mm×10mm
fz=0.1mm/t
MECH032-S32-11-5-4T

(Internal evaluation)

Number of Inserts Installed

Description	No. of Flutes	No. of Inserts	No. of Inserts	
			BDMT11T308ER-	
			N2	N3
MECH 025-S25-11-4-2T	2	8	4	4
032-S32-11-5-2T		10	5	5
032-S32-11-5-4T	4	20	10	10
040-S32-11-6-4T		24	12	12
040-S42-11-6-4T				
050-S42-11-7-4T		28	14	14
050-S42-11-7-6T	6	42	21	21
MECH 040-S32-17-4-2T	2	8	-	-
040-S42-17-4-2T				
050-S42-17-5-4T	4	20		
MECH 040R-11-4-4T-M	4	16	8	8
050R-11-5-6T-M	6	30	15	15
MECH 050R-17-2-4T-M	4	8	-	-
050R-17-4-4T-M		16		
063R-17-3-4T-M		12		
080R-17-4-6T-M	6	24		
100R-17-4-6T-M				
MECH 063R-17-3-4T	4	12		
080R-17-4-6T	6	24		
100R-17-4-6T				

Description	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 025-S25-11-4-2T	2	8	4	4	-	-
032-S32-11-5-2T		10	5	5		
032-S32-11-5-4T	4	20	10	10		
040-S32-11-6-4T		24	12	12		
040-S42-11-6-4T						
050-S42-11-7-4T		28	14	14		
050-S42-11-7-6T	6	42	21	21		
MECH 040-S32-17-4-2T	2	8	-	-	4	4
040-S42-17-4-2T						
050-S42-17-5-4T	4	20			10	10
MECH 040R-11-4-4T-M	4	16	8	8	-	-
050R-11-5-6T-M	6	30	15	15		
MECH 050R-17-2-4T-M	4	8	-	-	4	4
050R-17-4-4T-M		16			8	8
063R-17-3-4T-M		12			6	6
080R-17-4-6T-M	6	24			12	12
100R-17-4-6T-M						
MECH 063R-17-3-4T	4	12			6	6
080R-17-4-6T	6	24			12	12
100R-17-4-6T						

Description	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 050R11-8-4T-BT50	4	32	16	16	-	-
050R17-7-4T-BT50		28	-	-	14	14
063R17-7-4T-BT50						
080R17-7-4T-BT50						
100R17-7-6T-BT50	6	42			21	21
MECH 050R11-4T-BT50SA	4	32	16	16	-	-
063R17-4T-BT50SA	4	28	-	-	14	14
080R17-4T-BT50SA						
100R17-6T-BT50SA	6	42	-	-	21	21
MECH 050R11-4T-BT50-A	4	24	12	12	-	-
063R17-4T-BT50-A	4	20	-	-	10	10
080R17-4T-BT50-A						
100R17-6T-BT50-A	6	30	-	-	15	15
MECH 050R11-4T-F	4	8	4	4	-	-
063R17-4T-F	4	8	-	-	4	4
080R17-4T-F						
100R17-6T-F	6	12	-	-	6	6

Caution when installing Notched Insert

1. Install notched inserts by cutting the insert with the number of marks on the toolholder body.

<Insert Number and Toolholder Marks>

Insert Size	11 Type		17 Type	
Insert No.	2	3	3	4
Marks				

* Using the cutter with the inserts installed incorrectly will damage the toolholder.

2. When installing notched inserts in flute line, ensure that the number on the insert is the same as the insert in first stage. (Ref. to Fig.1, 2 and 3.)

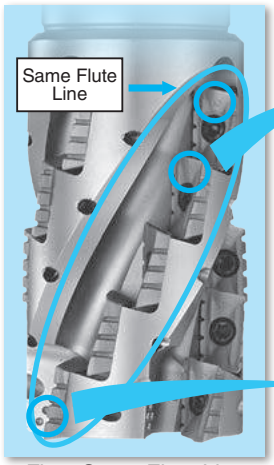


Fig.1 Same Flute Line

Fig.2 Insert No.

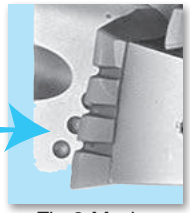


Fig.3 Marks

Recommended Cutting Conditions (When using a notched insert)

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)				
		MEGACOAT NANO	MEGACOAT			PVD Coated Carbide
		PR1535	**PR1225**	**PR1230**	**PR1210**	**PR830**
Carbon Steel	0.08~0.1~0.15	☆ 120~180~250	☆ 120~180~250	★ 120~180~220	-	☆ 100~140~180
Alloy Steel	0.08~0.1~0.15	☆ 100~160~220	☆ 100~160~220	★ 100~160~200	-	☆ 100~140~180
Mold Steel	0.08~0.1~0.15	☆ 80~140~180	☆ 80~140~180	★ 80~140~160	-	☆ 100~120~150
Gray Cast Iron	0.08~0.15~0.18	-	-	-	★ 120~180~250	-
Nodular Cast Iron	0.08~0.15~0.18	-	-	-	★ 100~150~220	-
*Titanium Alloys	0.08~0.1~0.15	★ 40~60~80	-	-	☆ 30~50~70	-

* Machining with coolant is recommended for titanium alloys.

★:1st Recommendation ☆:2nd Recommendation

1. The recommended cutting conditions above are for notched inserts.
2. If using an insert without notch, the cutting depth (ap) and width (ae) should be less than 60% of those of a notched insert.

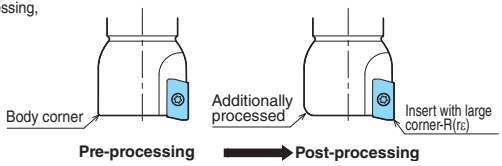
·JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
		Carbide
		GW25
Aluminum Alloy (Si 13% or less)	0.05~0.3	200~800
Aluminum Alloy (Si 13% and over)	0.05~0.2	200~300

■ **When using inserts with corner-R(rε) 1.6 or larger, additional modifications of the cutter body will be necessary. Ref. to the table below for the recommended modifications. (Additional grind off is not necessary when corner-R(rε) is 1.2mm or less.)**

Insert Corner-R(rε) (mm)	Additional Processing Dimension to Body Corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

* Round- shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.

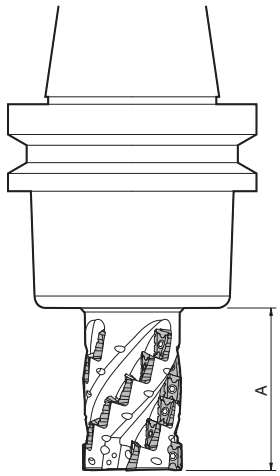


Cutting Performance (Used Machine: Machining center equivalent to AC15 / 18.5kW)

MECH End Mill

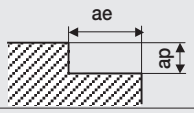
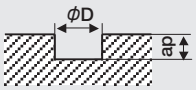
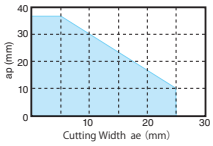
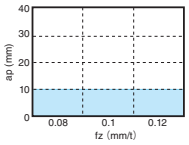
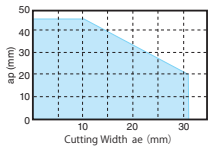
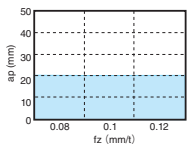
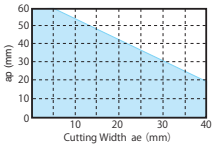
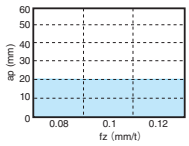
Cutting Dia.	Description	Overhang Length A (mm)
ϕ25	MECH025-S25-11-4-2T	48
ϕ32	MECH032-S32-11-5-2T	57
	MECH032-S32-11-5-4T	
ϕ40	MECH040-S32-11-6-4T	65
	MECH040-S42-11-6-4T	
ϕ50	MECH050-S42-11-7-4T	76
	MECH050-S42-11-7-6T	
ϕ40	MECH040-S32-17-4-2T	74
	MECH040-S42-17-4-2T	
ϕ50	MECH050-S42-17-5-4T	89

Shape

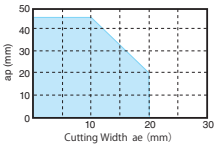
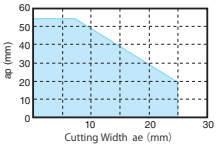
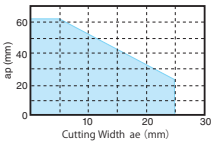
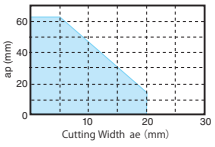
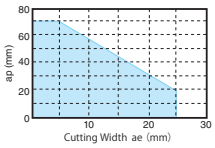


2 Flute Type

(Workpiece Material:S50C)

Description	■ Shouldering	■ Slotting
		
	Cutting Speed: Vc=100~180m/min Feed: fz=0.08~0.15mm/t	Cutting Speed: Vc=100~120m/min Feed: fz=0.08~0.12mm/t
MECH025-S25-11-4-2T		
MECH032-S32-11-5-2T		
MECH040-S32-17-4-2T MECH040-S42-17-4-2T		

4 Flute / 6 Flute Type

MECH032-S32-11-5-4T	
MECH040-S32-11-6-4T MECH040-S42-11-6-4T	
MECH050-S42-11-7-4T	
MECH050-S42-11-7-6T	
MECH050-S42-17-5-4T	

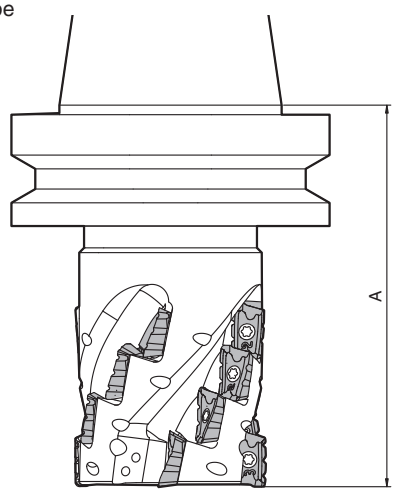
4 Flute / 6 Flute Type are not recommended for Slotting.

MECH Shell Mill

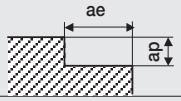
(Workpiece Material:S50C)

Cutting Dia.	Description	Overhang Length A (mm)
ϕ40	**MECH040R-11-4-4T-M**	125
ϕ50	**MECH050R-11-5-6T-M**	123
	MECH050R-17-2-4T-M	112
	MECH050R-17-4-4T-M	138
ϕ63	**MECH063R-17-3-4T-□**	115
ϕ80	**MECH080R-17-4-6T-□**	130
ϕ100	**MECH100R-17-4-6T-□**	130

Shape

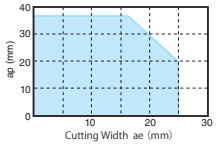


■ Shouldering

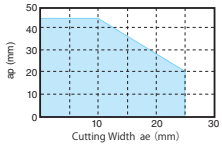


Cutting Speed: Vc=100~180m/min
Feed : fz=0.08~0.15mm/t

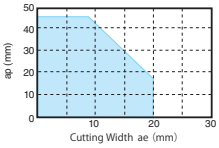
MECH040R -11-4-4T-M



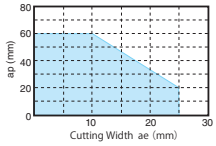
MECH063R -17-3-4T-□



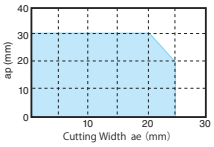
MECH050R -11-5-6T-M



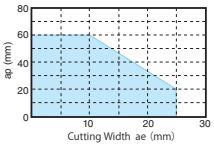
MECH080R -17-4-6T-□



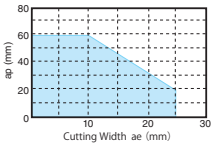
MECH050R -17-2-4T-M



MECH100R -17-4-6T-□



MECH050R -17-4-4T-M



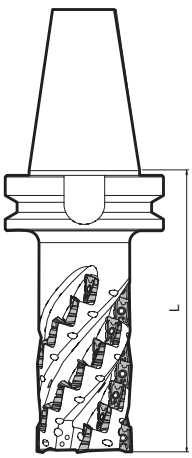
Slotting is not recommended.

MECH-BT50 (Integral Arbor Type)
MECH-BT50SA (Head exchangeable type / Integral Arbor type)

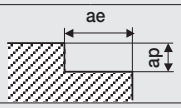
(Workpiece Material:S50C)

Cutting Dia.	Description	Overhang Length L (mm)
ϕ50	**MECH050R11-8-4T-BT50** **MECH050R11-4T-BT50SA**	143
	MECH050R17-7-4T-BT50	173
ϕ63	**MECH063R17-7-4T-BT50** **MECH063R17-4T-BT50SA**	
ϕ80	**MECH080R17-7-4T-BT50** **MECH080R17-4T-BT50SA**	
ϕ100	**MECH100R17-7-6T-BT50** **MECH100R17-6T-BT50SA**	

Shape

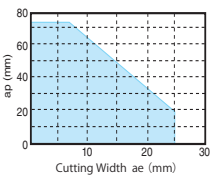


■ Shouldering

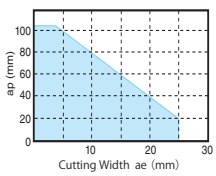


Cutting Speed: Vc=100~180m/min
Feed : fz=0.08~0.15mm/t

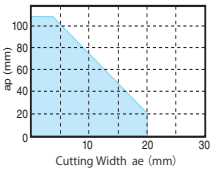
MECH050R11 -8-4T-BT50
MECH050R11 -4T-BT50SA



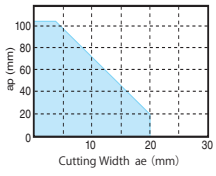
MECH080R17 -7-4T-BT50
MECH080R17 -4T-BT50SA



MECH050R17 -7-4T-BT50

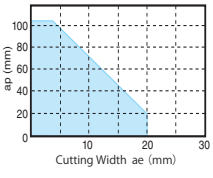


MECH100R17 -7-6T-BT50
MECH100R17 -6T-BT50SA



Slotting is not recommended.

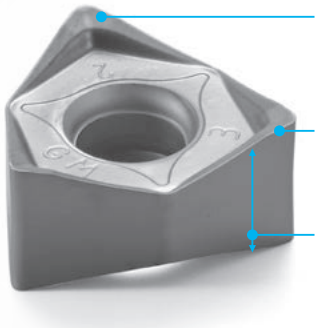
MECH063R17 -7-4T-BT50
MECH063R17 -4T-BT50SA



MFWN

Double-Sided, 6-edge insert, 90°Cutters Low cutting force and reduced chattering

6 Advantages



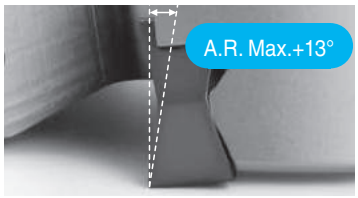
"Large slant edge" Design

Economical Double-sided 6-edge Insert

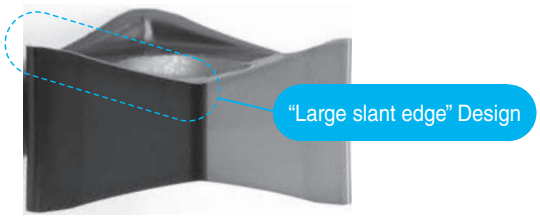
Tough Cutting Edge due to Thick Edge Design

Advantage 1 Sharp cutting due to low cutting force

● Sharp cutting by large rake angle



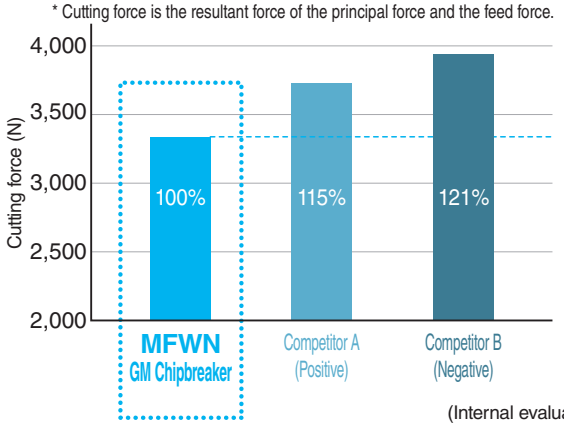
● "Large slant edge" Design reduces shock when cutting edge enters the workpiece



● Cutting Force Comparison

<Cutting Conditions>
Vc = 180m/min
ap×ae = 7×110mm
fz = 0.2mm/t
Workpiece Material : S50C
ϕ125mm Cutter

* Cutting force is the resultant force of the principal force and the feed force.

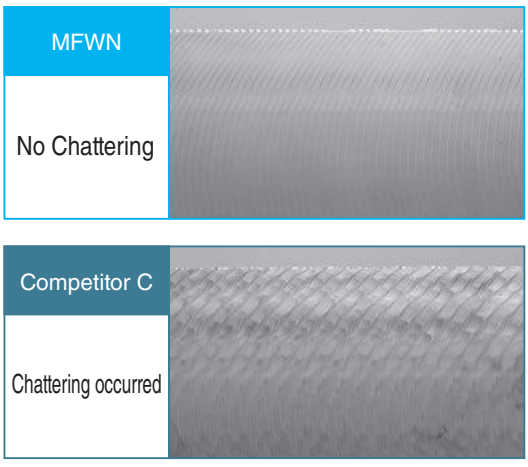


(Internal evaluation)

Advantage 2 Reduced chattering

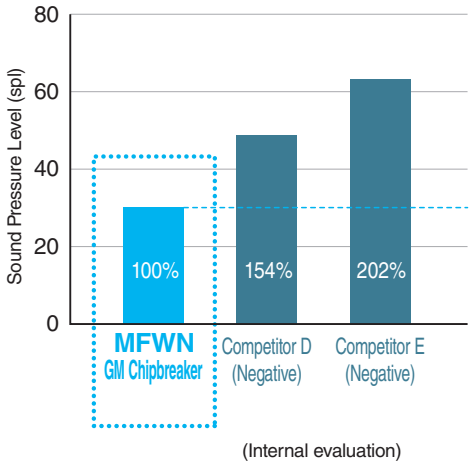
Applicable to long overhang

● Surface Finish Comparison



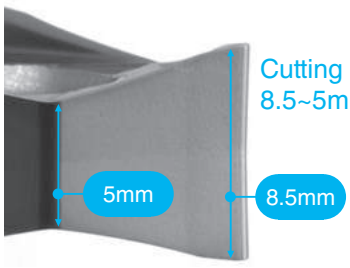
● Machining Noise Comparison

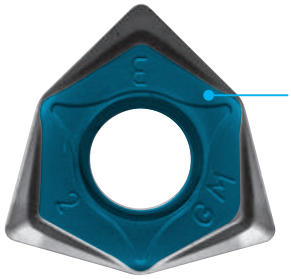
<Cutting Conditions>
Vc = 200m/min
ap×ae = 3×15mm
fz = 0.1mm/t
Workpiece Material : S50C
ϕ80mm Cutter (7 inserts)



(Internal evaluation)

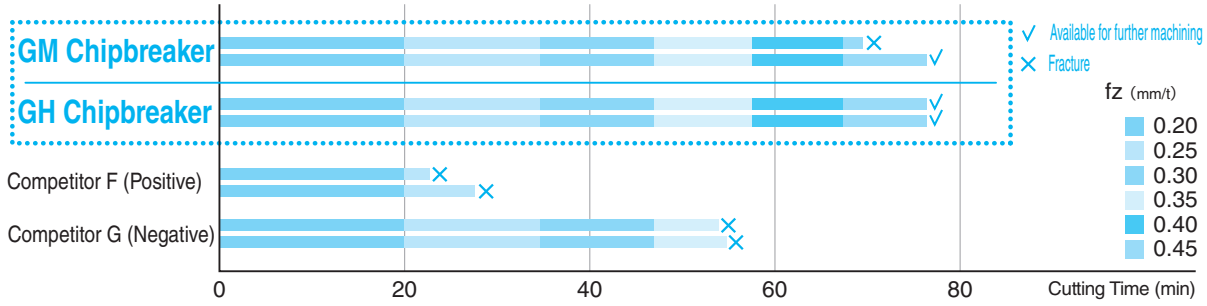
Advantage 3 Superior Fracture Resistance due to Thick Edge Design





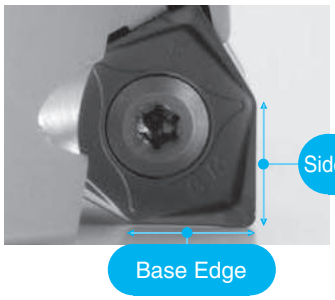
● **Fracture Resistance Comparison**

<Cutting Conditions>
Workpiece Material:SCM440H(38~42HS) Interruption with a slot on the workpiece
Vc = 100m/min apxae = 2x100mm fz = 0.2~0.45 mm/t Dry



Advantage 4 Neutral

For Vertical Machining as well as Facing Neutral Inserts are applicable to left-hand cutters (custom order).

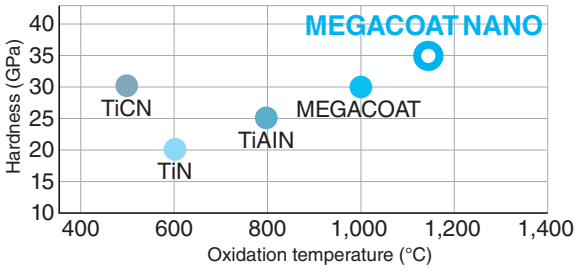


Applicable to a wide range of application

Advantage 5

Extended Tool Life by New MEGACOAT NANO Technology

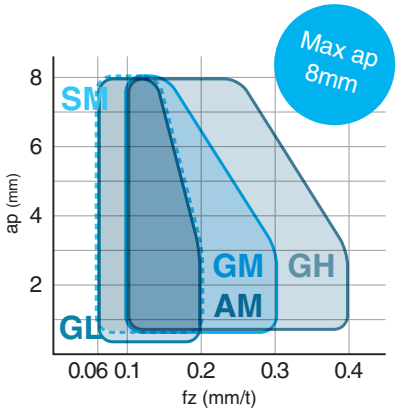
PR1525 for steel and stainless steel (austenitic), PR1535 for titanium alloys and stainless steel (precipitation hardening) and PR1510 for cast iron are available.
Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C) CA6535 (CVD coated) for heat-resistant alloys and stainless steel (martensitic) is available, too.



Low Oxidation resistance High

Advantage 6 5 chipbreakers for various applications

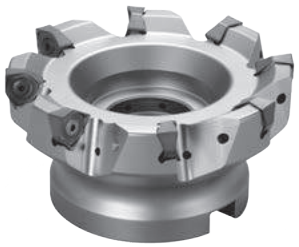
Chipbreaker	Applications	Insert
GM	General purpose	
SM	Low cutting force	
GH	For Heavy Milling	
GL	Surface-Finish Oriented	
AM	Non-ferrous Metals	



Smooth chip evacuation

Properly curled chips
(The photo was taken by a high speed camera.)

MFWN Face Mill



Rake Angle	A.R.	R.R.	
	(MAX.) +13°	ϕD=63 -10° ϕD=80 -9° ϕD=100 -8°	ϕD=125 -7.5° ϕD=160-250 -7°

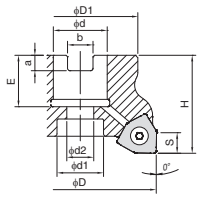


Fig.1

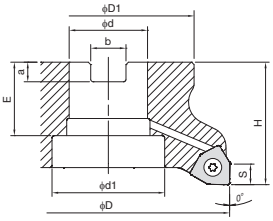


Fig.2

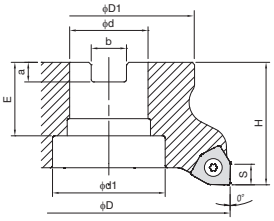


Fig.3

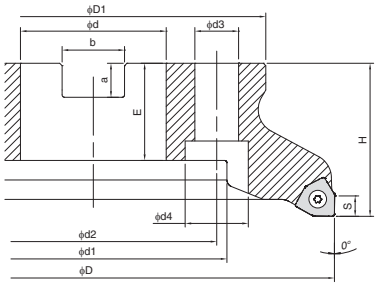


Fig.4

Toolholder Dimensions

Description				Std.	No. of Inserts	Dimension (mm)											Drawing	Weight (kg)	Shim	Coolant Hole
						ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	ϕd3	ϕd4				
Metric	Coarse pitch	MFWN	90063R-3T-M	●	3	63	47	22	19	11	40	21	6.3	10.4			Fig.1	0.5	Yes	Yes
			90080R-4T-M	●	4	80	60	27	20	13	50	24	7	12.4	-			1.0		
			90100R-5T-M	●	5	100	70	32	46	-		30	8	14.4			Fig.2	1.3		
			90125R-6T-M	●	6	125	87	40	55		63	33	9	16.4				2.5		
			90160R-8T-M	●	8	160	102		68	66.7		32			14	20	Fig.4	3.8		No
			90200R-10T-M	●	10	200	142	60	110	101.6		40	14	25.7	18	26		6.0		
			90250R-12T-M	●	12	250												8.4		
	Fine pitch	MFWN	90063R-4T-M	●	4	63	47	22	19	11	40	21	6.3	10.4			Fig.1	0.5	No	Yes
			90080R-5T-M	●	5	80	60	27	20	13	50	24	7	12.4	-	-		1.0		
			90100R-7T-M	●	7	100	70	32	46	-		30	8	14.4			Fig.2	1.3		
			90125R-8T-M	●	8	125	87	40	55		63	33	9	16.4				2.6		
			90160R-10T-M	●	10	160	102		68	66.7		32			14	20	Fig.4	3.9		No
			90200R-12T-M	●	12	200	142	60	110	101.6		40	14	25.7	18	26		6.3		
			90250R-14T-M	●	14	250												8.7		
	Extra fine pitch	MFWN	90063R-5T-M	●	5	63	47	22	19	11	40	21	6.3	10.4			Fig.1	0.5	No	Yes
			90080R-7T-M	●	7	80	60	27	20	13	50	24	7	12.4	-	-		1.1		
			90100R-9T-M	●	9	100	70	32	46	-		30	8	14.4			Fig.2	1.3		
			90125R-12T-M	●	12	125	87	40	55		63	33	9	16.4				2.6		
			90160R-14T-M	●	14	160	102		68	66.7		32			14	20	Fig.4	3.9		No
			90200R-16T-M	●	16	200	142	60	110	101.6		40	14	25.7	18	26		6.4		
			90250R-18T-M	●	18	250												8.8		
Bore Dia. Inch spec	Coarse pitch	MFWN	90080R-4T	○	4	80	60	25.4	20	13	50	27	6	9.5			Fig.1	1.0	Yes	Yes
			90100R-5T	○	5	100	70	31.75	46			34	8	12.7	-	-	Fig.2	1.3		
			90125R-6T	○	6	125	87	38.1	55	-		38	10	15.9				2.6		
			90160R-8T	○	8	160	102	50.8	72		63		11	19.1			Fig.3	3.9		
			90200R-10T	○	10	200	142	47.625	110	101.6		40	14	25.4	18	26	Fig.4	6.3		No
			90250R-12T	○	12	250												8.7		
	Fine pitch	MFWN	90080R-5T	○	5	80	60	25.4	20	13	50	27	6	9.5			Fig.1	1.0	No	Yes
			90100R-7T	○	7	100	70	31.75	46			34	8	12.7	-	-	Fig.2	1.4		
			90125R-8T	○	8	125	87	38.1	55	-		38	10	15.9				2.7		
			90160R-10T	○	10	160	102	50.8	72		63		11	19.1			Fig.3	4.0		
			90200R-12T	○	12	200	142	47.625	110	101.6		40	14	25.4	18	26	Fig.4	6.6		No
			90250R-14T	○	14	250												8.9		
	Extra fine pitch	MFWN	90080R-7T	○	7	80	60	25.4	20	13	50	27	6	9.5			Fig.1	1.1	No	Yes
			90100R-9T	○	9	100	70	31.75	46			34	8	12.7	-	-	Fig.2	1.3		
			90125R-12T	○	12	125	87	38.1	55	-		38	10	15.9				2.7		
			90160R-14T	○	14	160	102	50.8	72		63		11	19.1			Fig.3	4.1		
			90200R-16T	○	16	200	142	47.625	110	101.6		40	14	25.4	18	26	Fig.4	6.7		No
			90250R-18T	○	18	250												9.1		

*Dimension S : 8mm

Applicable Inserts ➡ M17

● : Std. Item

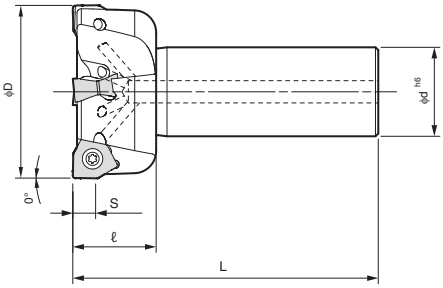
Spare Parts

Description		Spare Parts							
		Clamp Screw	Wrench		Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt
			TT	DTM					
Coarse pitch	MFWN 90063R-3T-M	SB-50140TR	TT-15	-	MFWN-90	SPW-7050	LW-5	MP-1	HH10X30
	MFWN 90080R-4T(-M)								HH12X35
	MFWN 90100R-5T(-M) ~ 90250R-12T(-M)	for Insert Clamp Recommended tightening torque 4.2N·m			for Shim Clamp Recommended tightening torque 6.0N·m				-
Fine pitch	MFWN 90063R-4T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10X30
	MFWN 90080R-5T(-M)								HH12X35
	MFWN 90100R-7T(-M) ~ 90250R-14T(-M)	for Insert Clamp Recommended tightening torque 4.2N · m							-
Extra fine pitch	MFWN 90063R-5T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10X30
	MFWN 90080R-7T(-M)	SB-40140TRN	-	DTM-15					HH12X35
	MFWN 90100R-9T(-M) ~ 90250R-18T(-M)	for Insert Clamp Recommended tightening torque 3.5N · m							-

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M92

MFWN with cylindrical shank (with coolant hole)



Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Spare Parts		
				φD	φd	L	ℓ	S	A.R. (MAX.)	R.R.		Clamp Screw	Wrench	Anti-seize Compound
MFWN	90050R-S32-3T	●	3	50	32	110	30	8	+13°	-12°	Yes	SB-50140TR	TT-15	MP-1
	90063R-S32-4T	●	4	63						-10°		Recommended tightening torque 4.2N·m		
	90080R-S32-5T	●	5	80						-9°				

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts ➡ M17

Applicable Inserts

Description	Applicable Inserts ➡ M17				
	Surface-Finish Oriented (Precision Class)	General purpose	Low Cutting Force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
MFWN90...	WNEU 080608EN-GL	WNMU 080608EN-GM	WNMU 080608EN-SM	WNMU 080608EN-GH	WNGT 080608FN-AM

● : Std. Item

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
   Remember that the screw hole of the toolholder for Extra fine pitch is inclined to the bearing surface. (Ref. to Fig. 2 and Fig. 3)
4. Be careful not to tighten the screw with excessive torque.
   Recommended tightening torque is 4.2N·m for M5 screw (SB-50140TR) and 3.5N·m for M4 screw (SB-40140TRN).
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.
6. To change the cutting edge of the insert, turn the insert counterclockwise (Ref. to Fig. 4). The insert corner identification number is stamped on the top surface of the insert.

Fig.1

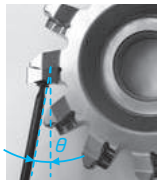


Fig.2

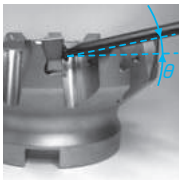


Fig.3

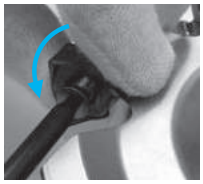


Fig.4

How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (Ref. to Fig. 1) and lightly pressing the shim toward the constraint surface (Ref. to Fig. 2), insert the screw into the hole of the shim and tighten (Ref. to Fig. 3).
   When tightening the screw, make sure that the screw is vertical to the bearing surface (Recommended tightening torque is 6.0N·m).
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.

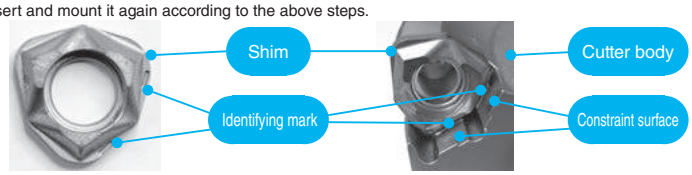


Fig.1 Fig.2

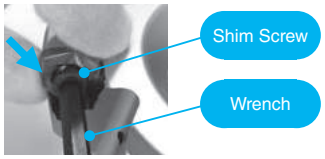


Fig.3

Recommended Cutting Conditions

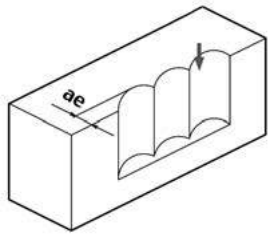
Chipbreaker	Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)					
			MEGACOAT NANO			CVD Coated Carbide	DLC Coated Carbide	Carbide
			PR1535	PR1525	PR1510	CA6535	PDL025	GW25
GM	Carbon Steel	0.1~**0.2**~0.3	☆ 120~**180**~250	★ 120~**180**~250	-	-	-	-
	Alloy Steel	0.1~**0.2**~0.3	☆ 100~**160**~220	★ 100~**160**~220	-	-	-	-
	Mold Steel	0.1~**0.15**~0.25	☆ 80~**140**~180	★ 80~**140**~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.1~**0.15**~0.25	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.1~**0.15**~0.25	☆ 150~**200**~250	-	-	☆ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.1~**0.15**~0.25	★ 90~**120**~150	-	-	-	-	-
	Gray Cast Iron	0.1~**0.2**~0.3	-	-	★ 120~**180**~250	-	-	-
	Nodular Cast Iron	0.1~**0.15**~0.25	-	-	★ 100~**150**~200	-	-	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	☆ 20~**30**~50	-	-	★ 20~**30**~50	-	-
SM *1 (GL)	Carbon Steel	0.06~**0.12**~0.2	☆ 120~**180**~250	☆ 120~**180**~250	-	-	-	-
	Alloy Steel	0.06~**0.12**~0.2	☆ 100~**160**~220	☆ 100~**160**~220	-	-	-	-
	Mold Steel	0.06~**0.08**~0.15	☆ 80~**140**~180	☆ 80~**140**~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.12**~0.2	★ 100~**160**~200	☆ 100~**160**~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.12**~0.2	☆ 150~**200**~250	-	-	★ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.06~**0.12**~0.2	☆ 90~**120**~150	-	-	-	-	-
	Gray Cast Iron	0.06~**0.12**~0.2	-	-	☆ 120~**180**~250	-	-	-
	Nodular Cast Iron	0.06~**0.08**~0.15	-	-	☆ 100~**150**~200	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.1**~0.15	☆ 20~**30**~50	-	-	☆ 20~**30**~50	-	-
	Titanium Alloys	0.06~**0.08**~0.15	★ 40~**60**~80	-	-	-	-	-
*2GH	Carbon Steel	0.2~**0.3**~0.4	☆ 120~**180**~250	☆ 120~**180**~250	-	-	-	-
	Alloy Steel	0.2~**0.3**~0.4	☆ 100~**160**~220	☆ 100~**160**~220	-	-	-	-
	Mold Steel	0.15~**0.2**~0.3	☆ 80~**140**~180	☆ 80~**140**~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.2~**0.25**~0.3	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.2~**0.25**~0.3	☆ 150~**200**~250	-	-	☆ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.2~**0.25**~0.3	☆ 90~**120**~150	-	-	-	-	-
	Gray Cast Iron	0.2~**0.3**~0.4	-	-	☆ 120~**180**~250	-	-	-
	Nodular Cast Iron	0.15~**0.2**~0.3	-	-	☆ 100~**150**~200	-	-	-
	Ni-base heat-resistant alloys	0.15~**0.2**~0.25	☆ 20~**30**~50	-	-	☆ 20~**30**~50	-	-
AM	Non-ferrous metals	0.1~**0.2**~0.3	-	-	-	-	★ 200~**600**~900	☆ 200~**500**~800

· **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. ★ :1st Recommendation ☆ :2nd Recommendation
· Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
*1. GL Chipbreaker is recommended for Surface finish oriented milling.
2. GH Chipbreaker : Fine pitch ⇒ fz≤0.3 (mm/t)
Extra fine pitch ⇒ Not recommended

Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM (GL)	GH
Coarse pitch (with shim)	✓	✓	✓
Fine pitch (without shim)	✓	✓	△ (Feed rate is recommended under fz=0.3mm/t)
Extra fine pitch (without shim)	✓	✓	N/A

Vertical milling (Plunging)



Cutting Dia.	Max. Width of Cut (ae)
All items	8mm

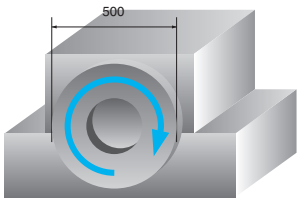
Cutter type and chipbreaker selection

Milling Purpose	Cutter Type			Chipbreaker			
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL
General milling for steel and alloy steel		●		●			
Steel and alloy steel (at chattering due to low rigidity machine or poor clamping power)	●				●		
Productivity oriented (Running cost decrease) (ap=4mm and over, fz=0.25mm/t and over)	●					●	
Surface finish oriented	●	●					●
General milling of stainless steel		●			●		
Stainless steel (at chattering due to low rigidity machine or poor clamping power)	●				●		
Cast Iron (for processing efficiency improvement)			●	●			
Cast Iron (ap=4mm and over, fz=0.25mm/t and over)	●					●	

Case Studies

FC300

- Machine Part
- Vc=170m/min
- ap×ae=2.5×130mm
- fz=0.183mm/t (Vf=500mm/min)
- Wet
- MFWN90160R-8T (8 inserts)
- WNMU080608EN-GM (PR1510)

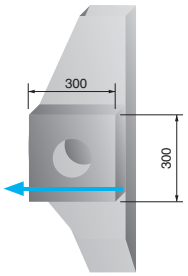


PR1510	Chip Evacuation Rate = 163cc/min
Competitor A (Positive Cutter)	Chip Evacuation Rate = 68cc/min

Competitor A proceeded machining under low cutting conditions, as the workpiece was slipping because of the unstable chucking.
With MFWN, stable machining was possible at higher cutting conditions.
(Evaluation by the user)

Manganese Steel

- Construction machine part
- Vc=150m/min
- ap×ae=1×100mm
- fz=0.2mm/t (Vf=668mm/min)
- Dry
- MFWN90100R-7T (7 inserts)
- WNMU080608EN-GM (PR1525)



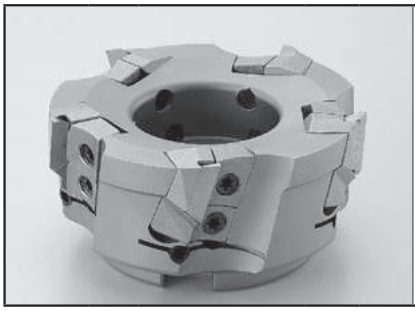
PR1525	Machining efficiency: 2 pcs/edge
Competitor B (Negative Cutter) (Vertical inserts)	1 pc/edge

Despite instability with the long overhang of the workpiece, MFWN doubled tool life, improving the efficiency by 150%.
(Evaluation by the user)

Easy edge adjustment MTE90

Shouldering | Slotting | Facing

MTE90-SF Face Mill (Easy edge adjustment)



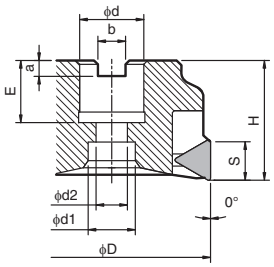


Fig.1

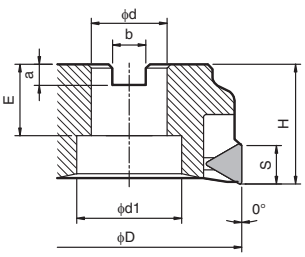


Fig.2

Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)									Rake Angle		Drawing	Weight (kg)
				φD	φd	φd1	φd2	H	E	a	b	S	A.R.	R.R.		
Bore Dia. Inch spec	MTE 90080R-4T-SF	○	4	80	25.4	20	13	50	26	6	9.5	17	+17°	+3°	Fig.1	1.0
	90100R-5T-SF	○	5	100	31.75	45	-		32	8	12.7			+4°	Fig.2	1.5
	90125R-6T-SF	○	6	125	38.1	55		63	38	10	15.9			+5°		3.0

Spare Parts

Description	Cartridge	Clamp	Clamp	Clamp Screw	Adjustment Screw	Wrench	Wrench
MTE 90○○○R-○T-SF	LTE-490SR	C91R (for Insert)	C92R (for Cartridge)	W8X16	SV-60136R	TTC-25	LW-4 (for adjustment screw)

· Mounting bolt (HH12X35M) is included for MTE90080R-4T-SF.

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)					
		Cermet	MEGACOAT		PVD Coated Carbide	Carbide	PCD
		TN100M	PR1225	PR1210	PR830	KW10	KPD001 (KPD010)
Carbon Steel	~0.25	★ 120~200	★ 120~250	-	☆ 120~200	-	-
Alloy Steel	~0.25	★ 100~180	★ 100~220	-	☆ 100~180	-	-
Mold Steel	~0.20	★ 100~180	★ 80~180	-	☆ 80~150	-	-
Stainless Steel	~0.20	☆ 120~200	★ 120~220	-	☆ 120~200	-	-
Cast Iron	~0.25	-	-	★ 100~220	-	☆ 80~150	-
Non-ferrous Metals	~0.20	-	-	-	-	★ 100~300	★ 300~800

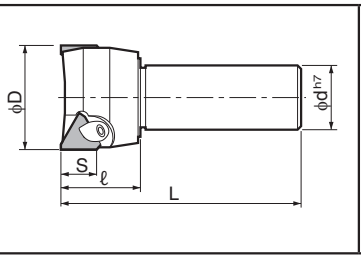
★:1st Recommendation ☆:2nd Recommendation

How to Adjust Cutting Edge height

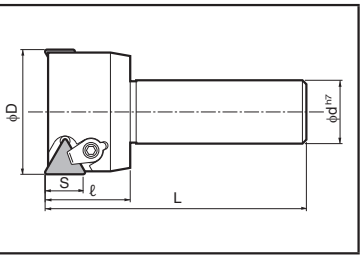
For adjustment method of edge height, ref. to page ➡ M41

○ : Check Availability

MTE90 with cylindrical shank (High Rake)



MTP90 with cylindrical shank



Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) φD	φd	L	ℓ	S	Rake Angle A.R.	R.R.	Spare Parts: Clamp	Clamp	Clamp screw	Wrench	Shim	Shim Clamp Screw
MTE	9050	○	3	50	32	120	40	17	+13°	+3°	-	CP-8TE	W8X18	LW-4	MTE-42	SP3X8
	9063	○	3	63						+5°						
	9080-32	○	4	80					+16°	+6°						
MTP	9050	●	3	50	32	130	43	18	+8°	0°	CP-8W	-			KPT-42	
	9063	●	3	63												

Applicable Inserts

Description	Applicable Inserts → M12			Applicable Inserts → M25
MTE 90...	TEMR 2204PTER-H	TEKR 2204PTER-S	TEEN 2204PTTR TEKN 2204PTTR 2204PTFR	TEKN 2204PTFR-NE 2204PTFR (PCD)
MTP 90...	TPMR 2204PDER-H	TPKR 2204PDER-S	TPKN 2204PDTR 2204PDFR	-

Recommended Cutting Conditions → M94

● : Std. Item
○ : Check Availability

MSO90 Face Mill (Coarse pitch / Fine pitch)

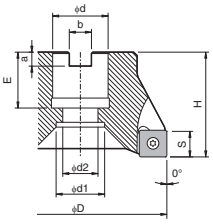


Fig.1

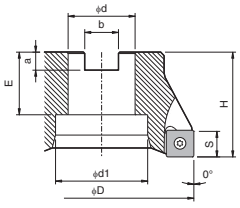


Fig.2

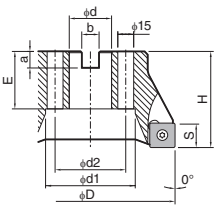


Fig.3

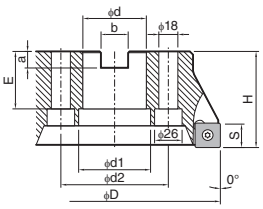


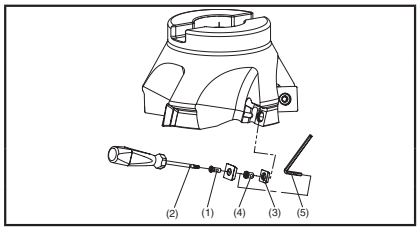
Fig.4

Toolholder Dimensions

Description			Std.	No. of Inserts	Dimension (mm)									Rake Angle		Drawing	Weight (kg)
					φD	φd	φd1	φd2	H	E	a	b	S	A.R.	R.R.		
Metric	Coarse pitch	MSO 90063R-15-4T-M	○	4	63	22	17	11	50	21	6.3	10.4	13	+15°	-9.5°	Fig.1	0.6
		90080R-15-4T-M	○	4	80	27	20	14		24	7	12.4			-9°		0.8
		90100R-15-5T-M	○	5	100	32	48	-	60	32	8	14.4			-8.5°	Fig.2	1.3
		90125R-15-6T-M	○	6	125	40	59			33	9	16.4			-8°		2.3
		90160R-15-7T-M	○	7	160		81	66.7	63	30					-7.5°	Fig.3	4.1
		90200R-15-9T-M	○	9	200	60	68	101.6		32	14	25.7			-7.5°	Fig.4	7.1
	Fine pitch	MSO 90063R-15-5T-M	○	5	63	22	17	11	50	21	6.3	10.4	13	+15°	-9.5°	Fig.1	0.6
		90080R-15-6T-M	○	6	80	27	20	14		24	7	12.4			-9°		0.8
		90100R-15-6T-M	○	6	100	32	48	-	60	32	8	14.4			-8.5°	Fig.2	1.3
		90125R-15-7T-M	○	7	125	40	59			33	9	16.4			-8°		2.3
		90160R-15-9T-M	○	9	160		81	66.7	63	30					-7.5°	Fig.3	4.1
		90200R-15-11T-M	○	11	200	60	68	101.6		32	14	25.7			-7.5°	Fig.4	7.1
Bore Dia. Inch spec	Coarse pitch	MSO 90080R-15-4T	○	4	80	25.4	20	13	50	26	6	9.5	13	+15°	-9°	Fig.1	0.8
		90100R-15-5T	○	5	100	31.75	48	-	60	32	8	12.7			-8.5°	Fig.2	1.3
		90125R-15-6T	○	6	125	38.1	59			38	10	15.9			-8°		2.3
		90160R-15-7T	○	7	160	50.8	68		63		11	19.1			-7.5°		4.1
		90200R-15-9T	○	9	200	47.625		101.6			14	25.4			-7.5°	Fig.4	7.1
	Fine pitch	MSO 90080R-15-6T	○	6	80	25.4	20	13	50	26	6	9.5	13	+15°	-9°	Fig.1	0.8
		90100R-15-6T	○	6	100	31.75	48	-	60	32	8	12.7			-8.5°	Fig.2	1.3
		90125R-15-7T	○	7	125	38.1	59			38	10	15.9			-8°		2.3
		90160R-15-9T	○	9	160	50.8	68		63		11	19.1			-7.5°		4.1
		90200R-15-11T	○	11	200	47.625		101.6			14	25.4			-7.5°	Fig.4	7.1

Spare Parts

Description	(1)Clamp Screw	(2)Wrench	(3)Shim	(4)Shim Clamp Screw	(5)Wrench
MSO 90○○○R-15-○T-M	SB-45130TR	DTP-20	MSO-5200	SPW-6045	LW-4.5 (for Shim Clamp Screw)
MSO 90○○○R-15-○T					



· Mounting bolt (HH12X35M) is included for MSO90080R-15-○T-M and MSO90080R-15-○T
· Mounting bolt (HH10X30S) is included for MSO90063R-15-○T-M

Applicable Inserts

Description	Applicable Inserts → M22
MSO90○○○R-15...	SEMM150408PESR

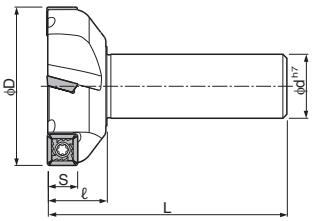
Recommended Cutting Conditions

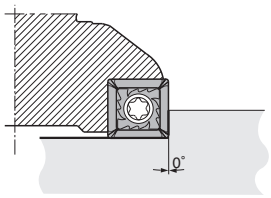
Workpiece Material	Feed Rate fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)				
		Cermet	MEGACOAT		PVD Coated Carbide	Carbide
		TN100M	PR1225	PR1210	PR830	KW10
Carbon Steel	~0.20	★ 120~200	★ 120~250	-	☆ 120~200	-
Alloy Steel	~0.20	★ 100~180	★ 100~220	-	☆ 100~180	-
Mold Steel	~0.20	★ 100~180	★ 80~180	-	☆ 80~150	-
Stainless Steel	~0.20	☆ 120~200	★ 120~220	-	☆ 120~200	-
Cast Iron	~0.20	-	-	★ 100~220	-	☆ 80~150
Non-ferrous Metals	~0.20	-	-	-	-	★ 100~300

★:1st Recommendation ☆:2nd Recommendation

○ : Check Availability

MSO90-S with cylindrical shank



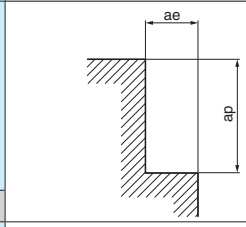
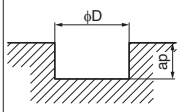
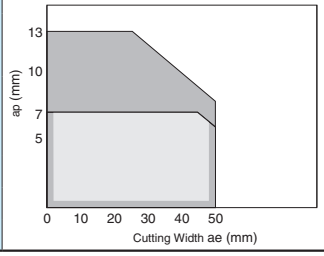
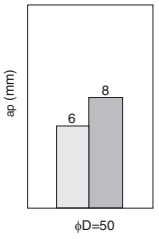


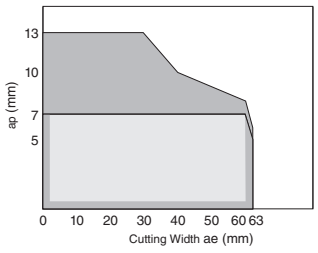
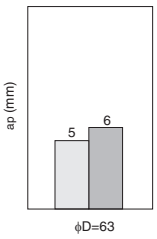
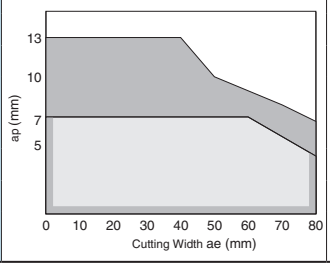
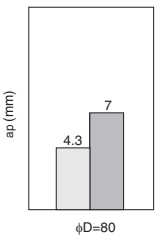
Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) φD	φd	L	ℓ	S		Rake Angle A.R.	R.R.	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts → M22
MSO	9050-S32-09	○	3	50	32	120	30	7		+12°	-9°	SB-3080TR	DT-10	SEMM 09T308PESR
	9063-S32-09	○	4	63										
	9080-S32-09	○		80							-7°			
MSO	9050-S32-15	○	3	50	32	120	30	13		+15°	-10°	SB-5085TR	DT-20	SEMM 150408PESR
	9063-S32-15	○	4	63							-9°			
	9080-S32-15	○		80							-8°			

Cutting Performance

[Cutting Conditions] Vc=100m/min, fz=0.15mm/t, Dry

Workpiece Material	Shouldering	Slotting
S50C		
Description		
MSO-9050-S32-○○ Insert Size: 09 type, 15 type		

Description	Shouldering	Slotting
MSO-9063-S32-○○ Insert Size: 09 type, 15 type		
MSO-9080-S32-○○ Insert Size: 09 type, 15 type		

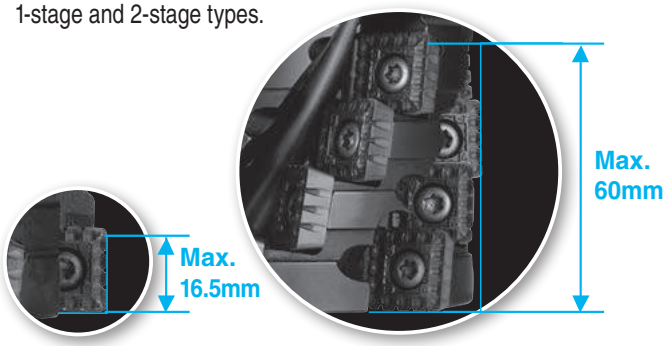
○ : Check Availability

Heavy Milling Cutter MSRS90

+

● **Wide selection of cutting edge length according to cutting conditions**

4-stage type (ϕ80, ϕ100) is added to the standard lineup as well as 1-stage and 2-stage types.



● **High efficiency, low cutting force and stable machining without chatter**

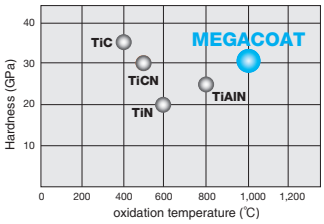
● **Neutral and corner-R insert**

Applicable to shouldering (cutting angle: 90°),
high feed milling (cutting angle: 30°), plunging, and side cutter.

Custom-ordered milling cutter with high performance notched neutral inserts provides various applications

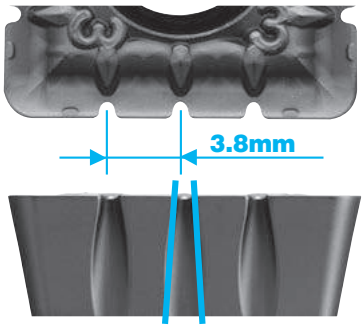
Neutral insert with corner-R is available to various applications

Long tool life: MEGACOAT



High hardness and
high oxidation resistance
Long tool life: MEGACOAT

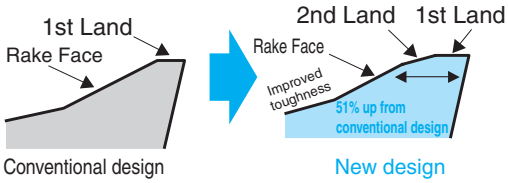
Notched insert SPMT180616EN type



The notched insert breaks chips into small pieces and reduces cutting force.

The second land near the cutting edge improves edge strength.

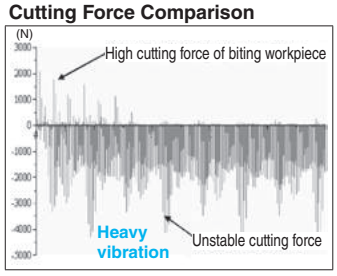
For neutral (Right / Left) hand
Applicable for various cutting angles.
Cutting edge length: 18mm



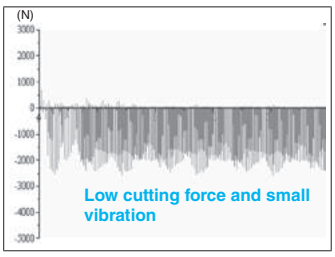
Edge preparation

● **Low cutting force (Notched insert benefit)**

Cutting Force Comparison



Competitor A



MSRS90

Notched insert realizes lower cutting force and smaller vibration

Tapered cutter

Vertical Milling (Plunging) cutter

45° Face Mill

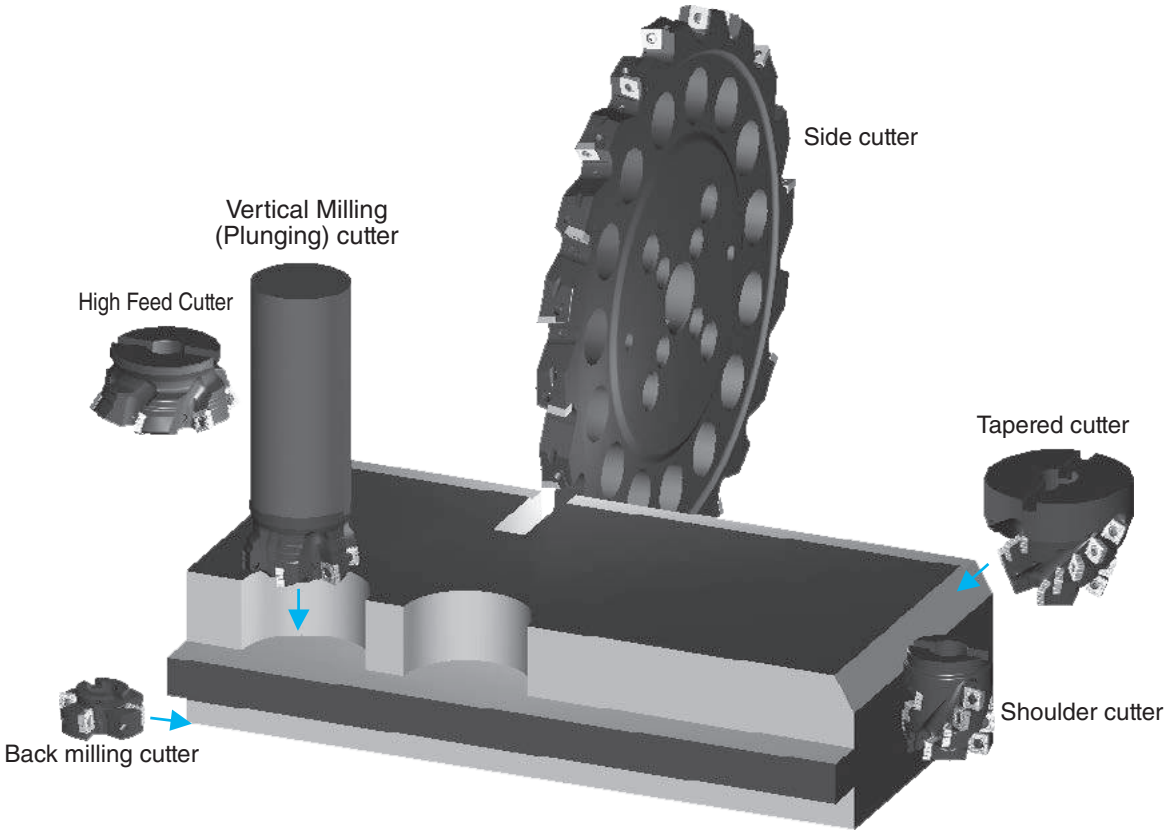
High Feed Cutter

Shoulder cutter

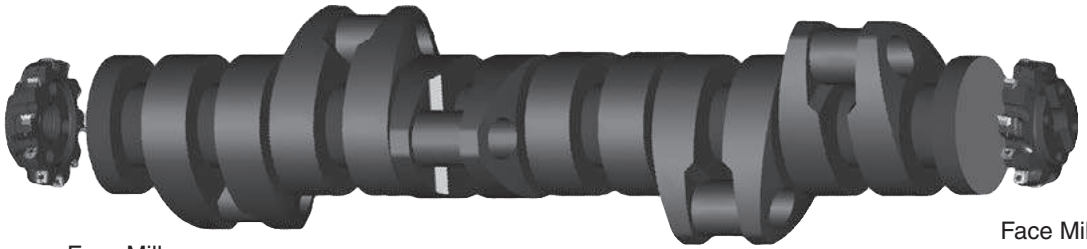
Applicable Inserts: Available for various applications

Applications	Chipbreaker selection	3-Notched	4-Notched	Without notch
General purpose	Standard	NB3 +	NB4	
Low Cutting Force	Low Cutting Force	NB3P +	NB4P	
Edge Strength Oriented	Without notch (Usable with notched inserts)	(NB3 or	NB4) +	

Various expansive possibilities (Custom-ordered and standard milling cutter)

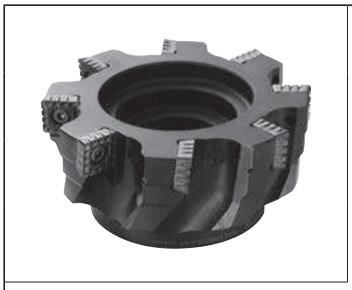


Shaft length determination



The custom-ordered milling cutter can be customized for your requirements such as diameter, cutting angle, number of insert stages.

MSRS90



Rake Angle	
A.R.	R.R.
+7°	-10°

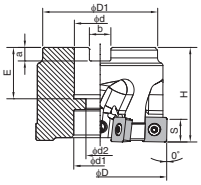


Fig.1

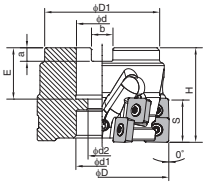


Fig.2

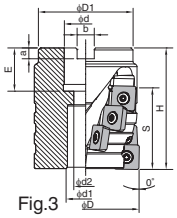


Fig.3

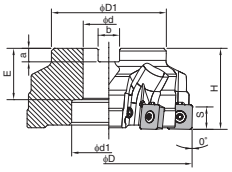


Fig.4

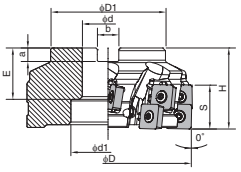


Fig.5

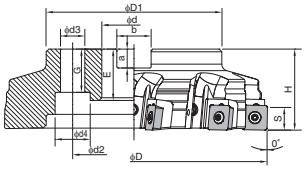


Fig.6

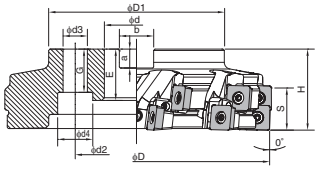


Fig.7

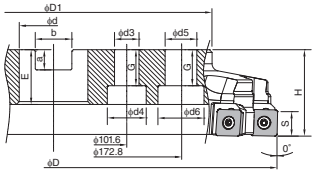


Fig.8

Toolholder Dimensions

Description			Std.	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm)															Drawing	Weight (kg)
							ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S	ϕd3	ϕd4	ϕd5	ϕd6	G		
Metric	MSRS	90080R-1-4T-M	●	4	4	1	80	70	27	20	13	60	24	7	12.4	16.5	-	-	-	-	-	Fig.1	1.3
		90080R-2-4T-M	●	8		2										31						Fig.2	1.1
		90080R-4-4T-M	●	16		4						85				60						Fig.3	1.4
		90100R-1-6T-M	●	6	6	1	100	85	32	45	-	70	30	8	14.4	16.5						Fig.1	2.2
		90100R-2-6T-M	●	12		2										31						Fig.2	2.0
		90100R-4-6T-M	MTO	24		4						90				60						Fig.3	3.1
		90125R-1-8T-M	●	8	8	1	125		40	55		60	33	9	16.4	16.5						Fig.4	2.6
		90125R-2-8T-M	MTO	16		2										31						Fig.5	2.4
		90160R-1-8T-M	●	8	8	1	160	110			66.7					16.5	14	20	-	-	28	Fig.6	4.2
		90160R-2-8T-M	MTO	16		2										31						Fig.7	4.0
		90200R-1-10T-M	●	10	10	1	200	140	60	-	101.6		40	14	25.7	16.5	18	26	-	-	32	Fig.6	6.7
		90200R-2-10T-M	MTO	20		2										31						Fig.7	6.6
		90250R-1-12T-M	●	12	12	1	250									16.5						Fig.6	12.6
		90250R-2-12T-M	MTO	24		2										31						Fig.7	12.5
		90315R-1-14T-M	●	14	14	1	315	220			-					16.5	17	27	22	32	25	Fig.8	16.1
		90315R-2-14T-M	MTO	28		2										31						-	16.0
Bore Dia. Inch spec	MSRS	90080R-1-4T	○	4	4	1	80	70	31.75	27	18	60	32	8	12.7	16.5	-	-	-	-	-	Fig.1	1.4
		90080R-2-4T	○	8		2										31						Fig.2	1.2
		90080R-4-4T	○	16		4						85				60						Fig.3	1.5
		90100R-1-6T	○	6	6	1	100	85	38.1	39	21	70	38	10	15.9	16.5						Fig.1	2.3
		90100R-2-6T	○	12		2										31						Fig.2	2.1
		90100R-4-6T	MTO	24		4						90				60						Fig.3	3.2
		90125R-1-8T	○	8	8	1	125			55	-	60				16.5						Fig.4	2.6
		90125R-2-8T	MTO	16		2										31						Fig.5	2.4
		90160R-1-8T	○	8	8	1	160	100	50.8	70				11	19.1	16.5						Fig.4	4.3
		90160R-2-8T	MTO	16		2										31						Fig.5	4.1
		90200R-1-10T	○	10	10	1	200	130	47.625	-	101.6			14	25.4	16.5	18	26	-	-	32	Fig.6	6.7
		90200R-2-10T	MTO	20		2										31						Fig.7	6.6
		90250R-1-12T	○	12	12	1	250									16.5						Fig.6	12.6
		90250R-2-12T	MTO	24		2										31						Fig.7	12.5
		90315R-1-14T	○	14	14	1	315	220			-					16.5	17	27	22	32	25	Fig.8	16.1
		90315R-2-14T	MTO	28		2										31						-	16.0

● : Std. Item
MTO : Made to order

Applicable Inserts

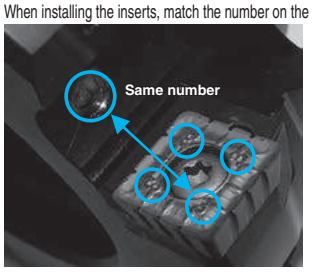
Description	Applicable Inserts ➔ M24				
	3-Notched	4-Notched	3-Notched / Low Cutting Force	4-Notched / Low Cutting Force	Without notch
MSRS90…	**SPMT180616EN-NB3**	**SPMT180616EN-NB4**	**SPMT180616EN-NB3P**	**SPMT180616EN-NB4P**	**SPMT180616EN-V**

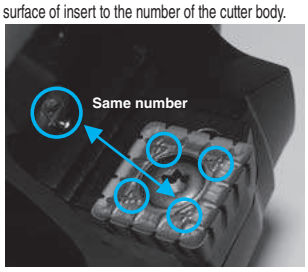
Caution when installing Notched Insert

It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body. For MSRS90, Notched Insert location indicator is marked at insert installed pocket of the cutter body.

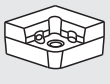
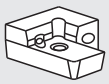
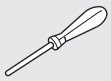
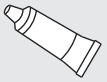
Description		No. of Inserts	No. of Flutes	No. of Stages	No. of Inserts Notched	
					NB3(P)	NB4(P)
MSRS	90100R-1-6T	6	6	1	3	3
	90100R-2-6T	12		2	6	6
	90100R-4-6T	24		4	12	12

When installing the inserts, match the number on the top surface of insert to the number of the cutter body.





Spare Parts

Description		Spare Parts							
		Clamp Screw	Wrench	Cartridge		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
				MAP-1806M 	MAP-1806S  (Bottom edge only)				
Without cartridge	MSRS 90080R-○-4T-M	SB-60120TR for Insert Clamp Recommended tightening torque 7.5N·m	TT-25L	-	-	-	-	MP-1	HH12X35
	90100R-○-6T-M								-
	90125R-○-8T-M								
With cartridge	MSRS 90160R-○-8T-M ~ 90315R-○-14T-M			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		
				for Cartridge Clamp Recommended tightening torque 3.5N·m					
Without cartridge	MSRS 90080R-○-4T			-	-	-	-		HH16X45
	90100R-○-6T								HH20X55
	90125R-○-8T								
With cartridge	MSRS 90160R-○-8T ~ 90315R-○-14T			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		-
				for Cartridge Clamp Recommended tightening torque 3.5N·m					

Notes) *1: MAP-1806M is only for the bottom edge (1st stage) of MSRS90..R-1.
*2: MAP-1806S is only for the bottom edge (1st stage) of MSRS90..R-2... Use it only for the bottom edge (1st stage).

How to attach the cartridge : You need to tighten 2 clamp screws to fix the cartridge. Tighten the slant screw first and then tighten the other screw.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Cutting Speed Vc (m/min)	
	Standard NB3 + NB4	Low Cutting Force NB3P + NB4P	MEGACOAT	
			PR1230	**PR1210**
Soft Steel	0.1~0.2~0.25	0.1~0.2~0.25	★ 120~150~220	☆ 120~150~220
Carbon Steel	0.1~0.2~0.25	0.1~0.2~0.25	★ 100~150~200	☆ 100~150~200
Alloy Steel	0.1~0.15~0.2	0.1~0.15~0.2	★ 100~150~200	☆ 100~150~200
Mold Steel	0.1~0.15~0.2	0.1~0.12~0.15	★ 100~150~180	☆ 100~150~180
Gray Cast Iron	0.1~0.2~0.3	0.1~0.2~0.25	☆ 100~180~250	★ 100~180~250
Nodular Cast Iron	0.1~0.2~0.25	0.1~0.18~0.2	☆ 100~180~220	★ 100~180~220
Stainless Steel	Not recommended			
Aluminum / Copper	Not recommended			

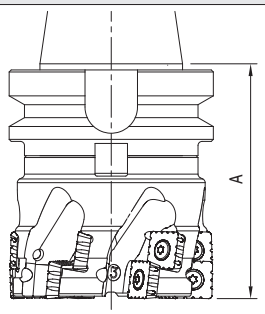
★:1st Recommendation ☆:2nd Recommendation

Cutting Conditions (Shouldering)

In case of MSRS90100R-1-6T

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		apxae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 120mm	180	0.2	15x80	826
	120~200mm	180	0.2	15x40	413
	201mm and over	230	0.1	15x40	263
Carbon Steel	Less than 120mm	150	0.2	15x80	689
	120~200mm	150	0.2	15x40	344
	201mm and over	200	0.1	15x40	229

Overhang Length A (mm)



In case of MSRS90100R-2-6T

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		apxae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 120mm	180	0.2	30x50	1,032
	120~200mm	180	0.2	30x30	619
	201mm and over	230	0.1	30x25	329
Carbon Steel	Less than 120mm	150	0.2	30x50	861
	120~200mm	150	0.2	30x30	517
	201mm and over	200	0.1	30x25	287

In case of MSRS90100R-4-6T

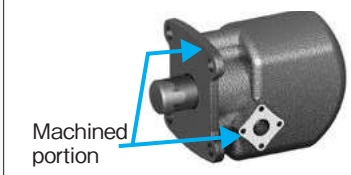
Workpiece Material	Overhang Length A (mm)	Cutting Conditions		apxae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 140mm	180	0.2	60x20	826
	140~200mm	180	0.2	60x10	413
	201mm and over	230	0.1	60x10	263
Carbon Steel	Less than 140mm	150	0.2	60x20	689
	140~200mm	150	0.2	60x10	344
	201mm and over	200	0.1	60x10	229

Case Studies

FCD450

Industrial parts
·Vc=150m/min
·apxae=6x65mm
·fz=0.15mm/t
(Vf=430mm/min)

MSRS90100R-1-6T (ϕ100 ·6 inserts)
SPMT180616EN-NB3 / NB4
(PR1210)



MSRS90(PR1210)	Chip Evacuation Rate = 258cc/min
Competitor B	107cc/min

·MSRS90 more than doubled the machining efficiency compared with competitor B.
·Competitor B machined with 2 passes (apxae=3x65mm).
MSRS90 machined with only 1 pass.
·Cutting time was reduced. (Evaluation by the user)

SCM420

Construction machine part
·Vc=200m/min
·apxae=10x50mm
·fz=0.1mm/t
(Vf=400mm/min)

MSRS90125R-1-8T (ϕ125 ·8 inserts)
SPMT180616EN-NB3 / NB4
(PR1230)

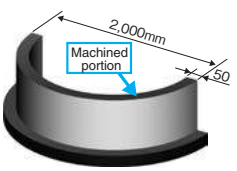
MSRS90(PR1230)	Chip Evacuation Rate = 200cc/min
Competitor C	153cc/min

·MSRS90 improved the machining efficiency to 1.3 times that of competitor C.
·Competitor C machined with apxae=5x50mm
·Tool cost is reduced to 1/3 although competitor C is expensive using 2-corner insert.
MSRS90 reduced machining cost as well as improved machining efficiency. (Evaluation by the user)

SKD

Shipbuilding parts
·Vc=150m/min
·apxae=10x10~50mm
·fz=0.1mm/t
(Vf=240mm/min)

MSRS90160R-1-8T (ϕ160 ·8 inserts)
SPMT180616EN-NB3 / NB4
(PR1230)



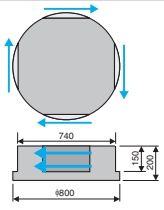
MSRS90(PR1230)	Chip Evacuation Rate = 120cc/min
Competitor D	60cc/min

·MSRS90 more than doubled the machining efficiency compared with competitor D.
·Competitor D machined with apxae=5x10~50mm
Low cutting force of MSRS90 enabled twice as large ap as that of competitor.
·It can double the ap as well as increase the cutting speed (Vc=100 ⇒150).
⇒Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time). (Evaluation by the user)

SNCM

Power generation parts
·Vc=160m/min
·apxae=10x0~20mm
·fz=0.15mm/t
(Vf=500mm/min)

MSRS90125R-1-8T (ϕ125 ·8 inserts)
SPMT180616EN-NB3 / NB4
(PR1230)



MSRS90(PR1230)	12 surfaces/edge
Competitor E	8 surfaces/edge

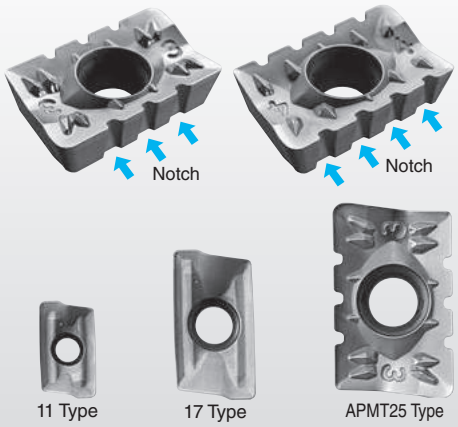
·MSRS90 showed 1.5 times longer tool life than that of competitor E.
·Competitor E machined with 2 passes on a side (apxae=12x0 to 10mm).
Competitor E was poor in feed rate (Vf=400mm/min). ⇒Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time).
·Although competitor E is load due to high cutting force. MSRS90 operates fairly quietly. (Evaluation by the user)

Heavy Milling Cutter MSR

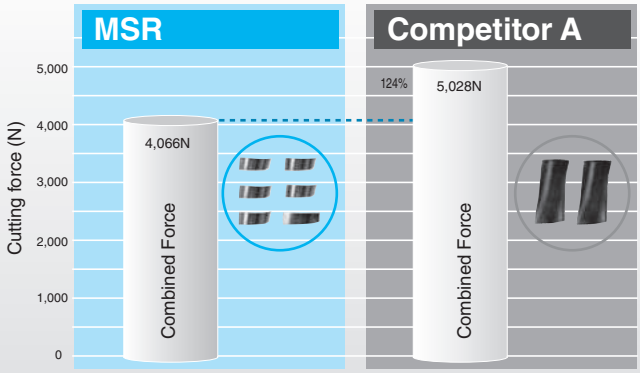
Notched insert reduces cutting force, and enables high feed rates by reducing chattering.
Improved chip evacuation and low cutting force due to the special chipbreaker.
Enables heavy milling and deep cutting, and also drastically improves machining efficiency. (Reduction of cutting time)

Notched Insert

Size Comparison (Full-Scale)

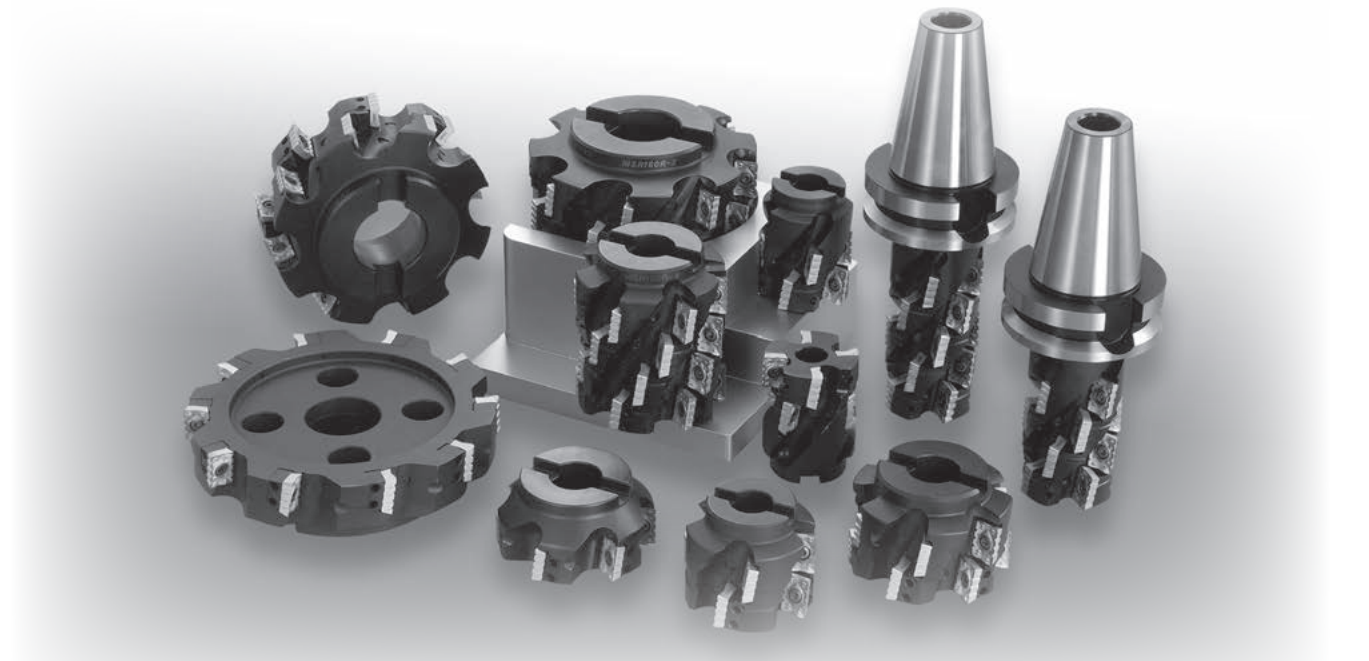


Cutting Force Comparison



* The exclusive notched chipbreaker provides low cutting force and good chip evacuation.

(Internal evaluation)



Shouldering | Slotting | Facing

* Not recommended for 4 stages type

MSR

Rake Angle
ϕ63~ϕ80 A.R.:+9° R.R.:-8°
ϕ100~ A.R.:+9° R.R.:-5°

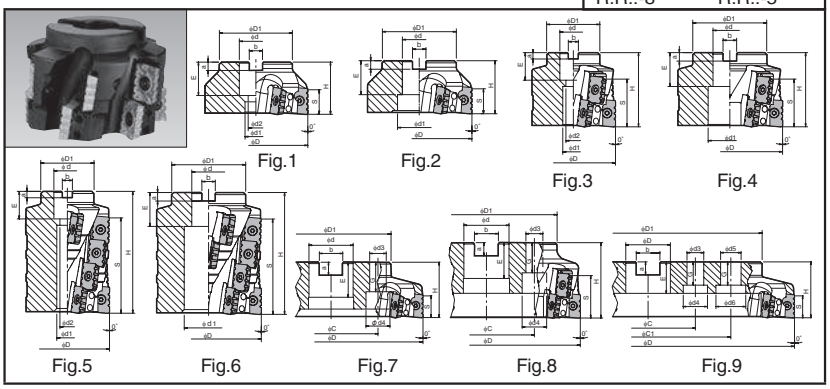


Fig.1 Fig.2 Fig.3 Fig.4 Fig.5 Fig.6 Fig.7 Fig.8 Fig.9

Spare Parts (Bore ϕd: common to Inch type / Metric type)

Description	Spare Parts					
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-○□	SB-60120TR	TT-25L	MAP-2506	SB-40140TR	DT-15	MP-1
MSR 080R-○□ ~ 315R-○□	for Insert Clamp		for Shim Clamp			

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Toolholder Dimensions (Metric)

Description	Std.	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm) ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S	ϕd3	ϕd4	ϕd5	ϕd6	ϕC	ϕC1	G	Drawing	Weight (kg)
MSR 063R-1M	●	4	4	1	63	50	27	20	14	65	22	7.2	12.4	23.5	-	-	-	-	-	-	-	Fig.1	0.7
063R-2M	●	8		2						85				45								Fig.3	0.9
080R-1M	●	4	4	1	80	55	27	20	14	50	22	7.2	12.4	23.5	-	-	-	-	-	-	-	Fig.1	1.0
080R-2M	●	8		2						70				45								Fig.3	1.5
080R-4M	●	16		4						115				90								Fig.5	2.5
100R-1M	●	6	6	1	100	70	32	42	-	50	28	8	14.4	23.5	-	-	-	-	-	-	-	Fig.2	1.5
100R-2M	●	12		2						70				45								Fig.4	2.0
100R-4M	●	24		4						115				90								Fig.6	3.2
125R-1M	●	6	6	1	125	85	40	58	-	60	30	9	16.4	23.5	-	-	-	-	-	-	-	Fig.2	3.4
125R-2M	●	12		2						70				45								Fig.4	3.7
125R-4M	●	24		4						115				90								Fig.6	6.0
160R-1M	●	8	8	1	160	100	40	68	-	60	30	10	16.4	23.5	-	-	-	-	-	-	-	Fig.2	6.1
160R-2M	●	16		2						70				45								Fig.4	6.8
200R-1M	●	10	10	1	200	130	60	-	-	60	38	15	25.4	23.5	18	26	-	-	101.6	-	32	Fig.7	7.0
200R-2M	●	20		2						80				45								Fig.8	9.9
250R-1M	●	12	12	1	250	130	60	-	-	60	38	15	25.4	23.5	18	26	-	-	101.6	-	32	Fig.7	10.3
250R-2M	●	24		2						80				45								Fig.8	14.2
315R-1M	MTO	14	14	1	315	230	60	-	-	60	35	15	25.4	23.5	17	27	22	32	101.6	177.8	25	Fig.9	15.5

· Shim is not available for MSR063R (ϕD=63).
· Mounting bolt (HH12X35) is included for MSR063R / MSR080R.
· It is not recommended using only top edge part (under ap=30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
· Deep slotting is not recommended for this cutter.

Toolholder Dimensions (Bore Dia. ϕd: Inch spec)

Description	Std.	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm) ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S	ϕd3	ϕd4	ϕd5	ϕd6	ϕC	ϕC1	G	Drawing	Weight (kg)
MSR 063R-1	○	4	4	1	63	50	25.4	20	14	65	26	6	9.5	23.5	-	-	-	-	-	-	-	Fig.1	0.8
063R-2	○	8		2						85				45								Fig.3	1.0
080R-1	○	4	4	1	80	55	25.4	20	14	50	26	6	9.5	23.5	-	-	-	-	-	-	-	Fig.1	1.1
080R-2	○	8		2						70				45								Fig.3	1.6
080R-2-31.75	○					70	31.75	27	18		32	8	12.7									Fig.3	1.7
080R-4	○	16		4		55	25.4	20	14	115	26	6	9.5	90								Fig.5	2.6
080R-4-31.75	○					70	31.75	27	18		32	8	12.7									Fig.5	2.7
100R-1	○	6	6	1	100	70	31.75	42	-	50	32	8	12.7	23.5	-	-	-	-	-	-	-	Fig.2	1.6
100R-2	○	12		2						70				45								Fig.4	2.2
100R-4	○	24		4						115				90								Fig.6	3.6
125R-1	○	6	6	1	125	85	38.1	54	-	60	38	10	15.9	23.5	-	-	-	-	-	-	-	Fig.2	3.5
125R-2	○	12		2						70				45								Fig.4	3.8
125R-4	○	24		4						115				90								Fig.6	6.1
160R-1	○	8	8	1	160	100	50.8	68	-	60	38	11	19.0	23.5	-	-	-	-	-	-	-	Fig.2	5.8
160R-2	○	16		2						70				45								Fig.4	6.4
160R-4	○	32		4						115				90								Fig.6	10.7
200R-1	○	10	10	1	200	130	47.625	-	-	60	38	14	25.4	23.5	18	26	-	-	101.6	-	32	Fig.7	7.5
200R-2	○	20		2						80				45								Fig.8	10.4
250R-1	○	12	12	1	250	130	47.625	-	-	60	38	14	25.4	23.5	18	26	-	-	101.6	-	32	Fig.7	10.9
250R-2	○	24		2						80				45								Fig.8	14.7
315R-1	MTO	14	14	1	315	220	47.625	-	-	60	35	14	25.4	23.5	17	27	22	32	101.6	177.8	25	Fig.9	16.0

· Shim is not available for MSR063R (ϕD=63).
· Mounting bolt (HH12X40) is included for MSR063R and MSR080R. Mounting bolt (HH16X45) is included for MSR080R-○-31.75.
· It is not recommended using only top edge part (under ap=30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
· Deep slotting is not recommended for this cutter.

● : Std. Item
MTO : Made to order

MSR-BT50

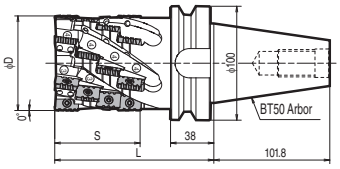


Fig.1

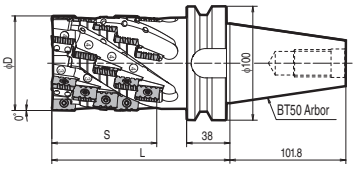


Fig.2

Toolholder Dimensions (BT50 Integral Arbor type)

Description		Std.	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm)			Rake Angle		Drawing	Weight (kg)	Spare Parts					
						φD	L	S	A.R.	R.R.			Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR	063R-BT50-4	●	16	4	4	63	160	90	+9°	-8°	Fig.1	5.7	SB-60120TR for Insert Clamp	TT-25L	-	-	-	MP-1
	063R-BT50-5	●	20		5		180	111			Fig.2	6.2						
	080R-BT50-4	●	16	4	4	80	160	90			Fig.1	6.9			MAP-2506	SB-40140TR for Shim Clamp	DT-15	
	080R-BT50-5	●	20		5		180	111			Fig.2	7.4						
	100R-BT50-4	●	24	6	4	100	160	90	+9°	-5°	Fig.1	9.6						
	100R-BT50-5	●	30		5		180	111			Fig.2	10.5						

· Shim is not available for MSR063R (φ D=63).
· It is not recommended using only top edge part (under ap=30mm) for 4 stages / 5 stages type. If ap is small, use previous page's 1 stage type or 2 stages type.
· Deep slotting is not recommended for this cutter.

Applicable Inserts

Description	Applicable Inserts ➔ M18 (Handed Insert shows Right-hand)			
	3-Notched	4-Notched	3-Notched / Low Cutting Force	4-Notched / Low Cutting Force
MSR… MSR…M	APMT 2506○○ER-NB3	APMT 2506○○ER-NB4	APMT 250616ER-NB3P	APMT 250616ER-NB4P
For custom-ordered cutter	APMT 250616EL-NB3	APMT 250616EL-NB4	–	–

Recommended Cutting Conditions ➔ M106

Caution when installing Notched Insert

It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body.
For MSR, Notched Insert location indicator is marked at insert installed area.

Please bear the following in mind when installing inserts to toolholders.
(Indication is marked near the insert pocket for MSR.)

1) (3) is for APMT2506○○ER-NB3
2) (4) is for APMT2506○○ER-NB4

(No. of Inserts - Example)

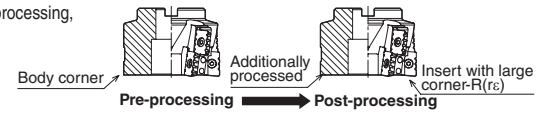
Description		No. of Inserts	No. of Flutes	No. of Inserts	
				Notched	
				NB3	NB4
MSR	100R-1	6	6	3	3
	100R-2	12		6	6
	100R-4	24		12	12

Caution when installing the Insert with Corner-R(rε) 4.0

When using inserts with Corner-R(rε) 4.0mm, additional modifications of the cutter body will be necessary.
Ref. to the table below for the recommended modifications.

Insert Corner-R(rε) (mm)	Additional Processing Dimension to Body Corner (mm)
4.0	R2.0

* Round- shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.



● : Std. Item

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
	Low Cutting Force	General purpose	MEGACOAT		PVD Coated Carbide
	NB3P+NB4P	NB3+NB4	**PR1230**	**PR1210**	**PR830**
Carbon Steel	0.15	0.2	★ 100~**150**~200	-	☆ 100~**150**~180
Cast Iron	0.15	0.2	-	★ 100~**150**~200	-
Stainless Steel	Not recommended				
Aluminum / Copper	Not recommended				

* For MSR, cutting speed should be carefully adjusted depending on the length of toolholder protruding from the end of machine spindle. ★: 1st Recommendation ☆: 2nd Recommendation
- When the overhang length of toolholder is small, ➡ set the cutting speed to slightly higher than the recommended cutting conditions.
- When the overhang length of toolholder is long, ➡ set the cutting speed to slightly lower than the recommended cutting conditions.

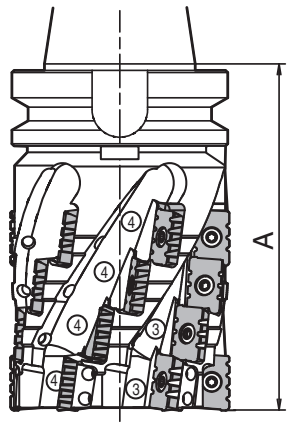
Cutting Conditions

1) Shouldering

In case of MSR100R-1

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	20×80	920
	100~200mm	150	0.2	20×40	460
	201mm and over	100	0.2	20×30	228
Cast Iron	Less than 100mm	180	0.2	20×80	1,100
	100~200mm	180	0.2	20×40	550
	201mm and over	120	0.2	20×30	276

Overhang Length A (mm)



In case of MSR100R-2

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	40×40	920
	130~230mm	150	0.2	40×20	460
	231mm and over	100	0.2	40×20	304
Cast Iron	Less than 130mm	180	0.2	40×40	1,100
	130~230mm	180	0.2	40×20	550
	231mm and over	120	0.2	40×20	368

In case of MSR100R-4

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 180mm	150	0.2	75×20	863
	180~280mm	150	0.2	75×10	431
	281mm and over	100	0.2	75×10	285
Cast Iron	Less than 180mm	180	0.2	75×20	1,035
	180~280mm	180	0.2	75×10	518
	281mm and over	120	0.2	75×10	345

2) Slotting

In case of MSR100R-1

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	7×100	403
	100~200mm	120	0.2	4×100	184
	201mm and over	100	0.2	3×100	114
Cast Iron	Less than 100mm	180	0.2	14×100	966
	100~200mm	150	0.2	7×100	403
	201mm and over	120	0.2	4×100	184

In case of MSR100R-2

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	7×100	403
	130~230mm	120	0.2	4×100	184
	231mm and over	100	0.2	3×100	114
Cast Iron	Less than 130mm	180	0.2	14×100	966
	130~230mm	150	0.2	7×100	403
	231mm and over	120	0.2	4×100	184

In case of MSR160R-1

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	5×160	384
	100~200mm	120	0.2	3×160	182
	201mm and over	100	0.2	2×160	102
Cast Iron	Less than 100mm	180	0.2	10×160	928
	100~200mm	150	0.2	5×160	384
	201mm and over	120	0.2	4×160	243

In case of MSR160R-2

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	5×160	384
	130~230mm	120	0.2	3×160	182
	231mm and over	100	0.2	2×160	102
Cast Iron	Less than 130mm	180	0.2	10×160	928
	130~230mm	150	0.2	5×160	384
	231mm and over	120	0.2	4×160	243

Notes) MSR...-4 (No. of stage)
Slotting is not recommended.

Q&A

Q-1 What cutting conditions are recommended in most cases for MSR?

A-1 Vc=150m/min, fz=0.2mm/t,
larger cutting depth and smaller cutting width

In case of MSR100R-2

e.g.) Load meter 120%

1st Pass	**ap×ae: 15×75mm**
2nd Pass	
3rd Pass	

e.g.) Load meter 90%

3rd Pass	2nd Pass	1st Pass
ap×ae: 45×25mm		✓

Q-2 Required equipment for MSR?

A-2 Max. spindle revolution is under 4,000min^{-1}. BT50 or larger.
* MSR is not only for Double column machining center. The reason why not recommended for high RPM spindle machine is its less torque.
* Although MSR works with BT40 shank, maximum available fz is about 0.1mm/tooth.

Q-3 What is the points to remember in case of less power machine?

A-3 Do not use large size cutters. ⇒ ϕ63 or ϕ80 is recommended
Please increase cutting speed and decrease feed rate.
Set up conditions to get the largest available torque by checking torque curve of the machine.
Tried under condition of Vc=150m/min, enough torque was not gained because of high gear.
In this case, it has to be prioritized using Vc which can exert enough torque as Vc=120m/min.
* Machine torque curve will be prioritized.

Q-4 In case of unstable workpiece.

A-4 Decrease feed ratio at the start machining the workpiece.

*** Almost all cases of moving workpiece happens when start machining.**

◎ Effective for increasing cutting speed and decrease feed rate.
Vc=150m/min, fz=0.2mm/t
↓
Vc=200m/min, fz=0.15mm/t

Q-5 What is the tool life?

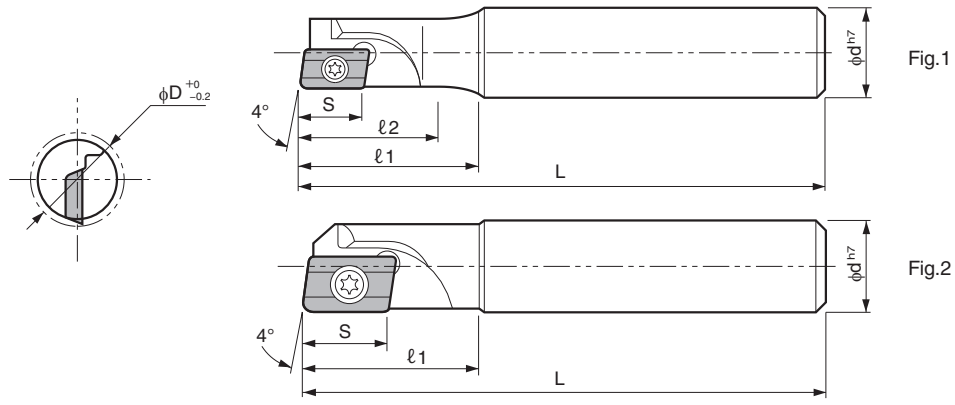
A-5 Chip weight: 700kg/Corner (Result by PR660)
Cutting time: 90min. (calculated value)
Cutting distance: 65m (calculated value)
How great 1,000cc/min? ⇒ About 7.8kg chips removed per minute
Tool life time=700kg (Chip weight)÷7.8kg (Chip evacuation amount per 1min)=90min
Cutting distance=90min (Time by the end of tool life)x717mm/min (Table feed ratio per 1min)=65m
* In case of cutting Vc=150m/min, apxae: 20x70mm, Vf=717mm/min.
* Tool: MSR100R-2 (6 inserts)

Q-6 How to reduce chattering.

A-6 ● **In chattering occurs, then the following conditions are recommended.**
⇒Reduce cutting speed and increase feed rate.

In case of Steel	In case of Cast Iron
·Vc=80m/min	·Vc=80m/min
·fz=0.25mm/t	·fz=0.35mm/t

DMC End Mill



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φD	φd	L	ℓ1	ℓ2	S	Rake Angle A.R.	R.R.	Drawing	Spare Parts Clamp Screw	Wrench
DMC 810-S16	●	1	10	16	90	27	16	8.5	+3°	-11°	Fig.1	SB-2545TR	FT-8
811-S16	●		11							-10°			
812-S16	●		12			31	20		+5°				
813-S16	●		13			28.5				-9°			
814-S16	●		14		100	33.5	25		+6°	-8°			
815-S16	●		15										
816-S16	●	2	16			31				-4°			
818-S20	●		18	20						-3°			
820-S20	●	3	20		120	36	30		+8°	-6°			
822-S25	□		22	25						-5°			
825-S25	●		25			46	40						
DMC 810	●	1	10	10	70	20	-	8.5	+3°	-6°	Fig.2	SB-2545TR	FT-8
812	●		12	12	80	25				-5°			
DMC 014	●	1	14	16	90	25	-	11.0	+3°	-4°	Fig.2	SB-3060TR	FT-10
016	●		16						+4°	-2°			
020	●	2	20	20	110	30			+5°	0°			

Applicable Inserts

Description	Applicable Inserts M20	
DMC8○○(-S○○)	NDCT 090204TR 090204FR	NDMM 090204ER-SP
DMC0○○	NDCT 120208TR 120208FR	NDMM 120204ER-SP 120208ER-SP

Recommended Cutting Conditions M110

● : Std. Item
□ : Deleted from the next catalogue

DMC-SX End Mill

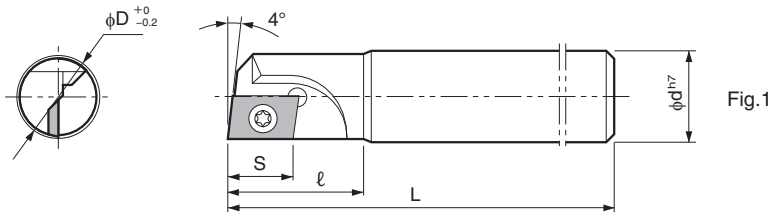


Fig.1

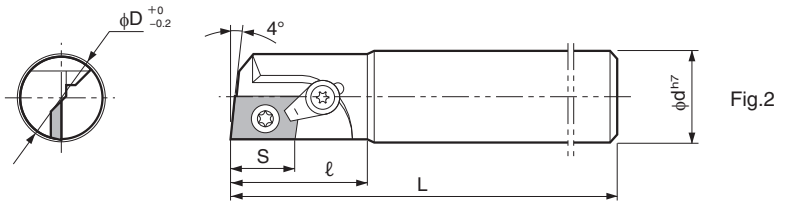


Fig.2

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φD	φd	L	ℓ	S		Rake Angle A.R.	R.R.	Drawing	Spare Parts: Clamp Set	Clamp Screw	Wrench
DMC 316SXT	●	1	16	16	90	30	14.0		+3°	-3°	Fig.1	-	SB-4060TR	FT-15
320SX	●		20	20	110									
325SX	●	2	25	25	120	40				-2°	Fig.2	CPS-2TR	SB-4065TR	
332SX	●		32	32	130					0°				
340SX	●		40	32	150									
DMC 320SX-200	●	1	20	20	200	50	14.0		+3°	-3°	Fig.1	-	SB-4065TR	FT-15
325SX-220	●	2	25	25	220	60				-2°				
332SX-250	●		32	32	250	80				0°				

Applicable Inserts

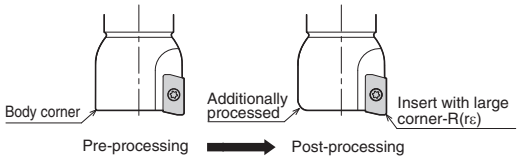
Description	Applicable Inserts ➡ M20		
DMC 316SXT	NDCW 150302TR	NDCT 150308TR	NDMM 150304ER-SP
320SX	150304TR	150308FR	150308ER-SP
325SX	150308TR	(NDCT 150308TRX)	
332SX	150320TR		
340SX	150330TR		
DMC 320SX-200	150340TR		
325SX-220	(NDCW150308TRX)		
332SX-250	(NDCW150308FRX)		

( ) insert is also attachable, however toolholder will be out from insert bottom. (Ref. to lower section of **M111**)

■ When using inserts with corner-R(rε) 2.0 or larger, additional modifications of the cutter body will be necessary. Additional modifications for the body will be necessary. Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(rε) is 0.8mm or less.)

Insert Corner-R(rε) (mm)	Additional Processing Dimension to Body Corner (mm)
2.0	R1.0
3.0	R1.6
4.0	R2.0

* Round- shaped additional processing is recommended.
When applying chamfer shaped additional processing, do not cut away too much.



DMC / DMC-SX Recommended Cutting Conditions

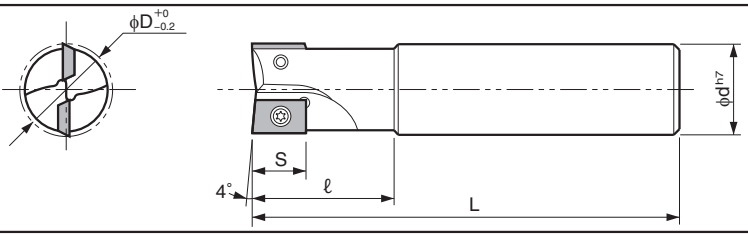
Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN100M	Carbide KW10	Max. ap (mm) Cutting Dia. (φD)	Slotting (ap)	Shouldering (ap×ae)
Carbon Steel	~0.2	★ 120~200		~φ12	2	6×2
				φ14~	3	9×3
Alloy Steel	~0.2	★ 100~180		~φ12	2	6×2
				φ14~	3	9×3
Mold Steel	~0.15	★ 100~180		~φ12	2	6×2
				φ14~	3	9×3
Stainless Steel	~0.15	☆ 120~200		~φ12	1.5	4×2
				φ14~	2	6×2
Cast Iron	~0.2		★ 80~150	~φ12	2	6×2
				φ14~	3	9×3
Non-ferrous Metals	~0.2		★ 100~300	~φ12	2	6×2
				φ14~	3	9×3

・Use DMC8 ○○ with ap=6mm MAX. for shouldering.

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item

DMC-H End Mill (High Rake)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φD	φd	L	ℓ	S		Rake Angle A.R.	R.R.	Drawing	Spare Parts Clamp Screw	Wrench	
DMC 316H	●	1	16	16	90	30	14.0		+5°	-3.5°	-	SB-4060TR	FT-15	
320H	●	1	20	20	110	30	14.0		+6°	-2°	-	SB-4060TR	FT-15	
325H	●	2	25	25	120	40	14.0		+8°	0°	-	SB-4065TR	FT-15	
332H	●	2	32	32	130	40	14.0		+8°	0°	-	SB-4065TR	FT-15	
340H	●	2	40	32	150	40	14.0		+8°	0°	-	SB-4065TR	FT-15	

Applicable Inserts

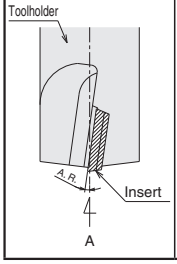
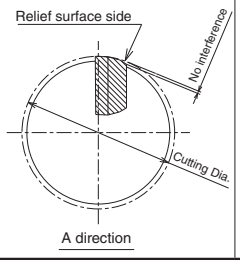
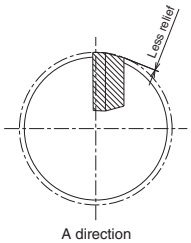
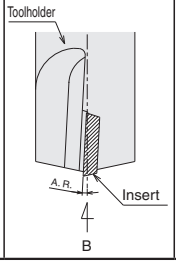
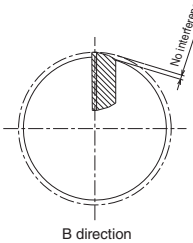
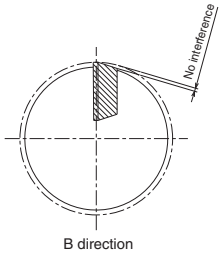
Description	Applicable Inserts ➡ M20			Applicable Inserts ➡ M25
DMC 316H 320H 325H 332H 340H	NDMM 150304ER-SP 150308ER-SP	NDCT 150308TRX	NDCW 150308TRX 150308FRX	NDCW 150302FRX-NE 150302FRX (PCD)

DMC-H Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN100M	Carbide KW10	PCD KPD230 (KPD001)	PCD KPD010	Max. ap (mm) Cutting Dia. (φD)	Slotting (ap)	Shouldering (ap×ae)
Carbon Steel	~0.2	★ 120~200				~φ20	4	8×4
						φ25~	8	14×6
Alloy Steel	~0.2	★ 100~180				~φ20	4	8×4
						φ25~	8	13×6
Mold Steel	~0.15	★ 100~180				~φ20	3	5×2
						φ25~	6	10×3
Stainless Steel	~0.15	☆ 120~200				~φ20	3	6×2
						φ25~	6	13×3
Cast Iron	~0.2		★ 80~150			~φ20	4	8×4
						φ25~	6	14×6
Non-ferrous Metals	~0.2		★ 100~300	★ 300~500	☆ 300~500	~φ20	4	8×4
						φ25~	6	14×6

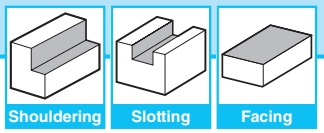
★ : 1st Recommendation ☆ : 2nd Recommendation

・Above inserts are also applicable to DMC ○○○ SX type, but the conventional NDCW1503 ○○ TR type insert is not applicable for this end mill.

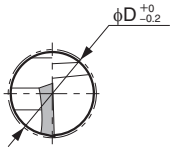
Insert Description / Toolholder Description	NDCT・・・TRX NDCW・・・(T/F)RX	NDCW・・・TR NDCT・・・(T/F)R	Insert Description / Toolholder Description	NDCT・・・TRX NDCW・・・(T/F)RX	NDCW・・・TR NDCT・・・(T/F)R
DMC-H	No interference of relief surface	Less relief ap must be under 5mm.	DMC-SX	No interference of relief surface	No interference of relief surface
					

● : Std. Item

End Mill for Aluminum Machining MEAL



MEAL (Aluminum Machining: with coolant hole)



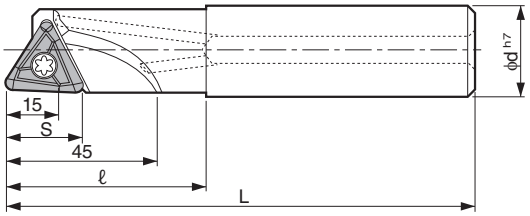
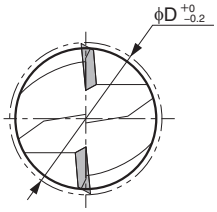


Fig.1



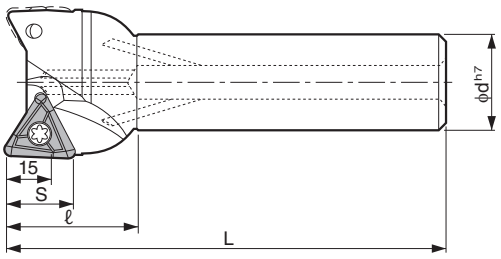
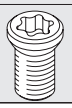
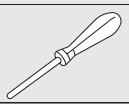
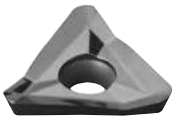


Fig.2

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm)						Rake Angle		Drawing	Spare Parts		
			φD	φd	L	ℓ	S		A.R.	R.R.		Clamp Screw	Wrench	
														
MEAL 25-S25	●	1	25	25	140	60	20		+12°	-7°	Fig.1	SB-5085TR	DT-20	
50-S32	●	2	50	32	150	45				-3.5°	Fig.2			

Applicable Inserts

Description	Applicable Inserts → M24
	
MEAL 25-S25 50-S32	TEMT250624-AQ

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
		Carbide
		KW10
Non-ferrous Metals	0.1~0.3	★ 300~500

・ap is recommended to be under 15mm.

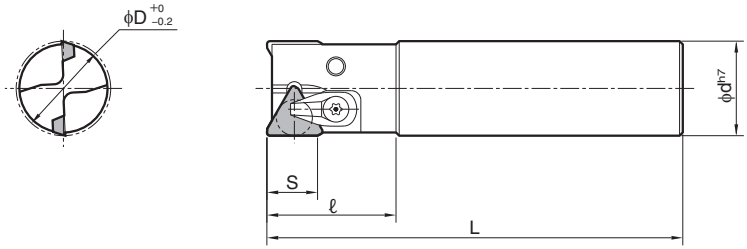
★ : 1st Recommendation

● : Std. Item

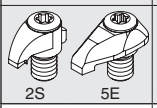
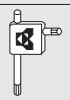
End Mill

Shouldering | Slotting | Facing

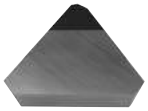
MTPS / MTES



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φD	φd	L	ℓ	S		Rake Angle A.R.	R.R.	Spare Parts: Clamp Set	Wrench	
											 2S 5E		
MTPS 216	○	1	16	16	80	25	9.0		+3°	-5°	CPS-2S	FT-15	
220	○	2	20	20	90	30			+5°	-4°			
MTES 325	○	2	25	25	110	35	13.5		+11°	-2°	CPS-5E	FT-15	
330	□	2	30	32	125	45			+15°				
335	○	3	35	32	125	45				0°			

Applicable Inserts

Description	Applicable Inserts M12	M25	M12	M12	M25
					
MTPS 216 220	TPGN 110302 110304 110308 TPMN 110304 110308	TPGN 110302 110304 110308 (PCD)	-	-	-
MTES 325 330 335	-	-	TEMR 1603PTER-H	TEKN 1603PTTR 1603PTFR	TEEN 1603PTFR-NE 1603PTFR (PCD)

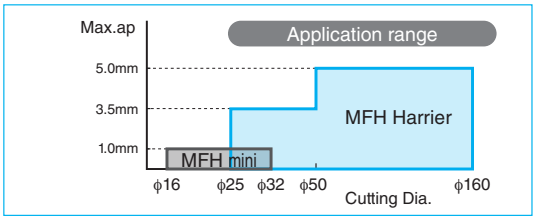
Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min) Cermet TN60	Cermet TN100M	MEGACOAT PR1225	MEGACOAT PR1210	Carbide KW10	PCD KPD001 (KPD010)	Max. ap (mm) Cutting Dia. (φD)	Slotting (ap)	Shouldering (ap×ae)
Carbon Steel	~0.15	☆ 150~200	★ 120~200	★ 120~250	-	-	-	~φ20	3	5×2
								φ25~	6	13×5
Alloy Steel	~0.15	☆ 120~200	★ 100~180	★ 100~220	-	-	-	~φ20	3	5×2
								φ25~	6	13×5
Mold Steel	~0.15	☆ 120~200	★ 100~180	★ 80~180	-	-	-	~φ20	3	5×2
								φ25~	6	13×5
Stainless Steel	~0.12	-	☆ 120~200	★ 120~220	-	-	-	~φ20	2	5×2
								φ25~	4	13×5
Cast Iron	~0.2	-	-	-	★ 100~220	☆ 80~150	-	~φ20	3	5×2
								φ25~	6	13×5
Non-ferrous Metals	~0.2	-	-	-	-	★ 100~300	★ 300~500	~φ20	3	5×2
								φ25~	6	13×5

★ : 1st Recommendation ☆ : 2nd Recommendation

○ : Check Availability
□ : Deleted from the next catalogue

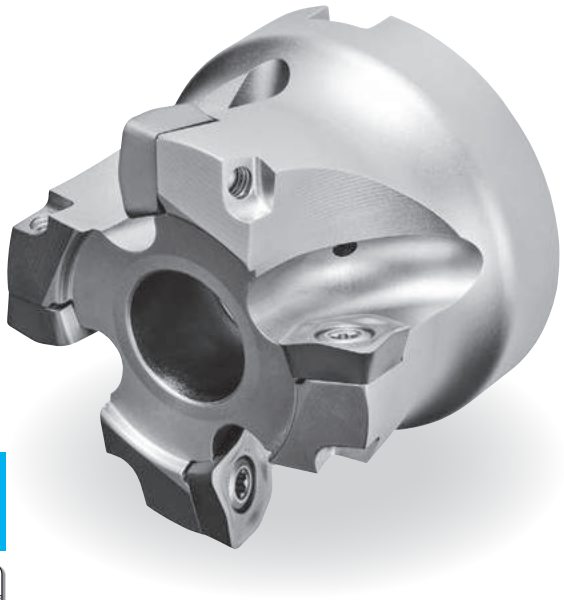
MFH Harrier



Anti chattering

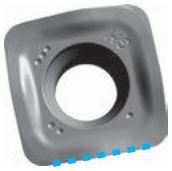
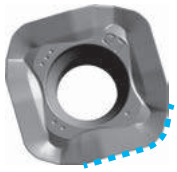
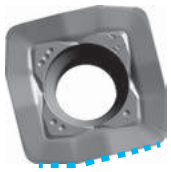
Applicable to various applications with 3 types of inserts

Increased chip evacuation and shortened cutting time



POINT.1 Various applications

with 3 types of inserts

	GM (General purpose)	LD (Large ap)	FL (With Wiper Edge)
Shape			
Applications	**1st recommendation for general purpose** → Facing, Pocketing, Helical milling	**Max. ap=5mm** → Applicable for scale removal at high efficiency	**Wide wiper edge** → Applicable for both roughing and finishing, for small machining center

3 types of inserts according to your application
Applicable to a wide range of application

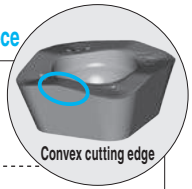
・For inclination angle at contouring, refer to the table above **M122**

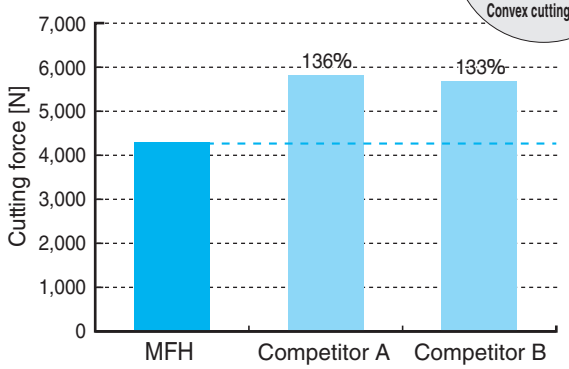
POINT.2 3D convex cutting edge

reduces shock of biting workpiece

● Cutting Force (Shock) Comparison when Biting Workpiece

Cutting with the ae that receives the maximum impact



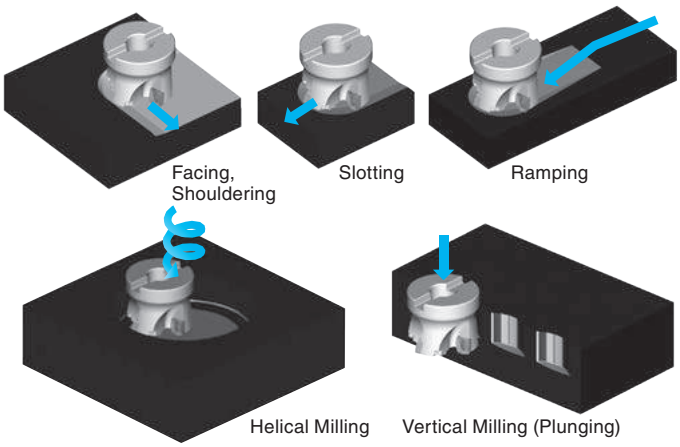


Vc=150m/min, fz=1.5mm/t, ap×ae=1.5×31.5mm
S50C, Dry, Cutter Dia. φ63

Chart shows resultant cutting force

POINT.3 Multi-functional cutter

for ramping, helical milling, etc.



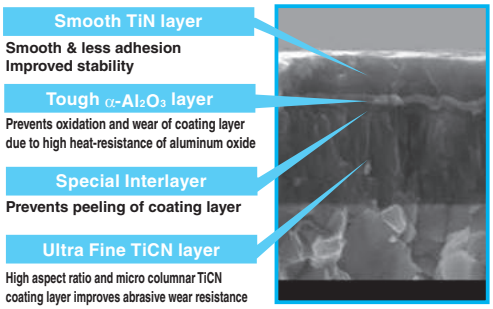
* GM type is applicable for all the above applications
* LD type and FL type are not applicable for Helical Milling, Plunging and Contouring of rising wall (Please refer to **M122**)

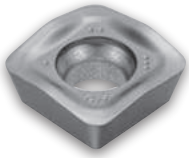
POINT.4

Applicable for Variety of Workpieces

from Steel to Heat-resistant Alloys

New grade for difficult-to-cut material which controls sudden fracture and realizes stable machining



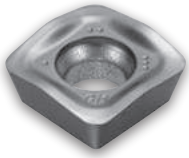


CA6535

For Martensitic stainless steel and Ni-base heat-resistant alloys

High heat resistance and wear resistance with CVD coating

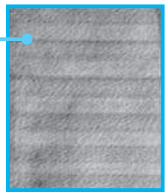
Improved stability due to thin layer coating technology



PR1535

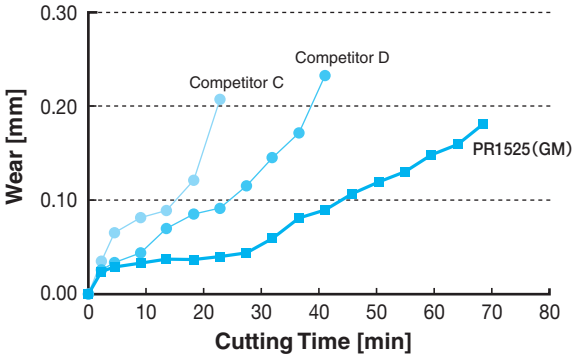
For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel

Stable and longer tool life by special nano coating layer MEGACOAT NANO



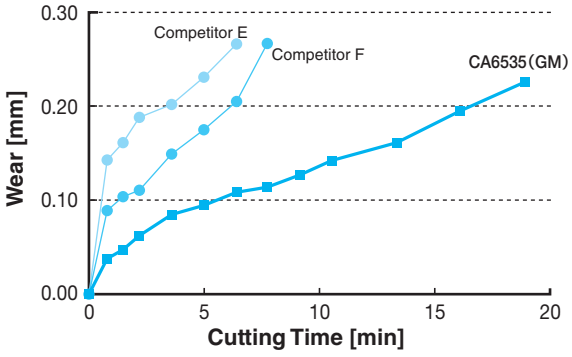
Wear Resistance Comparison

SKD11



<Cutting Conditions> Vc=150m/min, fz=1.5mm/t, apxae=1.0x16mm, Dry

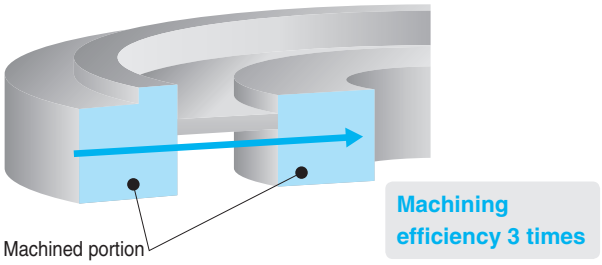
Ni-base heat-resistant alloys



<Cutting Conditions> Vc=30m/min, fz=0.8mm/t, apxae=1.0x40mm, Wet

Case Studies

SFVAF22B (Forged alloy steel)



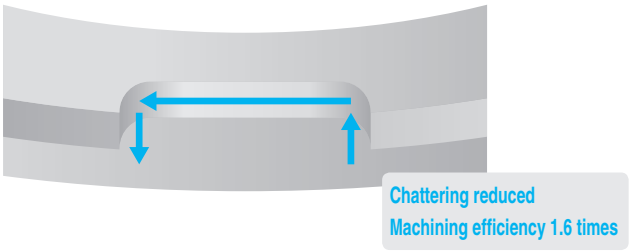
- Turbine parts
- Vc=160m/min
- fz=1.17mm/t
- apxae=1.5xmax.160mm
- Dry
- MFH160R-14-8T (8 inserts)
- SOMT140520ER-GM (PR1525)

PR1525	Chip Evacuation Rate = 720cc/min
Competitor G	Chip Evacuation Rate = 240cc/min

- Small machining noise even at 3 times higher feed rate
- Good edge condition without chipping and stable machining

(Evaluation by the user)

SUS304F



- Clutch
- Vc=120m/min
- fz=1.2mm/t
- apxae=1.0x20mm
- Dry
- MFH32-S32-10-2T (2 inserts)
- SOMT100420ER-GM (PR1535)

PR1535	Chip Evacuation Rate = 58cc/min
Competitor H	Chip Evacuation Rate = 36cc/min

- Competitor H caused chattering but MFH realized stable machining
- Good edge condition and long tool life

(Evaluation by the user)

MFH Harrier Face Mill

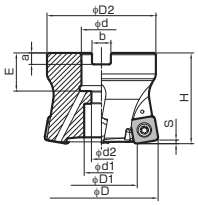


Fig.1

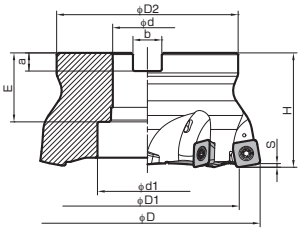


Fig.2

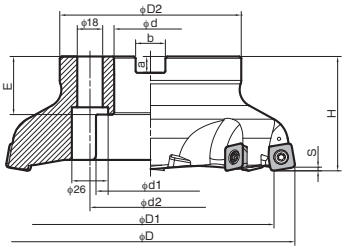


Fig.3

Toolholder Dimensions (SOMT10 type)

Description		Standard	No. of inserts	Dimension (mm)														Rake angle (°)		Coolant hole	Drawing	Weight (kg)	Max. revolution (min^{-1})
				øD	øD$_1$			øD$_2$	ød	ød$_1$	ød$_2$	H	E	a	b	S	S$_L$*1	A.R.	R.R.				
					GM	LD	FL																	
MFH	050R-10-4T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 (1.2)*2	3.5	+10°	-5°	Yes	#1	0.4	10,000
	050R-10-5T-M	●	5																				
	052R-10-4T-M	●	4	52	35	39.5	38.5	47															
	052R-10-5T-M	●	5																				
	063R-10-5T-22M	●	5	63	46	50.5	49.5	60											-4°			0.7	8,800
	063R-10-6T-22M	●	6																				
	063R-10-5T-27M	●	5						27	20	13		24	7	12.4								
	063R-10-6T-27M	●	6																				
	080R-10-7T-M	●	7	80	63	67.5	66.5	76				63										1.6	7,600

*1 For S$_L$ dimension, refer to the figure in the next page
*2 Dimension in ( ) is when attaching LD type

Toolholder Dimensions (SOMT14 type)

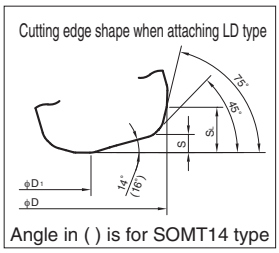
Description		Standard	No. of inserts	Dimension (mm)														Rake angle (°)		Coolant hole	Drawing	Weight (kg)	Max. revolution (min^{-1})
				øD	øD$_1$			øD$_2$	ød	ød$_1$	ød$_2$	H	E	a	b	S	S$_L$*1	A.R.	R.R.				
					GM	LD	FL																	
MFH	063R-14-4T-22M	●	4	63	40	46	45	60	22	19	11	50	21	6.3	10.4	2	5	+10°	-10°	Yes	#1	0.6	7,400
	063R-14-5T-22M	●	5																				
	063R-14-4T-27M	●	4						27	20	13		24	7	12.4								
	063R-14-5T-27M	●	5																				
	066R-14-4T-22M	●	4	66	43	49	48	60	22	19	11		21	6.3	10.4								
	066R-14-5T-22M	●	5																				
	066R-14-4T-27M	●	4						27	20	13		24	7	12.4								
	066R-14-5T-27M	●	5																				
	080R-14-5T-M	●	5	80	57	63	62	76	27	20	13		24	7	12.4				-8°			1.4	6,400
	080R-14-6T-M	●	6																				
	100R-14-6T-M	●	6	100	77	83	82	96	32	26	17	63	28	8	14.4				-7°		#2	2.4	5,600
	100R-14-7T-M	●	7																				
	125R-14-7T-M	●	7	125	102	108	107	100	40	55	-		33	9	16.4							2.8	4,800
	160R-14-8T-M	●	8	160	137	143	142			68	66.7		32						-6°	No	#3	3.7	4,200

*1 for S$_L$ dimension, refer to the figure in the next page

● : Std. Item

Spare Parts (Face Mill)

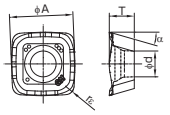
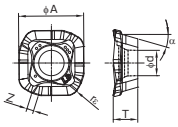
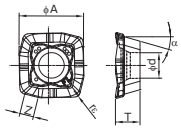
Description		Spare Parts				
		Clamp Screw	Wrench		Anti-seize Compound	Mounting bolt
			DTPM	TTP		
MFH	050R-10-...	SB-4090TRPN	DTPM-15 for Insert Clamp Recommended tightening torque 3.5N·m		MP-1	HH10X30
	050R-10-...-M					
	063R-10-...					
	063R-10-...-22M					
	063R-10-...-27M					HH12X35
	080R-10-...					HH16X40
	080R-10-...-M					HH12X35
MFH	063R-14-...	SB-50120TRP	TTP-20 for Insert Clamp Recommended tightening torque 4.5N·m		MP-1	HH10X30
	063R-14-...-22M					
	063R-14-...-27M					HH12X35
	080R-14-...					HH16X40
	080R-14-...-M					HH12X35
	100R-14-...					HH16X40
	100R-14-...-M					—
	125R-14-...					—
	160R-14-...					—



- **Max. Revolution**
  When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ M121

Applicable Inserts ➔ M17

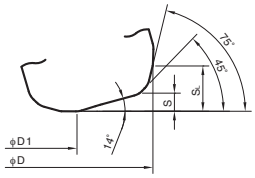
Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) A	T	φd	Z	rε	Angle α	CVD Coated Carbide CA6535	MEGACOAT NANO PR1535	PR1525	PR1510
General purpose		SOMT	100420ER-GM	10.30	4.58	4.6	-	2.0	16°	●	●	●	●
			140520ER-GM	14.14	5.56	5.8				●	●	●	●
Large ap		SOMT	100420ER-LD	10.45	4.58	4.6	0.9	2.0	16°	●	●	●	●
			140520ER-LD	14.76	5.56	5.8	1.6			●	●	●	●
With Wiper Edge		SOMT	100420ER-FL	10.44	4.58	4.6	1.4	2.0	16°	●	●	●	●
			140514ER-FL	14.57	5.56	5.8	3.1	1.4		●	●	●	●

● : Std. Item

MFH Harrier End Mill (SOMT10 type)

(Cylindrical)

Cutting edge shape when attaching LD type



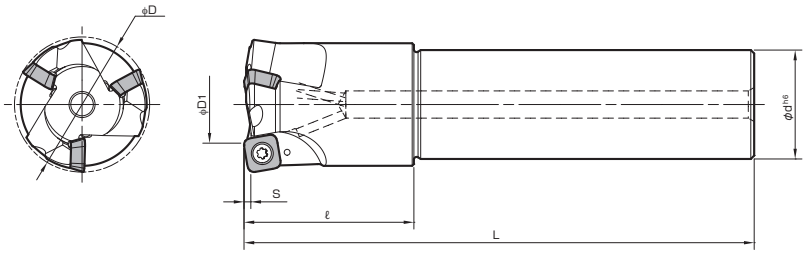


Fig.1

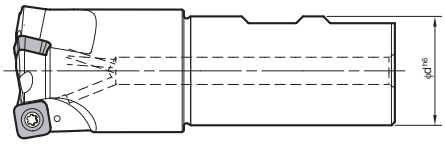


Fig.2

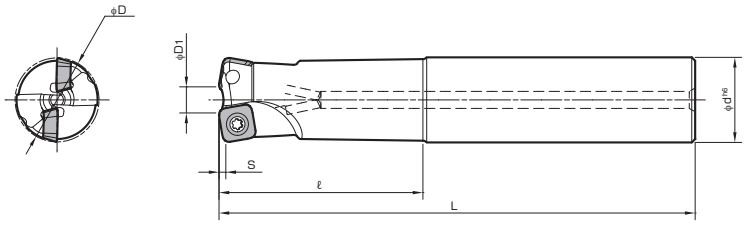


Fig.3

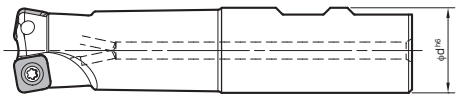


Fig.4

Toolholder Dimensions

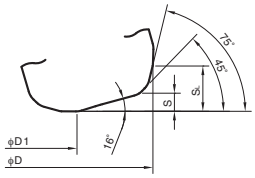
Description		Std.	No. of Inserts	Dimension (mm)									Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				ϕD	ϕD1			ϕd	L	ℓ	S	S_L	A.R.				
					GM	LD	FL										
Cylindrical	MFH 25-S25-10-2T	●	2	25	8	12.5	11.5	25	140	60	1.5 *(1.2)	3.5	+10°	Yes	Fig.3	0.4	17,000
	28-S25-10-2T	●	2	28	11	15.5	14.5			40					Fig.1	0.5	15,500
	32-S32-10-2T	●	2	32	15	19.5	18.5	32	150	70					Fig.3	0.8	14,000
	32-S32-10-3T	●	3														
	35-S32-10-2T	●	2	35	18	22.5	21.5			50					Fig.1		13,000
	35-S32-10-3T	●	3														
	40-S32-10-3T	●	3	40	23	27.5	26.5									0.9	11,500
	40-S32-10-4T	●	4														
Weldon	MFH 25-W25-10-2T	●	2	25	8	12.5	11.5	25	117	60	1.5 *(1.2)	3.5	+10°	Yes	Fig.4	0.4	17,000
	32-W32-10-3T	●	3	32	15	19.5	18.5	32	131	70						0.7	14,000
	40-W32-10-3T	●	3	40	23	27.5	26.5		112	50					Fig.2		11,500
	40-W32-10-4T	●	4														
Long Shank	MFH 25-S25-10-2T-200	●	2	25	8	12.5	11.5	25	200	120	1.5 *(1.2)	3.5	+10°	Yes	Fig.3	0.6	17,000
	28-S25-10-2T-200	●	2	28	11	15.5	14.5			40					Fig.1	0.7	15,500
	32-S32-10-2T-200	●	2	32	15	19.5	18.5	32		120					Fig.3	1.0	14,000
	35-S32-10-2T-200	●	2	35	18	22.5	21.5			50					Fig.1	1.4	13,000
	40-S32-10-4T-250	●	4	40	23	27.5	26.5		250							1.5	11,500
Extra Long Shank	MFH 25-S25-10-2T-300	●	2	25	8	12.5	11.5	25	300	180	1.5 *(1.2)	3.5	+10°	Yes	Fig.3	1.0	17,000
	28-S25-10-2T-300	●	2	28	11	15.5	14.5			40					Fig.1	1.1	15,500
	32-S32-10-2T-300	●	2	32	15	19.5	18.5	32		180					Fig.3	1.6	14,000
	35-S32-10-2T-300	●	2	35	18	22.5	21.5			50					Fig.1	1.7	13,000
	40-S32-10-4T-300	●	4	40	23	27.5	26.5									1.8	11,500

* Dimension in ( ) is when attaching LD type

● : Std. Item

MFH Harrier End Mill (SOMT14 type)

Cutting edge shape when attaching LD type



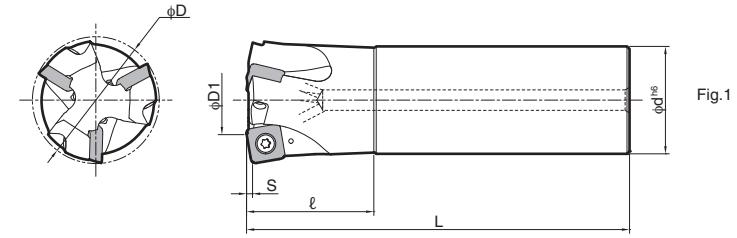


Fig.1

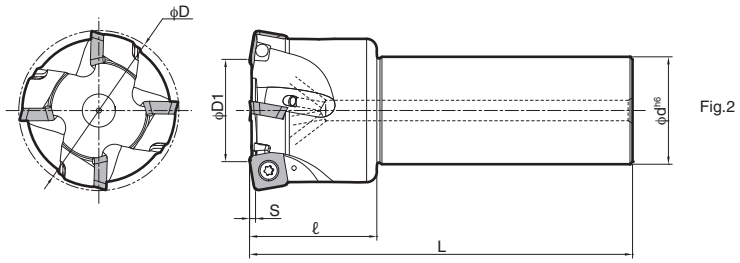
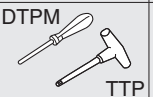


Fig.2

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) ϕD	ϕD1 GM	ϕD1 LD	ϕD1 FL	ϕd	L	ℓ	S	S_L	Rake Angle A.R.	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
MFH 50-S42-14-3T	●	3	50	27	33	32	42	150	50	2	5	+10°	Yes	Fig.1	1.4	8,800
63-S42-14-4T	●	4	63	40	46	45								Fig.2	1.7	7,400
80-S42-14-5T	●	5	80	57	63	62									2.3	6,400

Spare Parts and Applicable Inserts

Description	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Anti-seize Compound	Applicable Inserts ⇒ M17, M117
		 DTPM TTP		
MFH ...-10-...	SB-4075TRP	DTPM-15	MP-1	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
	for Insert Clamp Recommended tightening torque 3.5N·m			
MFH ...-14-...	SB-50120TRP	TTP-20	MP-1	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL
	for Insert Clamp Recommended tightening torque 4.5N·m			

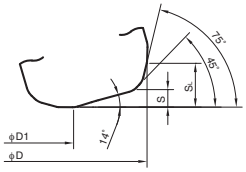
- **Max. Revolution**
  When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

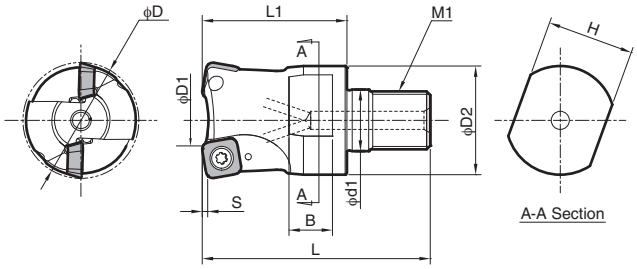
Recommended Cutting Conditions ⇒ M121

● : Std. Item

MFH Harrier type Head

Cutting edge shape when attaching LD type





Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm)													Rake Angle	Coolant Hole	Max. Revolution (min^{-1})
			φD	φD1			φD2	φd1	L	L1	M1	H	B	S	S_L	A.R.		
				GM	LD	FL												
MFH 25-M12-10-2T	●	2	25	8	12.5	11.5	23	12.5	57	35	M12xP1.75	19	10	1.5 *(1.2)	3.5	+10°	Yes	17,000
28-M12-10-2T	●	2	28	11	15.5	14.5												15,500
32-M16-10-2T	●	2	32	15	19.5	18.5	30	17	63	40	M16xP2.0	24	12					14,000
32-M16-10-3T	●	3																
35-M16-10-2T	●	2	35	18	22.5	21.5												13,000
35-M16-10-3T	●	3																
40-M16-10-3T	●	3	40	23	27.5	26.5												11,500
40-M16-10-4T	●	4																

Ref. to page ➔ **M58** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

* Dimension in ( ) is when attaching LD type

Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts ➔ **M17, M117**
	Clamp Screw	Wrench	Anti-seize Compound	
MFH ...-10-...	SB-4075TRP	DTPM-15	MP-1	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
	for Insert Clamp Recommended tightening torque 3.5N·m			

- **Max. Revolution**
  When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ **M121**

● : Std. Item

◆ Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz：mm/t)					Recommended Insert Grades (Cutting Speed Vc：m/min)			
		MFH25-…	MFH32-…	MFH40-…	MFH…R-10-…	MFH…R-14-…	MEGACOAT NANO			CVD Coated Carbide
							PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel	0.5~**0.8**~1.0(ap≦1.0mm) 0.2~**0.4**~0.5(ap≦1.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.3~**0.7**~1.0(ap≦1.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.4~**1.0**~1.5(ap≦1.5mm)	0.5~**1.5**~2.0		☆ 120~**180**~250	★ 120~**180**~250	–	–
	Alloy Steel	0.5~**0.8**~1.0(ap≦1.0mm) 0.2~**0.4**~0.5(ap≦1.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.3~**0.7**~1.0(ap≦1.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.4~**1.0**~1.5(ap≦1.5mm)	0.5~**1.5**~2.0		☆ 100~**160**~220	★ 100~**160**~220	–	–
	Mold Steel (~40HRC)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		☆ 80~**140**~180	★ 80~**140**~180	–	–
	Mold Steel (40~50HRC)	0.15~**0.3**~0.5(ap≦1.0mm) 0.15~**0.2**~0.25(ap≦1.5mm)	0.2~**0.5**~0.8(ap≦1.0mm) 0.2~**0.3**~0.45(ap≦1.5mm)	0.2~**0.6**~0.9(ap≦1.0mm) 0.2~**0.5**~0.7(ap≦1.5mm)	0.2~**0.7**~1.0		☆ 60~**100**~130	★ 60~**100**~130	–	–
	Stainless Steel (Austenitic related)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		☆ 100~**160**~200	☆ 100~**160**~200	–	–
	Stainless Steel (Martensitic related)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		☆ 150~**200**~250	–	–	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		★ 90~**120**~150	–	–	–
	Gray Cast Iron	0.5~**0.8**~1.0(ap≦1.0mm) 0.2~**0.4**~0.5(ap≦1.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.3~**0.7**~1.0(ap≦1.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.4~**1.0**~1.5(ap≦1.5mm)	0.5~**1.5**~2.0		–	–	★ 120~**180**~250	–
	Nodular Cast Iron	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		–	–	★ 100~**150**~200	–
	Ni-base heat-resistant alloys	0.2~**0.4**~0.6(ap≦1.0mm) 0.15~**0.2**~0.3(ap≦1.5mm)	0.2~**0.5**~0.9(ap≦1.0mm) 0.2~**0.4**~0.6(ap≦1.5mm)	0.2~**0.6**~1.0(ap≦1.0mm) 0.2~**0.5**~0.8(ap≦1.5mm)	0.2~**0.8**~1.2		☆ 20~**30**~50	–	–	★ 20~**30**~50
	Titanium Alloys	0.2~**0.4**~0.6(ap≦1.0mm) 0.15~**0.2**~0.3(ap≦1.5mm)	0.2~**0.5**~0.9(ap≦1.0mm) 0.2~**0.4**~0.6(ap≦1.5mm)	0.2~**0.6**~1.0(ap≦1.0mm) 0.2~**0.5**~0.8(ap≦1.5mm)	0.2~**0.8**~1.2		★ 40~**60**~80	–	☆ 30~**50**~70	–
LD	Carbon Steel	0.5~**0.8**~1.0(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.06~**0.15**~0.3(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.2**~0.3(ap≦3.5mm)	0.5~**1.5**~2.0(ap≦1.0mm) 0.06~**0.2**~0.3(ap≦3.5mm)	0.5~**1.5**~2.0(ap≦2.0mm) 0.06~**0.2**~0.4(ap≦5.0mm)	☆ 120~**180**~250	★ 120~**180**~250	–	–
	Alloy Steel	0.5~**0.8**~1.0(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.06~**0.15**~0.3(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.2**~0.3(ap≦3.5mm)	0.5~**1.5**~2.0(ap≦1.0mm) 0.06~**0.2**~0.3(ap≦3.5mm)	0.5~**1.5**~2.0(ap≦2.0mm) 0.06~**0.2**~0.4(ap≦5.0mm)	☆ 100~**160**~220	★ 100~**160**~220	–	–
	Mold Steel (~40HRC)	0.5~**0.7**~0.8(ap≦1.0mm) 0.06~**0.08**~0.15(ap≦3.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦2.0mm) 0.06~**0.15**~0.3(ap≦5.0mm)	☆ 80~**140**~180	★ 80~**140**~180	–	–
	Mold Steel (40~50HRC)	0.2~**0.3**~0.5(ap≦1.0mm) 0.03~**0.05**~0.1(ap≦3.5mm)	0.2~**0.5**~0.8(ap≦1.0mm) 0.03~**0.08**~0.15(ap≦3.5mm)	0.2~**0.6**~0.9(ap≦1.0mm) 0.03~**0.1**~0.15(ap≦3.5mm)	0.2~**0.7**~1.0(ap≦1.0mm) 0.03~**0.1**~0.15(ap≦3.5mm)	0.2~**0.7**~1.0(ap≦2.0mm) 0.03~**0.1**~0.2(ap≦5.0mm)	☆ 60~**100**~130	★ 60~**100**~130	–	–
	Stainless Steel (Austenitic related)	0.5~**0.7**~0.8(ap≦1.0mm) 0.06~**0.08**~0.15(ap≦3.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦2.0mm) 0.06~**0.15**~0.3(ap≦5.0mm)	★ 100~**160**~200	☆ 100~**160**~200	–	–
	Stainless Steel (Martensitic related)	0.5~**0.7**~0.8(ap≦1.0mm) 0.06~**0.08**~0.15(ap≦3.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦2.0mm) 0.06~**0.15**~0.3(ap≦5.0mm)	☆ 150~**200**~250	–	–	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.5~**0.7**~0.8(ap≦1.0mm) 0.06~**0.08**~0.15(ap≦3.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦2.0mm) 0.06~**0.15**~0.3(ap≦5.0mm)	★ 90~**120**~150	–	–	–
	Gray Cast Iron	0.5~**0.8**~1.0(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.06~**0.15**~0.3(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.2**~0.3(ap≦3.5mm)	0.5~**1.5**~2.0(ap≦1.0mm) 0.06~**0.2**~0.3(ap≦3.5mm)	0.5~**1.5**~2.0(ap≦2.0mm) 0.06~**0.2**~0.4(ap≦5.0mm)	–	–	★ 120~**180**~250	–
	Nodular Cast Iron	0.5~**0.7**~0.8(ap≦1.0mm) 0.06~**0.08**~0.15(ap≦3.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.06~**0.1**~0.2(ap≦3.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.06~**0.15**~0.2(ap≦3.5mm)	0.5~**1.2**~1.8(ap≦2.0mm) 0.06~**0.15**~0.3(ap≦5.0mm)	–	–	★ 100~**150**~200	–
	Ni-base heat-resistant alloys	0.2~**0.4**~0.6(ap≦1.0mm) 0.03~**0.05**~0.1(ap≦3.5mm)	0.2~**0.5**~0.9(ap≦1.0mm) 0.03~**0.08**~0.15(ap≦3.5mm)	0.2~**0.6**~1.0(ap≦1.0mm) 0.03~**0.1**~0.15(ap≦3.5mm)	0.2~**0.8**~1.2(ap≦1.0mm) 0.03~**0.1**~0.15(ap≦3.5mm)	0.2~**0.8**~1.2(ap≦2.0mm) 0.03~**0.1**~0.2(ap≦5.0mm)	☆ 20~**30**~50	–	–	★ 20~**30**~50
	Titanium Alloys	0.2~**0.4**~0.6(ap≦1.0mm) 0.03~**0.05**~0.1(ap≦3.5mm)	0.2~**0.5**~0.9(ap≦1.0mm) 0.03~**0.08**~0.15(ap≦3.5mm)	0.2~**0.6**~1.0(ap≦1.0mm) 0.03~**0.1**~0.15(ap≦3.5mm)	0.2~**0.8**~1.2(ap≦1.0mm) 0.03~**0.1**~0.15(ap≦3.5mm)	0.2~**0.8**~1.2(ap≦2.0mm) 0.03~**0.1**~0.2(ap≦5.0mm)	★ 40~**60**~80	–	☆ 30~**50**~70	–
FL	Carbon Steel	0.5~**0.8**~1.0(ap≦1.0mm) 0.2~**0.4**~0.5(ap≦1.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.3~**0.7**~1.0(ap≦1.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.4~**1.0**~1.5(ap≦1.5mm)	0.5~**1.5**~2.0		☆ 120~**180**~250	★ 120~**180**~250	–	–
	Alloy Steel	0.5~**0.8**~1.0(ap≦1.0mm) 0.2~**0.4**~0.5(ap≦1.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.3~**0.7**~1.0(ap≦1.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.4~**1.0**~1.5(ap≦1.5mm)	0.5~**1.5**~2.0		☆ 100~**160**~220	★ 100~**160**~220	–	–
	Mold Steel (~40HRC)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		☆ 80~**140**~180	★ 80~**140**~180	–	–
	Mold Steel (40~50HRC)	0.15~**0.3**~0.5(ap≦1.0mm) 0.15~**0.2**~0.25(ap≦1.5mm)	0.2~**0.5**~0.8(ap≦1.0mm) 0.2~**0.3**~0.45(ap≦1.5mm)	0.2~**0.6**~0.9(ap≦1.0mm) 0.2~**0.5**~0.7(ap≦1.5mm)	0.2~**0.7**~1.0		☆ 60~**100**~130	★ 60~**100**~130	–	–
	Stainless Steel (Austenitic related)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		★ 100~**160**~200	☆ 100~**160**~200	–	–
	Stainless Steel (Martensitic related)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		☆ 150~**200**~250	–	–	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		★ 90~**120**~150	–	–	–
	Gray Cast Iron	0.5~**0.8**~1.0(ap≦1.0mm) 0.2~**0.4**~0.5(ap≦1.5mm)	0.5~**1.0**~1.5(ap≦1.0mm) 0.3~**0.7**~1.0(ap≦1.5mm)	0.5~**1.2**~1.8(ap≦1.0mm) 0.4~**1.0**~1.5(ap≦1.5mm)	0.5~**1.5**~2.0		–	–	★ 120~**180**~250	–
	Nodular Cast Iron	0.5~**0.7**~0.8(ap≦1.0mm) 0.2~**0.3**~0.4(ap≦1.5mm)	0.5~**0.8**~1.2(ap≦1.0mm) 0.3~**0.6**~0.8(ap≦1.5mm)	0.5~**1.0**~1.6(ap≦1.0mm) 0.4~**0.8**~1.2(ap≦1.5mm)	0.5~**1.2**~1.8		–	–	★ 100~**150**~200	–
	Ni-base heat-resistant alloys	0.2~**0.4**~0.6(ap≦1.0mm) 0.15~**0.2**~0.3(ap≦1.5mm)	0.2~**0.5**~0.9(ap≦1.0mm) 0.2~**0.4**~0.6(ap≦1.5mm)	0.2~**0.6**~1.0(ap≦1.0mm) 0.2~**0.5**~0.8(ap≦1.5mm)	0.2~**0.8**~1.2		☆ 20~**30**~50	–	–	★ 20~**30**~50
	Titanium Alloys	0.2~**0.4**~0.6(ap≦1.0mm) 0.15~**0.2**~0.3(ap≦1.5mm)	0.2~**0.5**~0.9(ap≦1.0mm) 0.2~**0.4**~0.6(ap≦1.5mm)	0.2~**0.6**~1.0(ap≦1.0mm) 0.2~**0.5**~0.8(ap≦1.5mm)	0.2~**0.8**~1.2		★ 40~**60**~80	–	☆ 30~**50**~70	–

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ★：1st Recommendation ☆：2nd Recommendation

* **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

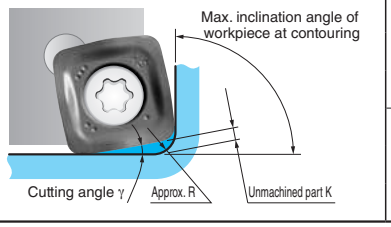
* When finishing with LD type and FL type inserts, recommended feed rate for SOMT14 LD type: f=1.5(mm/rev) or less / for SOMT10 LD type: f=0.9(mm/rev)
for SOMT14 FL type: f=3.0(mm/rev) or less / for SOMT10 FL type: f=1.4(mm/rev)

* For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.

* For slotting, internal coolant is recommended.

MFH High Feed Cutter NEW

Note for Machining Program (Approx. R)

Shape	Description	Insert Type	Cutting angle γ	Approx. R (mm)	Unmachined part K (mm)	Max. inclination angle of workpiece at contouring
	MFH…-10-…	GM	10°	3.0	0.85	90°
		FL	14°	3.0	0.89	80°
		LD	14°	3.5	0.69	65°
	MFH…-14-…	GM	10°	3.5	1.37	90°
		FL	13°	3.0	1.36	80°
		LD	16°	5.0	1.06	65°

Reference data for Ramping

MFH…-10-…

Cutter Dia. ϕD (mm)	25	28	32	35	40	50	63	80
Max. ramping angle α_{max}	5°	4.5°	4°	3.5°	3°	2.5°	2°	1°
tan α_{max}	0.087	0.078	0.070	0.061	0.052	0.043	0.035	0.017

MFH…-14-…

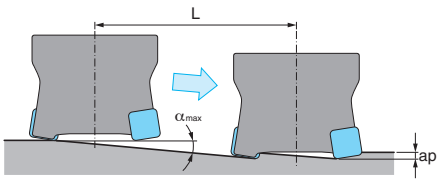
Cutter Dia. ϕD (mm)	50	63	80	100	125	160
Max. ramping angle α_{max}	2°	1.8°	1°	0.5°	0.4°	0.2°
tan α_{max}	0.035	0.031	0.017	0.009	0.007	0.003

Guide for Ramping (Slant Milling)

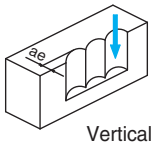
- Ramping angle should be under α_{max} (Maximum ramping angle) in the above cutting conditions.
- Feed rate should be under 70% of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan \alpha_{max}}$$



Vertical Milling (Plunging)



Insert Description	Max. Width of Cut (ae)
SOMT10	8mm
SOMT14	11.5mm

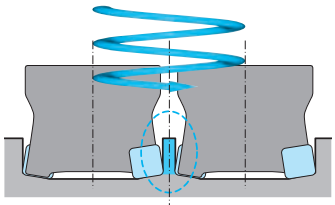
Vertical Milling (Plunging) is available only with GM type insert.
(LD type and FL type are not applicable)

・For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

Guide for Helical milling

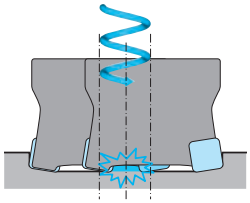
For helical milling, use between Min. cutting dia. and Max. cutting dia.

Over Max. Cutting Dia.



Center core part remains after machining

Under Min. Cutting Dia.

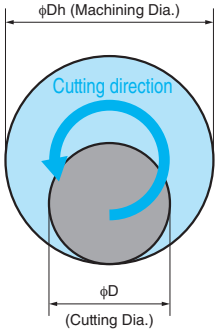


Center core part interferes with toolholder

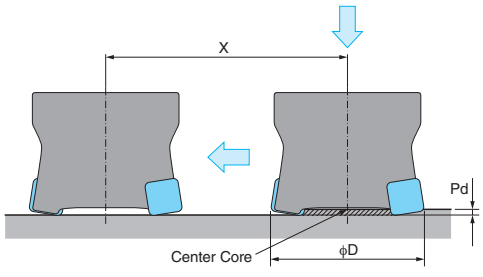
Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH…-10-…	2×D-18	2×D-2
MFH…-14-…	2×D-25	2×D-2

Unit : mm

・Sinking depth (h) at helical milling should be under Max. depth of cut (S) in the cutter dimension chart.
・Down-cut milling is recommended (refer to the right figure)
・Feed rate should be under 50% of the recommended cutting conditions.
・Be careful to machine in a safe environment to avoid accident caused by long chips.



Guide for Drilling



3D machining

Insert Type	Ramping	Contouring (rising wall angle)	Vertical	Helical Milling	Pocketing
GM	✓	✓ (90°)	✓	✓	✓
LD	✓	△ (65°)	N/A	N/A	N/A
FL	✓	△ (80°)	N/A	N/A	N/A

・Some applications are not available depending on insert type.
・For FL and LD type, there is a limit of rising wall angle at contouring.

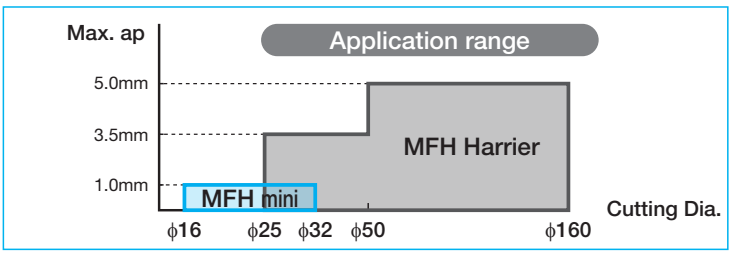
Description	GM		LD		FL	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH…-10-…	1.5	D-18	1.5	D-14	1.5	D-15
MFH…-14-…	2	D-24	2	D-18	2	D-19

Unit : mm

[Drilling depth] Please refer to Pd (Max. drilling depth) in the chart.
[When Traversing after Drilling]
(1) Reduce feed rate 25% or less of the recommended conditions until the center core part (unmachined part) is removed.
(2) When drilling, reduce feed rate per revolution to under f=0.2mm/rev.

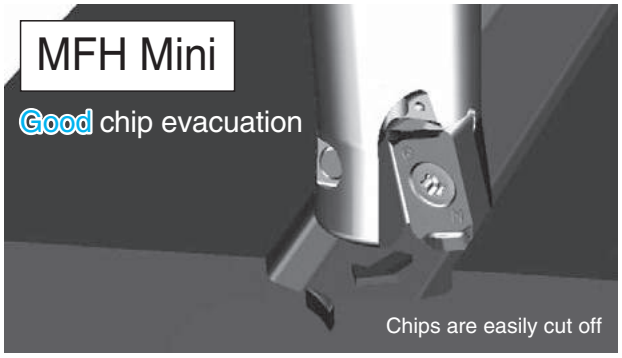
MFH Mini

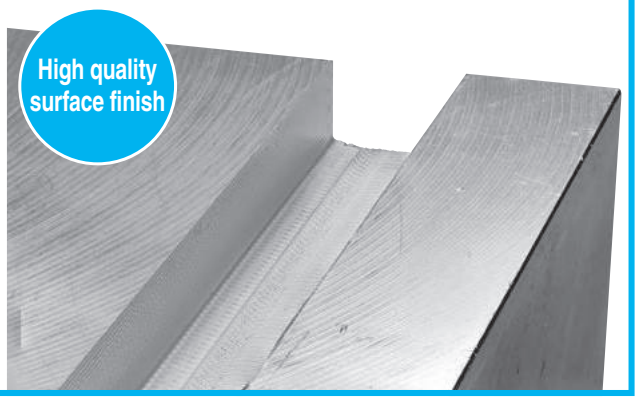
Cutter Dia.: ϕ16~ϕ32

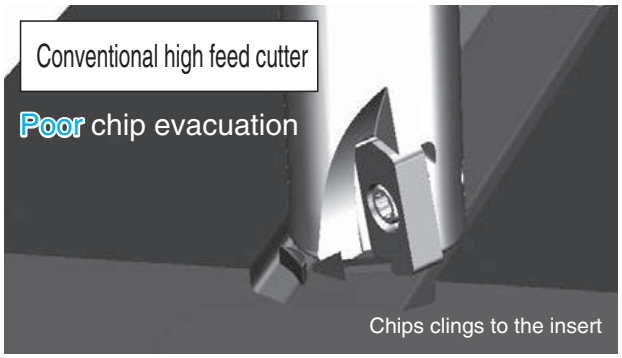


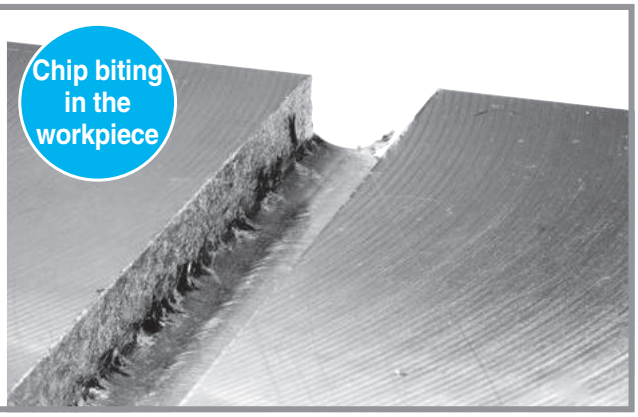
- **Economical Double-sided 4-edge Insert**
- **High efficiency and high feed machining at small dia. machining and small machining center**

POINT.1 Good Chip Evacuation









MFH Mini controls chip biting with 3D convex cutting edge

Cutting Conditions: Workpiece Material SS400 Cutter Dia. ϕ16 Vc=150m/min fz=0.6mm/t ap×ae=10mm (0.5mm×20 passes)×16mm Dry

POINT.2 Multi edge design enables high efficiency machining

·Cutter Dia. ϕ25

MFH Mini

5 inserts

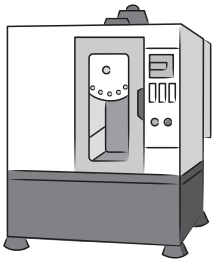
MFH25-S25-03-5T

MFH Harrier

2 inserts

MFH25-S25-10-2T

POINT.3 High efficiency and high feed machining at small machining center (BT30/BT40)



Suitable for roughing of mold

MFH Mini End Mill

(Cylindrical)

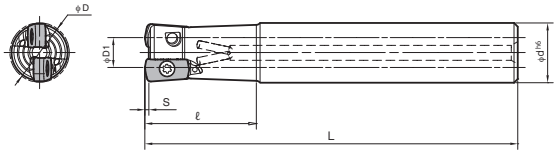


Fig.1

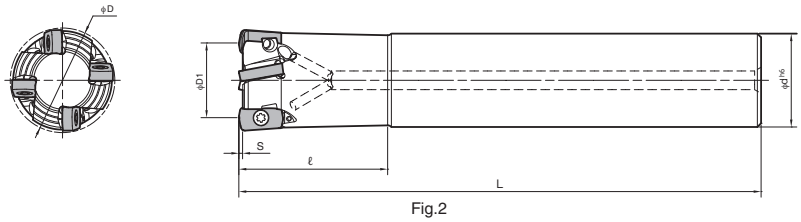


Fig.2

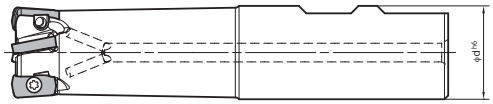


Fig.3

Toolholder Dimensions

Description			Std.	No. of Inserts	Dimension (mm)						Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
					φD	φD1	φd	L	ℓ	S	A.R.				
Standard Shank	MFH	16-S16-03-2T	●	2	16	8	16	100	30	1	-10°	Yes	Fig.1	0.1	18,800
		20-S20-03-3T	●	3	20	12	20	130	50					0.3	15,700
		20-S20-03-4T	●	4											
		25-S25-03-4T	●		25	17	25	140	60					0.5	13,400
		25-S25-03-5T	●	5											
		32-S32-03-5T	●		32	24	32	150	70					0.8	11,400
		32-S32-03-6T	●	6											
Over Size (Straight)	MFH	17-S16-03-2T	●	2	17	9	16	100	20				Fig.2	0.1	17,900
		18-S16-03-2T	●		18	10									17,000
		22-S20-03-3T	●	3	22	14	20	130	30					0.3	14,700
		22-S20-03-4T	●	4											
		28-S25-03-4T	●		28	20	25	140	40					0.5	12,400
		28-S25-03-5T	●	5											
Weldon	MFH	16-W16-03-2T	●	2	16	8	16	79	30				Fig.3	0.1	18,800
		20-W20-03-3T	●	3	20	12	20	101	50					0.2	15,700
		20-W20-03-4T	●	4											
		25-W25-03-4T	●		25	17	25	117	60					0.4	13,400
		25-W25-03-5T	●	5											
		32-W32-03-5T	●		32	24	32	131	70					0.7	11,400
		32-W32-03-6T	●	6											
Long Shank	MFH	16-S16-03-2T-150	●	2	16	8	16	150	50				Fig.1	0.2	18,800
		20-S20-03-3T-160	●	3	20	12	20	160	80					0.3	15,700
		25-S25-03-4T-180	●	4	25	17	25	180	100					0.6	13,400
		32-S32-03-5T-200	●	5	32	24	32	200	120					1.1	11,400

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

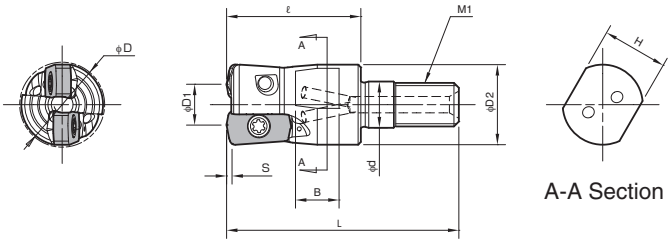
Recommended Cutting Conditions ➔ M126

■ **Max. Revolution**

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

● : Std. Item

MFH Mini type Head



Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) φD	φD1	φD2	φd	L	ℓ	M1	H	B	S	Rake Angle A.R.	Coolant Hole	Max. Revolution (min⁻¹)
MFH	16-M08-03-2T	●	2	16	8	14.7	8.5	43	25	M8xP1.25	12	8	1	-10°	Yes	18,880
	17-M08-03-2T	●		17	9											17,900
	18-M08-03-2T	●		18	10											17,000
	20-M10-03-3T	●	3	20	12	18.7	10.5	49	30	M10xP1.5	15	9				15,700
	20-M10-03-4T	●	4													
	22-M10-03-3T	●	3	22	14											14,700
	22-M10-03-4T	●	4													
	25-M12-03-4T	●		25	17	23	12.5	57	35	M12xP1.75	19	10				13,400
	25-M12-03-5T	●	5													
	28-M12-03-4T	●	4	28	20	23										12,400
	28-M12-03-5T	●	5													
	32-M16-03-5T	●		32	24	30	17	63	40	M16xP2.0	24	12				11,400
	32-M16-03-6T	●	6													
	35-M16-03-6T	○	6	35	27											
	42-M16-03-7T	○	7	42	34											

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ M126

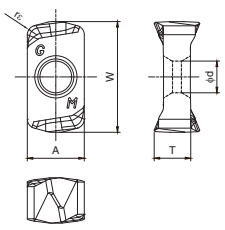
■ **Max. Revolution**
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Ref. to page ➔ M58 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts

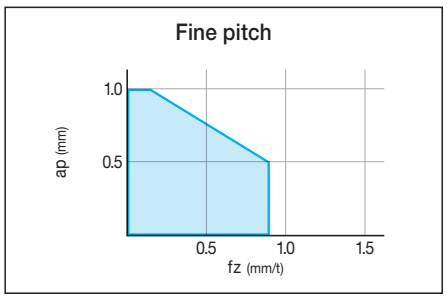
Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
MFH ...-03-...	SB-3065TRP	DTPM-8	MP-1
	for Insert Clamp Recommended tightening torque 1.2N·m		

Applicable Inserts ➔ M13

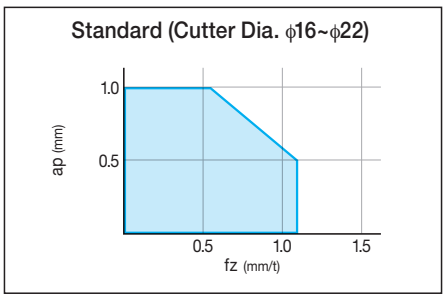
Insert		Description	Dimension (mm) A	T	φd	W	Z	rε	Angle α	MEGACOAT NANO PR1535	PR1525	PR1510	CVD Coated Carbide CA6535
General purpose		LOGU 030310ER-GM	6.2	3.96	3.45	11.9	–	1.0	–	●	●	●	●

● : Std. Item

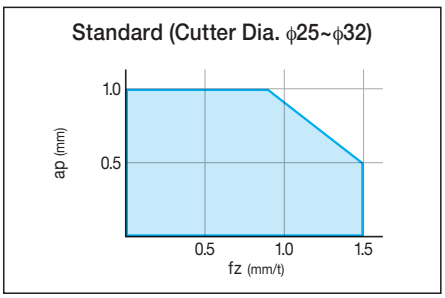
Cutting Performance (GM)



MFH20-····-4T, MFH22-····-4T, MFH25-····-5T
MFH28-····-5T, MFH32-····-6T



MFH16-····-2T, MFH17-····-2T, MFH18-····-2T
MFH20-····-3T, MFH22-····-3T



MFH25-····-4T, MFH28-····-4T, MFH32-····-5T

When using fine pitch type, reduce the cutting conditions compared with standard type.

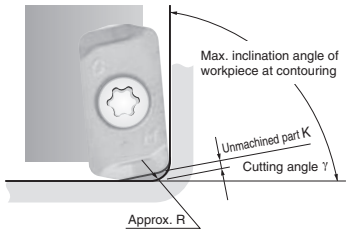
Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz [mm/t]) * Recommended feed rate (Reference value) : ap=0.5mm							Recommended Insert Grades (Cutting Speed Vc [m/min])			
		MFH16 -...-2T	MFH20 -...-3T	MFH20 -...-4T	MFH25 -...-4T	MFH25 -...-5T	MFH32 -...-5T	MFH32 -...-6T	MEGACOAT NANO			CVD Coated Carbide
									PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel	0.2~**0.7**~1.2		0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	☆ 120~**180**~250	★ 120~**180**~250	–	–
	Alloy Steel								☆ 100~**160**~220	★ 100~**160**~220	–	–
	Mold Steel (~40HRC)	0.2~**0.5**~0.9		0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	☆ 80~**140**~180	★ 80~**140**~180	–	–
	Mold Steel (40~50HRC)	0.2~**0.3**~0.5		0.2~**0.25**~0.3	0.2~**0.3**~0.6	0.2~**0.25**~0.3	0.2~**0.3**~0.6	0.2~**0.25**~0.3	☆ 60~**100**~130	★ 60~**100**~130	–	–
	Stainless Steel (Austenitic related)	0.2~**0.5**~0.9		0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	★ 100~**160**~200	☆ 100~**160**~200	–	–
	Stainless Steel (Martensitic related)								☆ 150~**200**~250	–	–	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)								★ 90~**120**~150	–	–	–
	Gray Cast Iron	0.2~**0.7**~1.2		0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	–	–	★ 120~**180**~250	–
	Nodular Cast Iron	0.2~**0.5**~0.9		0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	–	–	★ 100~**150**~200	–
	Ni-base heat-resistant alloys	0.2~**0.3**~0.6		0.2~**0.25**~0.4	0.2~**0.4**~0.8	0.2~**0.25**~0.4	0.2~**0.4**~0.8	0.2~**0.25**~0.4	☆ 20~**30**~50	–	–	★ 20~**30**~50
	Titanium Alloys								★ 40~**60**~80	–	☆ 30~**50**~70	–

Standard Fine pitch ★:1st Recommendation ☆:2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition. For slotting, internal coolant or center through coolant is recommended.

Note for Machining Program (Approx. R)

Shape	Description	Insert Type	Cutting angle γ	Approx. R (mm)	Unmachined part K (mm)	Max. inclination angle of workpiece at contouring
	MFH...-03-...	GM	12°	1.6	0.39	90°

Reference data for Ramping

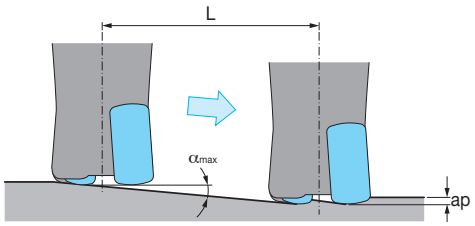
Description	Cutter Dia. ϕD (mm)	16	17	18	20	22	25	28	32
MFH…-03-…	Max. ramping angle α_{max}	2.8°	2.5°	2.1°	1.7°	1.4°	1.2°	1°	0.8°
	tan α_{max}	0.049	0.042	0.037	0.03	0.024	0.021	0.017	0.014

Guide for Ramping (Slant Milling)

- Ramping angle should be under α_{max} (Maximum ramping angle) in the above cutting conditions.
- Feed rate should be under 70% of the above cutting conditions.

Formula of the cutting length "**L**" at Max. ramping angle

$$L = \frac{ap}{\tan \alpha_{max}}$$

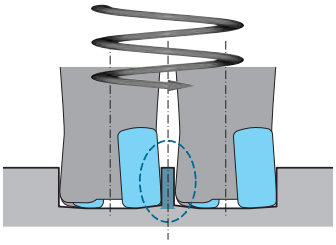


Guide for Helical milling

- For helical milling, use between Min. cutting dia. and Max. cutting dia.

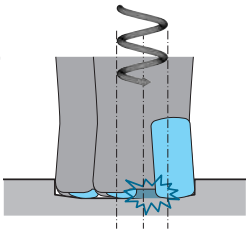
Over Max. Cutting Dia.

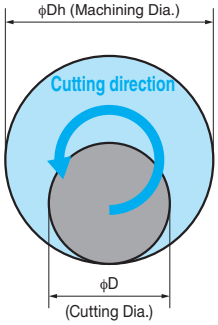
Center core part remains after machining



Under Min. Cutting Dia.

Center core part interferes with toolholder



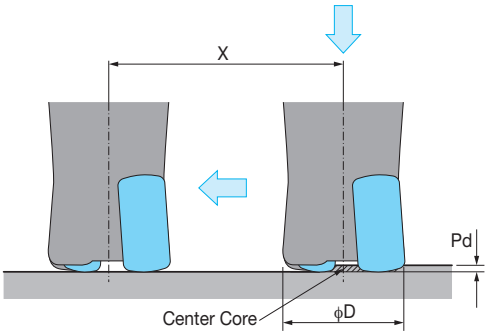


Description	Min. Cutting Dia. ϕDh1	Max. Cutting Dia. ϕDh2
MFH…-03-…	2×D-8	2×D-2

Unit : mm

- Sinking depth at helical milling should be under Max. ap (1mm).
- Down-cut milling is recommended (refer to the figure above)
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

Guide for Drilling



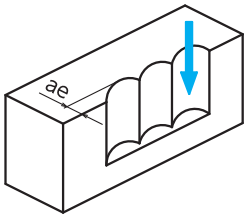
Description	GM	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH…-03-…	1.0	ϕD-9

Unit : mm

* When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
* When drilling, reduce feed rate per revolution to under f=0.2mm/rev.

Vertical milling (Plunging)

Vertical milling (Plunging)



- Available for vertical milling (plunging).

Insert Description	Max. Width of Cut (ae)
LOGU03	3.5mm

- For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

MFH Micro

Cutter Dia.: ϕ8~ϕ16

- **Low Resistance and Durable Against Chatter for Highly Efficient Machining**
- **Max. ap 0.5 mm. Stable High Feed Machining on a Wide Range of Applications**

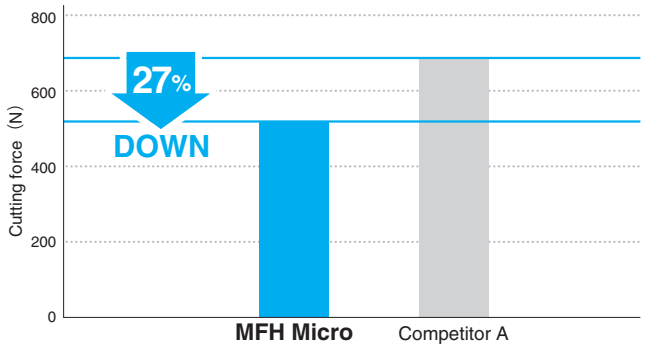
Molded convex cutting edge

High Precision G Class Insert

POINT.1 Stable Machining with Chattering Resistance

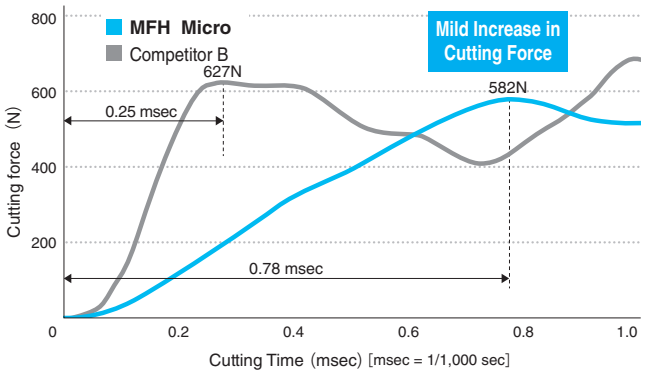
Molded Convex Cutting Edge Controls Initial Impact when Entering the Workpiece

Cutting Force Comparison (Internal evaluation)



Cutting Conditions : Vc=120m/min, fz=0.6mm/t, ap=0.4mm
Cutter Dia. ϕ10mm, Slotting, Dry Workpiece Material : S50C

Increase in Cutting Force when Entering Workpiece (Internal evaluation)



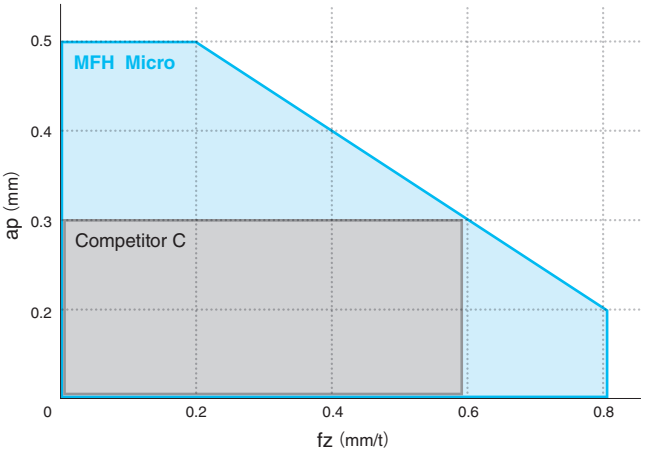
Cutting Conditions : Vc=120m/min, fz=0.6mm/t, ap×ae=0.4×5mm
Cutter Dia. ϕ10mm, Dry Workpiece Material : S50C

POINT.2 Wide Range of Machining Applications

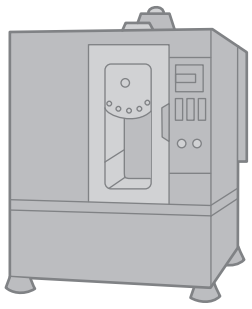
Wide Range of Machining Applications at a Maximum Depth of Cut of 0.5 mm

Stable Machining Even with Small Machining Centers

Cutting Performance Map (Cutter Dia. ϕ10mm)



(Internal evaluation)

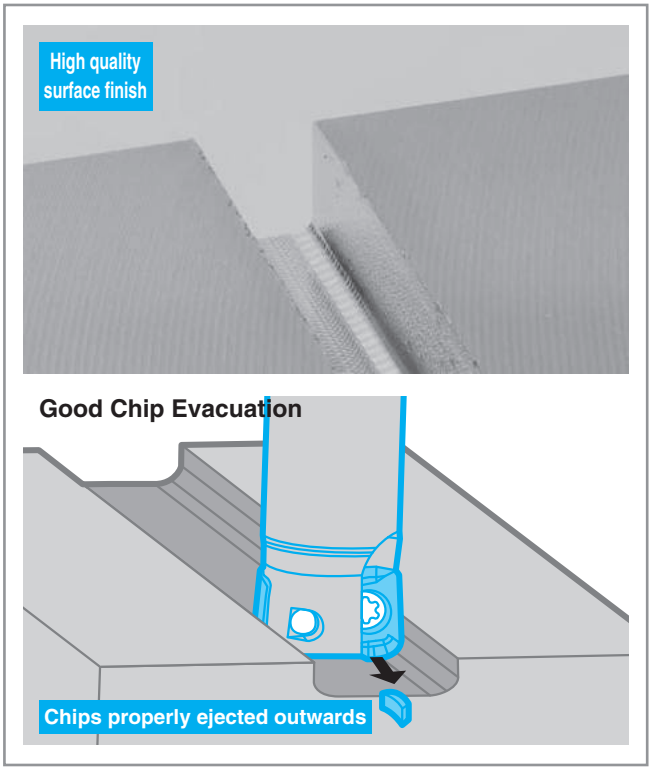


Applicable for BT30/ BT40

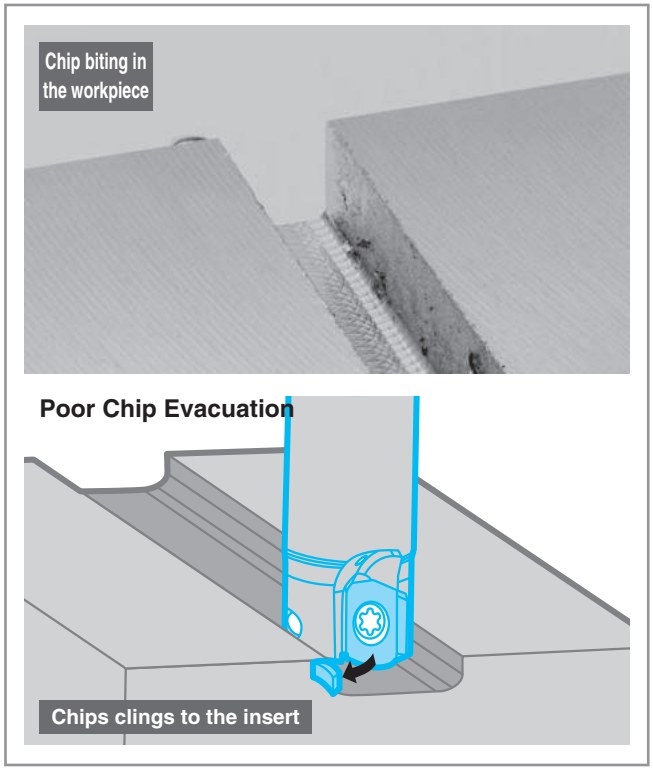
POINT.3 Good Chip Evacuation

Controls Chip Biting with Convex Cutting Edge

MFH Micro



Competitor F



Cutting Conditions : Cutter Dia. Dc=ϕ10mm, Vc=120m/min, fz=0.6mm/t, ap=0.4mm(25passes) Total10mm, Dry Workpiece Material : SS400 (Internal evaluation)

POINT.4 Replaces Solid End Mills to Reduce Machining Costs

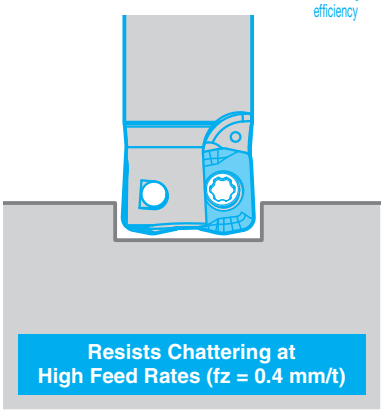
Suppresses Chattering and Increases Milling Efficiency

MFH Micro Compared to Solid End Mills

MFH Micro Q=15.3cc/min

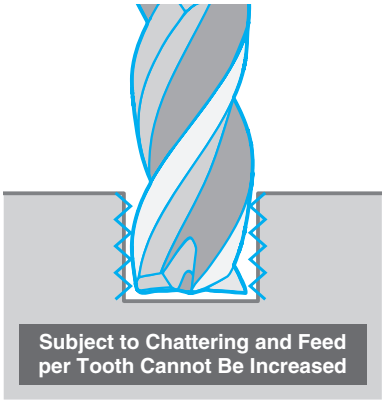
Vc=150m/min, fz=0.4mm/t
ap×ae=0.4×10mm, Dry
MFH10-S10-01-2T (2 inserts)
LPGT010210ER-GM (PR1525)

1.25 times
Machining efficiency



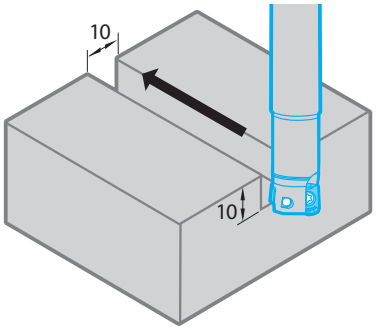
Solid End Mill Q=12.2cc/min

Vc=80m/min, fz=0.04mm/t
ap×ae=3×10mm, Dry
ϕ10 (4 flutes)



Machine Part Slotting

Workpiece Material : S50C



(Evaluation by the user)

MFH Micro End Mill

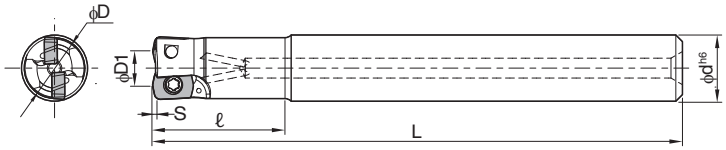


Fig.1

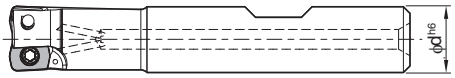


Fig.2

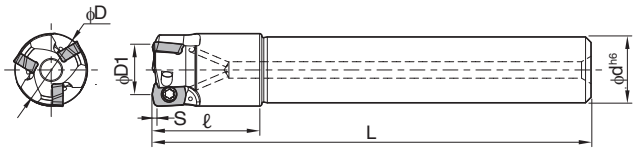


Fig.3

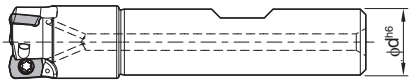


Fig.4

Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)						Max. ramping angle	A.R.	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				φD	φD1	φd	L	ℓ	S						
Standard Shank	MFH 08-S10-01-1T	●	1	8	4.2	10	75	16	0.5	4°	5°	Yes	Fig.1	0.04	20,000
	10-S10-01-2T	●	2	10	6.2	10	80	20		3°				0.04	16,200
	12-S12-01-3T	●	3	12	8.2	12	80	20		2°				0.06	14,000
	16-S16-01-4T	●	4	16	12.2	16	90	25		1.2°				0.12	11,400
Over Size (Straight)	MFH 14-S12-01-3T	●	3	14	10.2	12	80	20	0.5	1.5°	5°	Yes	Fig.3	0.07	12,500
Weldon	MFH 08-W10-01-1T	●	1	8	4.2	10	58	16	0.5	4°	5°	Yes	Fig.2	0.03	20,000
	10-W10-01-2T	●	2	10	6.2	10	60	20		3°				0.03	16,200
	12-W12-01-3T	●	3	12	8.2	12	65	20		2°				0.05	14,000
	16-W16-01-4T	●	4	16	12.2	16	73	25		1.2°				0.1	11,400
Over Size (Weldon)	MFH 14-W12-01-3T	●	3	14	10.2	12	65	20	0.5	1.5°	5°	Yes	Fig.4	0.05	12,500

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

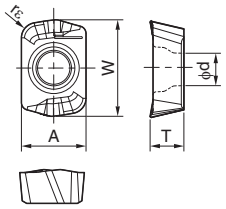
■ **Max. Revolution**
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Spare Parts

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
MFH…-01-…	SB-1840TRP	FTP-6	MP-1

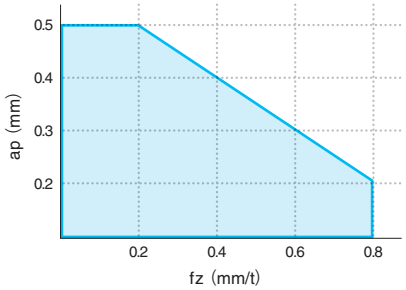
● : Std. Item

Applicable Inserts M13

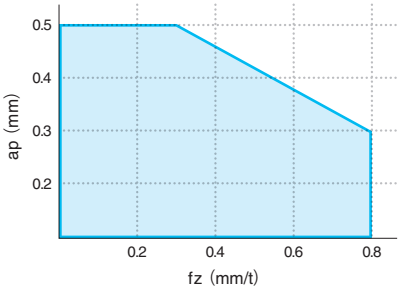
Insert		Description	Dimension (mm)					MEGACOAT NANO		CVD Coated Carbide
			A	T	φd	W	rε	PR1535	PR1525	CA6535
General purpose		LPGT 010210ER-GM	4.19	2.19	2.1	6.26	1.0	●	●	●

Cutting Performance

Cutter Dia. : φ8~φ12



Cutter Dia. : φ14~φ16



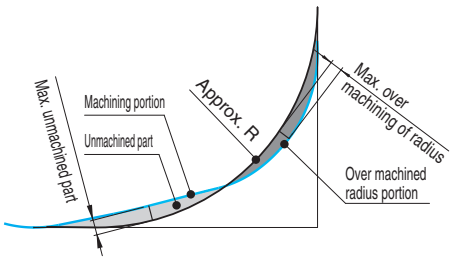
Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz [mm/t]) * Recommended feed rate (Reference value) : ap=0.3mm					Recommended Insert Grades (Cutting Speed Vc : m/min)		
		MFH08-…-1T	MFH10-…-2T	MFH12-…-3T	MFH14-…-3T	MFH16-…-4T	MEGACOAT NANO		CVD Coated Carbide
							PR1525	PR1535	CA6535
GM	Carbon Steel	0.2~**0.4**~0.6			0.2~**0.5**~0.8		★ 120~**180**~250	☆ 120~**180**~250	-
	Alloy Steel						★ 100~**160**~220	☆ 100~**160**~220	-
	Mold Steel (~40HRC)	0.2~**0.3**~0.5			0.2~**0.4**~0.6		★ 80~**140**~180	☆ 80~**140**~180	-
	Mold Steel (40~50HRC)	0.2~**0.25**~0.3			0.2~**0.25**~0.4		★ 60~**100**~130	☆ 60~**100**~130	-
	Stainless Steel (Austenitic related)	0.2~**0.3**~0.5			0.2~**0.4**~0.6		☆ 100~**160**~200	★ 100~**160**~200	-
	Stainless Steel (Martensitic related)						-	☆ 150~**200**~250	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)						-	★ 90~**120**~150	-
	Gray Cast Iron	0.2~**0.4**~0.6			0.2~**0.5**~0.8		★ 120~**180**~250	-	-
	Nodular Cast Iron	0.2~**0.3**~0.5			0.2~**0.4**~0.6		★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.25**~0.3			0.2~**0.25**~0.4		-	☆ 20~**30**~50	★ 20~**30**~50
	Titanium Alloys						-	★ 40~**60**~80	-

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
★1st Recommendation ☆2nd Recommendation
The bold-faced number indicates a center value of recommended cutting condition.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Internal coolant is recommended for slotting.

● : Std. Item

Note for Machining Program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined part (mm)
	R1.0	0	0.21
	R1.2 (Recommended)	0	0.17
	R1.5	0.08	0.1
	R2.0	0.28	0.01

Cutting Edge Angle : 12°

Reference data for Ramping

Description	Cutter Dia. ϕD (mm)	8	10	12	14	16
MFH…-01-…	Max. ramping angle α_{max}	4.0°	3.0°	2.0°	1.5°	1.2°
	tan α_{max}	0.070	0.052	0.035	0.026	0.021

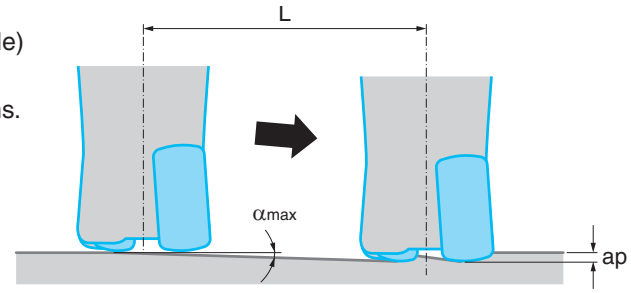
Decrease ramping angle if chips become excessively long

Guide for Ramping (Slant Milling)

Guide for Ramping (Slant Milling)
Ramping angle should be under α_{max} (Maximum ramping angle) in the above cutting conditions.
Feed rate should be under 70% of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan \alpha_{max}}$$

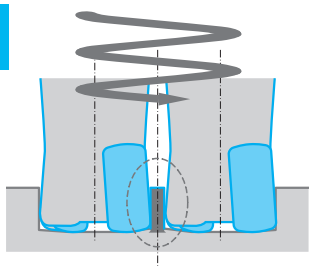


Guide for Helical milling

For helical milling, use between Min. cutting dia. and Max. cutting dia.

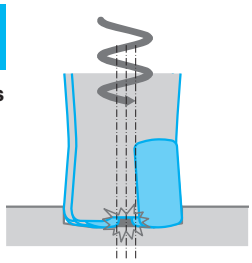
Exceeding Max. Cutting Dia.

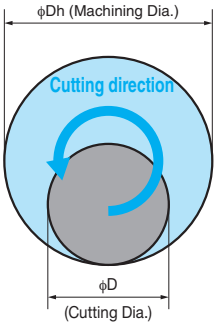
Center core part remains after machining



Under Min. Cutting Dia.

Center core part interferes with toolholder



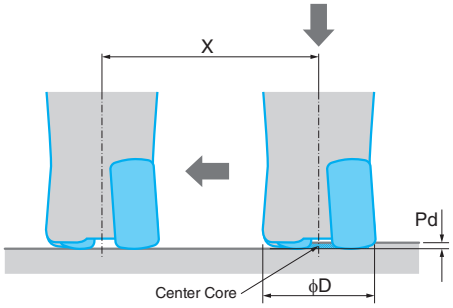


Description	Min. Cutting Dia. ϕDh1	Max. Cutting Dia. ϕDh2
MFH…-01-…	2×D-3.5	2×D-2

Unit : mm

- Sinking depth at helical milling should be under Max. ap (0.5mm).
- Down-cut milling is recommended (refer to the figure above)
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

Guide for Drilling



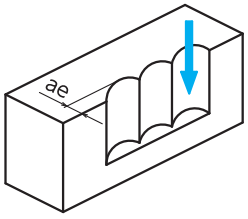
Description	GM	
	Max. Cutting Depth Pd	Min. cutting length X for flat bottom surface
MFH…-01-…	0.5	ϕD-3.5

Unit : mm

* When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
* When drilling, reduce feed rate per revolution to under f=0.2mm/rev.

Vertical milling (Plunging)

Vertical milling (Plunging)

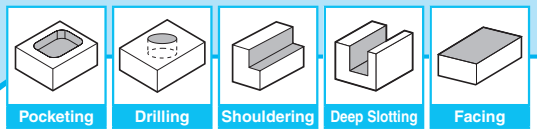


- Available for vertical milling (plunging).

Insert Description	Max. Width of Cut (ae)
LOGT01	1.7mm

- For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

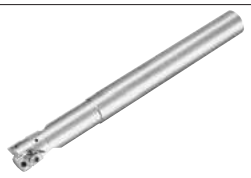
Multi-Function Machining End Mill MEY



MEY

Standard

Long Head


Long Shank

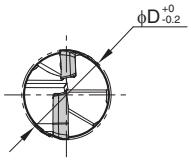
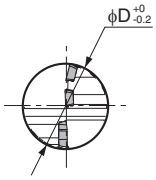


Fig.1



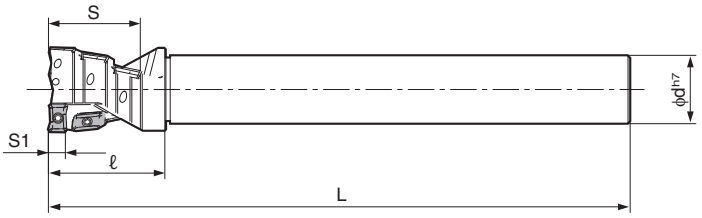


Fig.2

Toolholder Dimensions

	Description		Std.	No. of Inserts	No. of Flutes	Dimension (mm) φD	φd	L	ℓ	S	S1	Rake Angle A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound
Standard	MEY	16-S16	●	4	2	16	16	120	31	19	4.5	+11°	-11°	Fig.1	SB-2040TRG	DTM-6	MP-1
		17-S16	●			17											
		20-S20	●			20	20	130	35	22	6	+13°	-9°		SB-2555TRG	DT-8	
		21-S20	●			21											
		25-S25	●			25	25	140	40	28	7.5		-11°		SB-3070TRG	DT-10	
		26-S25	●			26											
		32-S32	●			32	32	150	50	36	9.5		-9°		SB-4070TRG	DT-15	
		33-S32	●			33											
		40-S32	●	7		40		160	55	42	7.5		-11°	Fig.2	SB-3070TRG	DT-10	
		50-S42	●			50	42	170	70	54	9.5		-9°		SB-4070TRG	DT-15	
Long Head	MEY	16-S16-140H	●	4	2	16	16	140	51	19	4.5	+11°	-11°	Fig.1	SB-2040TRG	DTM-6	MP-1
		20-S20-150H	●			20	20	150	53	22	6	+13°	-9°		SB-2555TRG	DT-8	
		25-S25-170H	●			25	25	170	70	28	7.5		-11°		SB-3070TRG	DT-10	
		32-S32-180H	●			32	32	180	80	36	9.5		-9°		SB-4070TRG	DT-15	
Long Shank	MEY	16-S16-190	●	4	2	16	16	190	61	19	4.5	+11°	-11°	Fig.1	SB-2040TRG	DTM-6	MP-1
		17-S16-190	●			17			31								
		20-S20-200	●			20	20	200	63	22	6	+13°	-9°		SB-2555TRG	DT-8	
		21-S20-200	●			21			35								
		25-S25-220	●			25	25	220	80	28	7.5		-11°		SB-3070TRG	DT-10	
		26-S25-220	●			26			40								
		32-S32-230	●			32	32	230	90	36	9.5		-9°		SB-4070TRG	DT-15	
		33-S32-230	●			33			50								
		40-S32-240	●	7		40		240	55	42	7.5		-11°	Fig.2	SB-3070TRG	DT-10	
		50-S42-250	●			50	42	250	70	54	9.5		-9°		SB-4070TRG	DT-15	
Weldon	MEY	16-S16-80W-H	●	4	2	16	16	80	31	19	4.5	+11°	-11°		SB-2040TRG	DTM-6	MP-1
		17-S16-80W-H	●			17											
		20-S20-85W-H	●			20	20	85	35	22	6	+13°	-9°		SB-2555TRG	DT-8	
		21-S20-85W-H	●			21											
		25-S25-95W-H	●			25	25	95	40	28	7.5		-11°		SB-3070TRG	DT-10	
		26-S25-95W-H	●			26											
		32-S32-110W-H	●			32	32	110	50	36	9.5		-9°		SB-4070TRG	DT-15	
		33-S32-110W-H	●			33											
		40-S32-130W-H	●	7		40		130	55	42	7.5		-11°		SB-3070TRG	DT-10	
		50-S40-140W-H	●			50	40	140	70	54	9.5		-9°		SB-4070TRG	DT-15	

・S1 shows the edge length of the complete 2-insert part.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Applicable Inserts

Description		Applicable Inserts → M19			
		Side Edge	No. of Inserts	Center Edge	No. of Inserts
MEY	16-S16(-...)	JOMT08T208ER-D	3	GOMT08T208ER-D	1
	17-S16(-...)				
	20-S20(-...)	JOMT100308ER-D		GOMT100308ER-D	
	21-S20(-...)				
	25-S25(-...)	JOMT13T308ER-D		GOMT13T308ER-D	
	26-S25(-...)				
	32-S32(-...)	JOMT160408ER-D		GOMT160408ER-D	
	33-S32(-...)				
	40-S32(-...)	JOMT13T308ER-D	6	GOMT13T308ER-D	
	50-S42(-...)	JOMT160408ER-D		GOMT160408ER-D	

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
			MEGACOAT		PVD Coated Carbide
	Drilling	Shouldering Slotting	PR1225	PR1210	PR830
Carbon Steel	0.08~0.15	0.05~0.25	★ 120~250	-	☆ 120~200
Alloy Steel	0.08~0.15	0.05~0.25	★ 100~220	-	☆ 100~180
Mold Steel	0.08~0.12	0.05~0.15	★ 80~180	-	☆ 80~150
Stainless Steel	0.08~0.12	0.05~0.15	★ 120~220	-	☆ 100~180
Cast Iron	0.05~0.20	0.05~0.25	-	★ 100~220	-

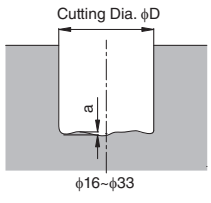
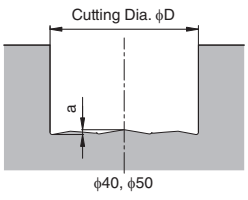
★ : 1st Recommendation ☆ : 2nd Recommendation

Caution of drilling

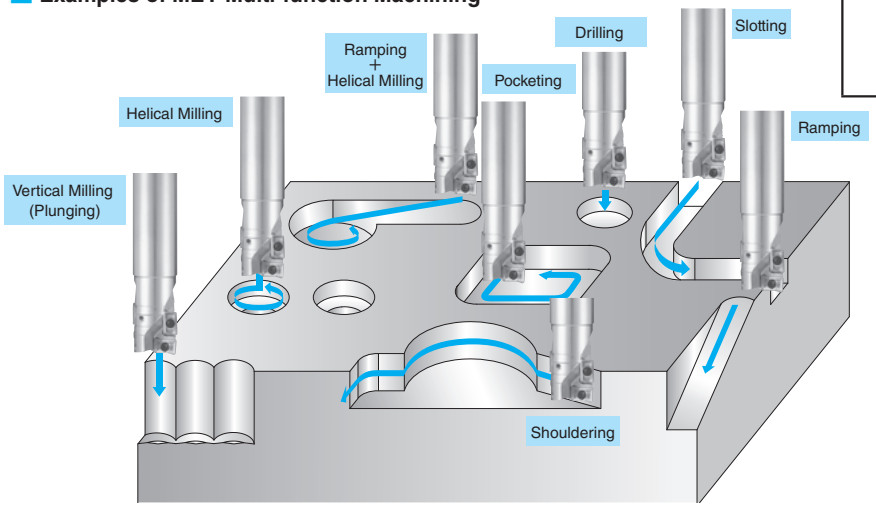
(1) Drilling conditions should be calculated as one flute line.
(2) Use compressed air during drilling.
(3) Carbon steel other than low carbon steel can be drilled to a depth of 0.5D without step feeding.
For soft steel or sticky material such as stainless steel, step feed drilling (0.5-1.0mm) is recommended.
(4) For stainless steel drilling, coolant is recommended.
(5) Please refer to right list for maximum hole depth.

Cutting Dia. (ϕD)	Max. hole depth (mm)
ϕ16	13
ϕ17	13
ϕ20	17
ϕ21	17
ϕ25	22
ϕ26	22
ϕ32	29
ϕ33	29
ϕ40	36
ϕ50	40

Shape of the bottom of the drilled hole

Cutting Dia.	a (mm)	Shape of the bottom
ϕ16, ϕ17	0.5	
ϕ20, ϕ21	0.64	
ϕ25, ϕ26	0.85	
ϕ32, ϕ33	1.12	
ϕ40	1.54	
ϕ50	1.65	

Examples of MEY Multi-function Machining



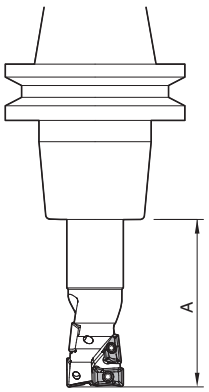
Multi-Function Machining End Mill MEY

Cutting Performance of MEY

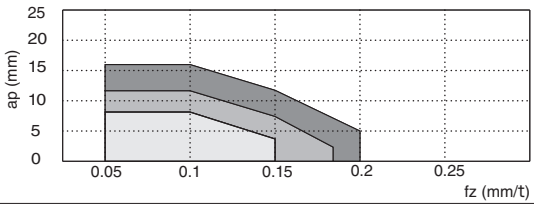
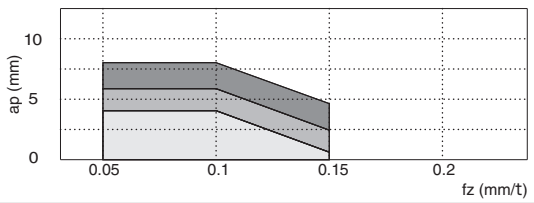
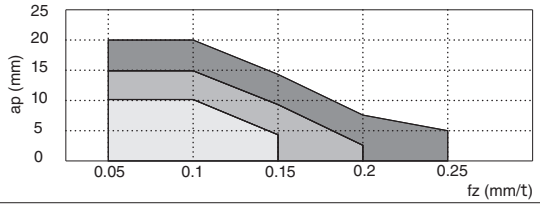
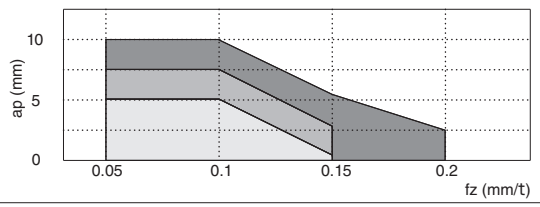
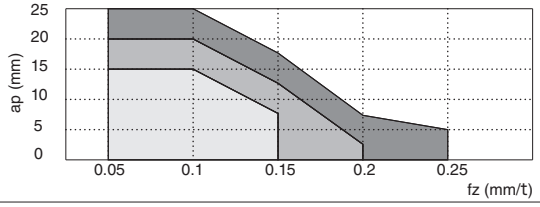
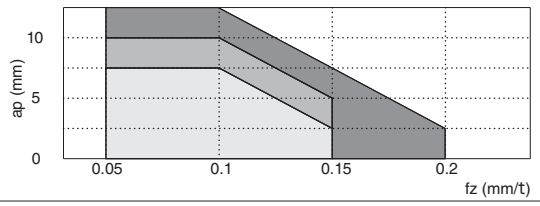
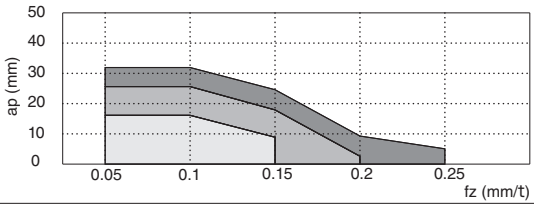
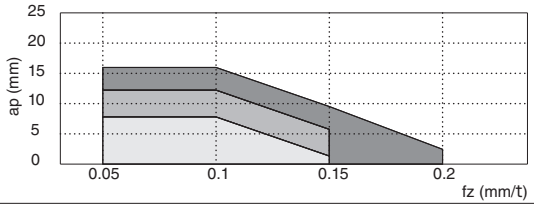
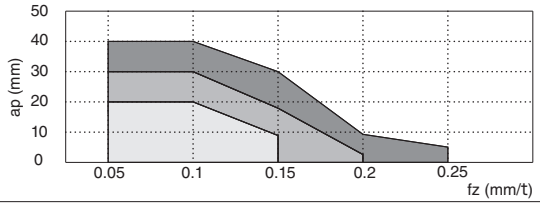
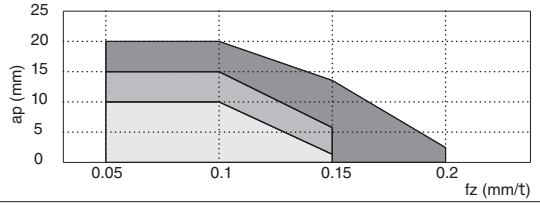
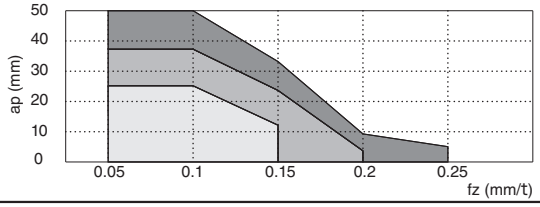
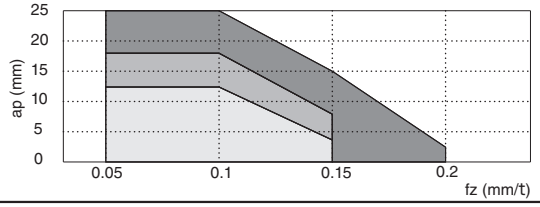
〔Workpiece Material : S50C〕

Cutting Dia.	Description	Overhang Length A (mm)		
ϕ16	MEY16-S16	31	[~61]	(Not Recommended)
	MEY16-S16-140H	-	~61	[~91]
	MEY16-S16-190	-	61	~91
ϕ17	MEY17-S16	31	[~61]	(Not Recommended)
	MEY17-S16-190	31	~61	~91
ϕ20	MEY20-S20	35	[~65]	(Not Recommended)
	MEY20-S20-150H	-	~65	[~95]
	MEY20-S20-200	-	65	~95
ϕ21	MEY21-S20	35	[~65]	(Not Recommended)
	MEY21-S20-200	35	~65	~95
ϕ25	MEY25-S25	40	[~70]	(Not Recommended)
	MEY25-S25-170H	-	70	[~100]
	MEY25-S25-220	-	~80	~100
ϕ26	MEY26-S25	40	[~70]	(Not Recommended)
	MEY26-S25-220	40	~70	~100
ϕ32	MEY32-S32	50	[~80]	(Not Recommended)
	MEY32-S32-180H	-	~80	[~110]
	MEY32-S32-230	-	90	~110
ϕ33	MEY33-S32	50	[~80]	(Not Recommended)
	MEY33-S32-230	50	~80	~110
ϕ40	MEY40-S32	55	[~85]	[~115]
	MEY40-S32-240	55	~85	~115
ϕ50	MEY50-S42	70	[~100]	[~130]
	MEY50-S42-250	70	~100	~130

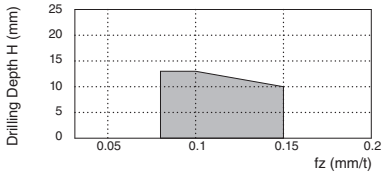
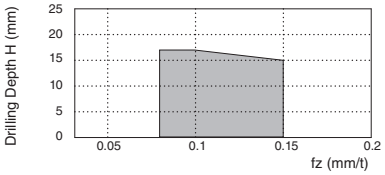
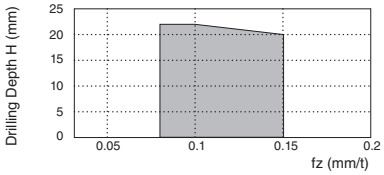
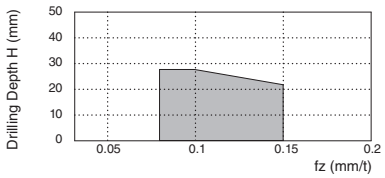
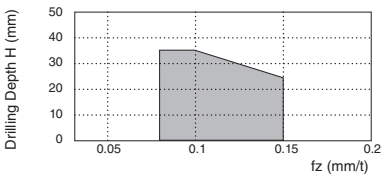
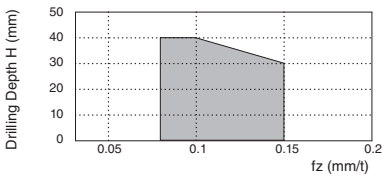
Shape



When using in [ ] dimension, be careful that the chucking length to the shank may get too short.

Description	■ Shouldering (Cutting width ae = ϕD/2) Note) Part ae = ϕD/4	■ Slotting ■ Ramping and Helical Milling
MEY16-S16 MEY17-S16		
MEY20-S20 MEY21-S20		
MEY25-S25 MEY26-S25		
MEY32-S32 MEY33-S32		
MEY40-S32		
MEY50-S42		

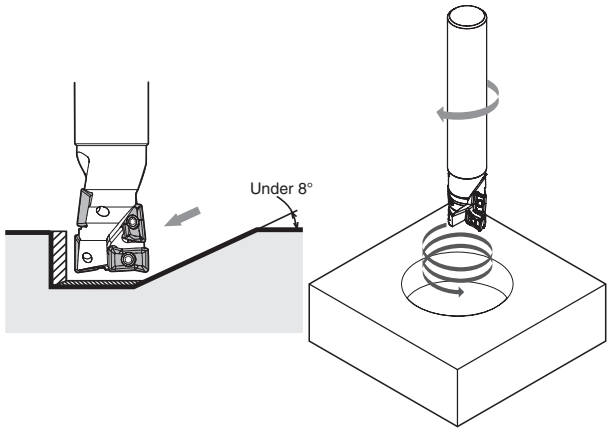
Drilling [Standard / Long Head / Long Shank: S50C]

MEY16-S16 MEY17-S16	MEY20-S20 MEY21-S20	MEY25-S25 MEY26-S25
		
MEY32-S32 MEY33-S32	**MEY40-S32**	**MEY50-S42**
		

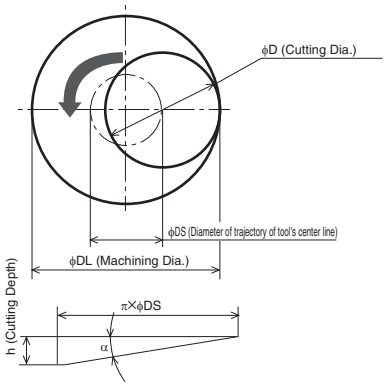
How to Use MEY Effectively

Ramping / Helical Milling

- Ramping angle is recommended to be under 8°.
- Sinking depth at helical milling should be set under 1/2 of the tool diameter.
  Use compressed air during machining.



Helical Milling Factors



ϕDS(How to find diameter of trajectory of tool's center line)

$\phi DS = \phi DL - \phi D$

h (How to find "h")

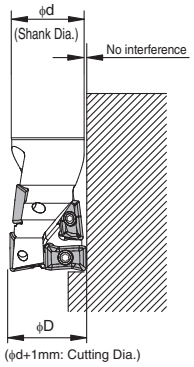
$h = \pi \times \phi DS \times \tan\alpha$

(α should be under 8°)

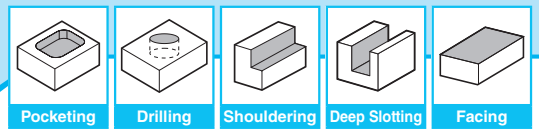
Shouldering

- Tools with 1mm larger cutting diameter than shank diameter are available.
  High wall shouldering is possible.
- Lineup (mm)

Description	ϕD	ϕd
MEY17-S16	17	16
MEY21-S20	21	20
MEY26-S25	26	25
MEY33-S32	33	32
MEY17-S16-190	17	16
MEY21-S20-200	21	20
MEY26-S25-220	26	25
MEY33-S32-230	33	32



Multi-Function Machining End Mill MEZ-G



MEZ-G

Standard

Long Shank / Long Head

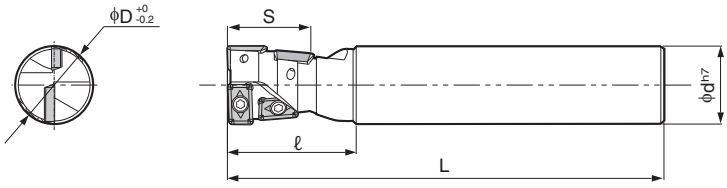


Fig.1

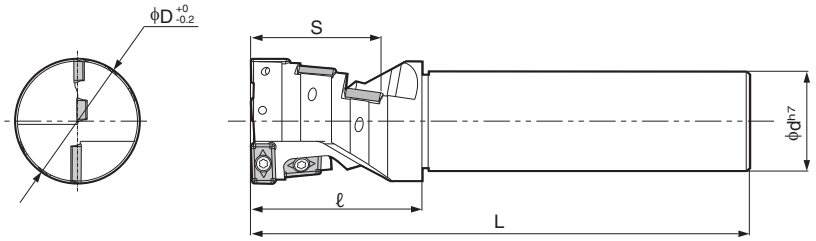


Fig.2

Toolholder Dimensions

Description		Std.	No. of Inserts	No. of Flutes	Dimension (mm) φD	φd	L	ℓ	S	Rake Angle A.R.	R.R.	Drawing	Spare Parts Clamp Screw	Spare Parts Wrench	Ref. to Page for Applicable Inserts M20
Standard	MEZ 16-S16G	●	4	2	16	16	120	31	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6	NDMT080208ER-D□
	20-S20G	●			20	20	130	33	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D□
	25-S25G	●			25	25	140	40	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D□
	32-S32G	●			32	32	150	50	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
	40-S32G	●	7		39	32	160	55	39		-3°	Fig.2	SB-3070TRG	DT-10	NEMT120308ER-D□
	50-S42G	●			49	42	170	70	51		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
Long Head	MEZ 16-S16-140HG	●	4		16	16	140	51	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6	NDMT080208ER-D□
	20-S20-150HG	●			20	20	150	53	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D□
	25-S25-170HG	●			25	25	170	70	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D□
	32-S32-180HG	●			32	32	180	80	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
Long Shank	MEZ 16-S16-190G	●	4		16	16	190	61	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6	NDMT080208ER-D□
	20-S20-200G	●			20	20	200	63	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D□
	25-S25-220G	●			25	25	220	80	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D□
	32-S32-230G	●			32	32	230	90	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
	40-S32-240G	●	7		39	32	240	55	39		-3°	Fig.2	SB-3070TRG	DT-10	NEMT120308ER-D□
	50-S42-250G	●			49	42	250	70	51		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□

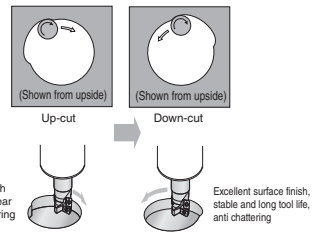
Recommended Cutting Conditions

Workpiece Material	fz (mm/t) Drilling	fz (mm/t) Shouldering Slotting	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN100M	MEGACOAT PR1225	MEGACOAT PR1210	Carbide KW10
Carbon Steel	0.05~0.2	0.05~0.2	★ 120~200	★ 120~250	-	-
Alloy Steel	0.05~0.2	0.05~0.2	★ 100~180	★ 100~220	-	-
Mold Steel	0.05~0.12	0.05~0.15	★ 100~180	★ 80~180	-	-
Stainless Steel	0.05~0.12	0.05~0.15	☆ 120~200	★ 120~220	-	-
Cast Iron	0.05~0.2	0.05~0.2	-	-	★ 100~220	☆ 80~150
Non-ferrous Metals	0.05~0.2	0.05~0.2	-	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

- Drilling conditions should be calculated as one flute line. Step feed (0.5-0.1mm) is recommended.
- Coolant is recommended when drilling stainless steel / cast iron.

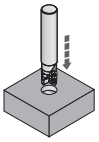
- Down-cut milling is recommended for the improvement of tool life and surface finish.
- Compressed air is recommended.



How to use MEZ-G effectively

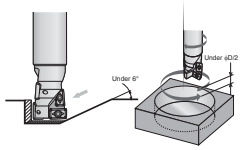
Drilling

- Step feeding is recommended for good chip control. (Depth approx. 1mm)
- Drill depth should be under 0.5D. (D:Drilling Dia.) Use compressed air during machining.



Ramping / Helical Milling

- Ramping angle is recommended to be under 6°.
- Plunge depth per revolution when helical milling should be under 1/2D. Use compressed air during machining.



End Milling

- Tough edge insert is recommended for high load end milling. (High feed rate, large ap) Use a low cutting force insert to prevent chattering.

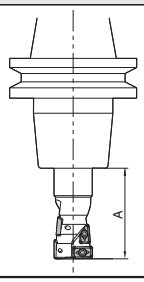
N(D/E)MT...ER-DH (Tough Edge)

N(D/E)MT...ER-D (Low Cutting Force)

● : Std. Item

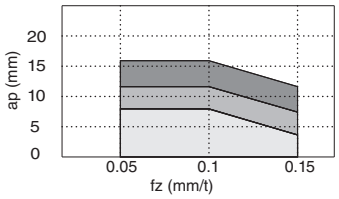
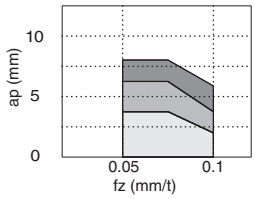
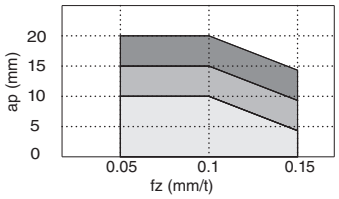
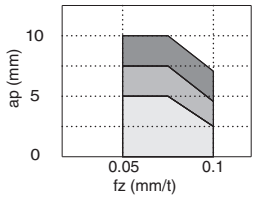
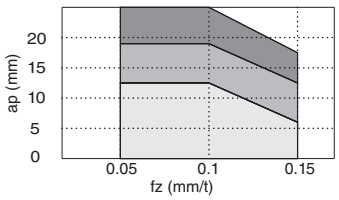
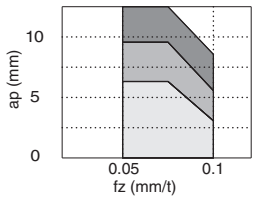
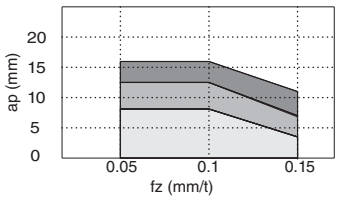
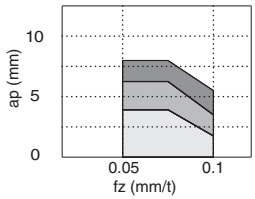
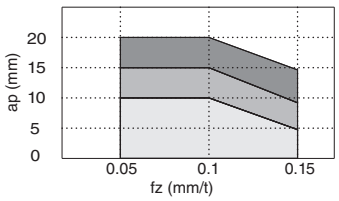
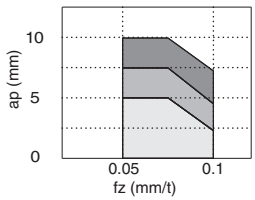
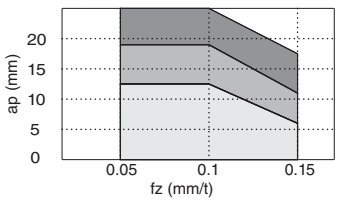
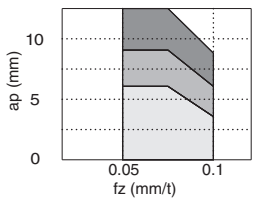
Cutting Performance of MEZ-G

〔Workpiece Material : S50C〕

Cutting Dia.	Description	Overhang Length A (mm)			Cutting Dia.	Description	Overhang Length A (mm)			Shape
ϕ16	MEZ16-S16G	31	[~61]	(Not Recommended)	ϕ32	MEZ32-S32G	50	[~80]	(Not Recommended)	
	MEZ16-S16-140HG	-	~61	[~91]		MEZ32-S32-180HG	-	80	[~110]	
	MEZ16-S16-190G	-	61	~91		MEZ32-S32-230G	-	90	~110	
ϕ20	MEZ20-S20G	33	[~63]	(Not Recommended)	ϕ39	MEZ40-S32G	55	[~85]	[~115]	
	MEZ20-S20-150HG	-	~63	[~93]		-	-	-	-	
	MEZ20-S20-200G	-	63	~93		MEZ40-S32-240G	55	~85	~115	
ϕ25	MEZ25-S25G	40	[~70]	(Not Recommended)	ϕ49	MEZ50-S42G	70	[~100]	[~130]	
	MEZ25-S25-170HG	-	70	[~100]		-	-	-	-	
	MEZ25-S25-220G	-	80	~100		MEZ50-S42-250G	70	~100	~130	

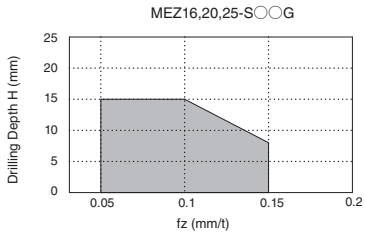
When using in [ ] dimension, be careful that the chucking length to the shank may get too short.

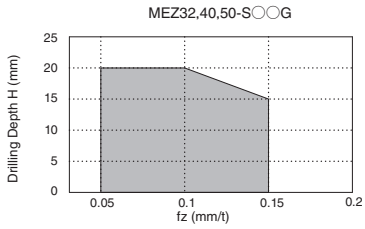
Shouldering / Slotting

Description	■ Shouldering (Cutting width ae = ϕD/2) Note) Part ae = ϕD/4	■ Slotting ■ Ramping and Helical Milling
MEZ16-S16G		
MEZ20-S20G		
MEZ25-S25G		
MEZ32-S32G		
MEZ40-S32G		
MEZ50-S42G		

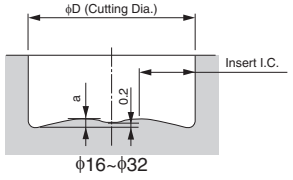
Drilling

■ Drilling
(Standard / Long Head / Long Shank)



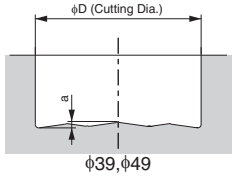


Shape of the bottom of the drilled hole
(ϕ16~ϕ49)



ϕ16~ϕ32

Cutting Dia.	ϕ16	ϕ20	ϕ25	ϕ32
a (mm)	0.30	0.33	0.38	0.45



ϕ39,ϕ49

Cutting Dia.	ϕ39	ϕ49
a (mm)	0.68	0.74

Slot Mill MST

Full range from 1.6mm to 23.3mm in 3 types

Full lineup of MST Series Slot Mills

Type	Applicable Inserts	Features	Slot width (mm)												
			1.6	2.2 (2.25)	3.05	4.05	6	8	10	13	14	16	18	20	22	24
MSTA	SLT..	1.6~4.05mm fixed	●	●	●	●										
MSTB	LNEU12..	6~13mm semi-adjustable					←			→						
MSTC	SP..10T3..	14~18mm full-adjustable									←		→			
	SD..1204...	18~23.3mm full-adjustable												←		→

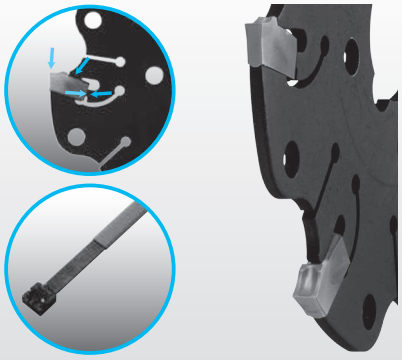
* Adjustable in 0.5mm increments between 6mm and 13mm with the combination of inserts

* Adjustable between 14mm and 18mm

* Adjustable between 18mm and 23.3mm

Slot Mill MSTA (Slot width 1.6, 2.2(2.25), 3.05, 4.05mm)

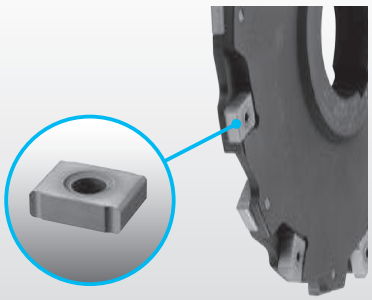
- **Self-clamping type Slot Mill**
  MSTA Slot Mills have simple self-clamping system to allow for easy attachment by just installing the insert.
- **High Rigidity Clamping System**
  Owing to the high rigidity clamping system - with an end - stopper, the toolholder enable high operability and stable slotting by maintaining an accurate edge position.
- **Double-Prism Clamping System**
  High replacement precision due to the double-prism clamping system
- **Easy replacement**
  The replacement of inserts is easy and quick by using special wrench.



Wrench is not attached. Please purchase it separately.

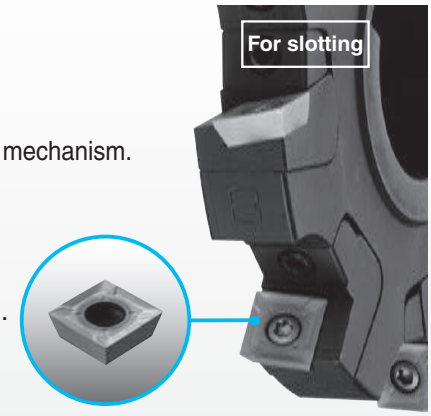
Slot Mill MSTB (Slot width 6.0~13.0mm)

- **Up-right type / semi-adjustable slot width**
- **Easy and secure screw holding**
  Inserts can be attached to the MSTB Slot Mills very easily by using clamp screws.
- **Economical 4-edge Insert**
- **Applicable to a variety of slotting by choosing different inserts.**
  By changing the thickness of inserts, it's a applicable to various slotting widths up to max 13mm in 0.5mm increments.

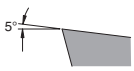
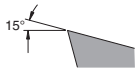
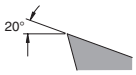


Slot Mill MSTC (Slot width 14.0~23.3mm)

- Lay-down type / full-adjustable slot width
- Applicable to various slotting needs. Slotting widths: 14.0mm to 23.3mm.
  Cutter Dia.: from 100mm to 160mm
- Smooth slotting width adjustment is possible owing to unique cam style adjustment mechanism.
- Economical 4-edge Insert
- Wide range corner-R repertories are suitable for various work.
- Owing to the wiper edge insert, an excellent surface finish can be expected.
- Owing to numerous insert geometries and grades, they are applicable for various types of workpiece machining.



Features of Insert Grades

Insert Shape			
Symbol	SB	SD	SE
Rake Angle			
Shape			

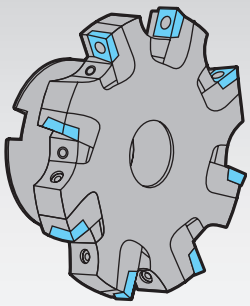
CA0835
·TiN+TiCN+Al_2O_3 based CVD Coated Carbide
·For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron.
·For middle to high speed machining.

PR0725
·TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
·For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron.
·For middle speed machining.

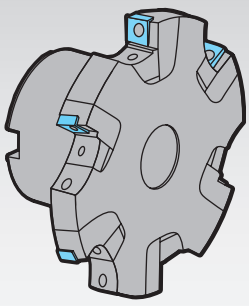
PR0110
·TiB_2 based PVD Coated Carbide
·For Non-ferrous Metals such as Aluminum Alloys (Si<10%) and Titanium Alloys.
·For high speed machining.

With Boss

Right-hand



Left-hand



Slot Mill MSTA (Self-clamping type)

Slotting | Slotting | Cut-Off

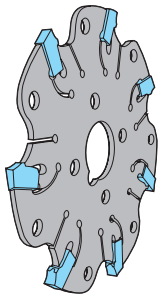
Identification System

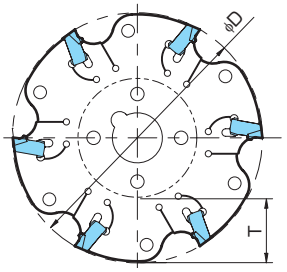
MSTA Slot Mill

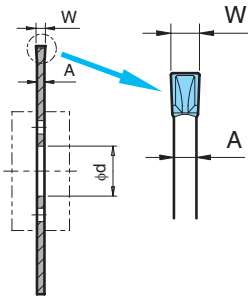
MSTA ○○○ **N** ○○○-○○ **T**

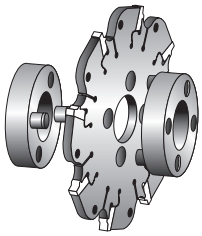
MSTA	○○○	N	○○○-○○	T
Self-clamping type Slot Mill	Cutting Dia.	Neutral	Edge Width	No. of Inserts

MSTA (Metric)









Drive Ring (sold separately)
Assembly Example

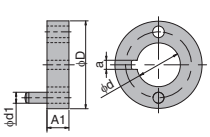
Toolholder Dimensions

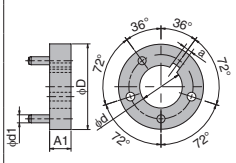
Description		Std.	Edge Width W (mm)	Slot Depth T (mm)	No. of Inserts	Dimension (mm) φD	Dimension (mm) φd (H7)	Dimension (mm) A	Weight (kg)	Applicable Inserts ➡M144	Max. Revolution (min⁻¹)	Spare Parts Wrench	Recommended Cutting Conditions	Applicable Arbor
MSTA	63N16-5T	●	1.6	15	5	63	16	1.3	0.03	SLT16…	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately) ·How to use Wrench →M145	M145	M165
	80N16-7T	●		21	7	80			0.04		4,000			
	100N16-9T	●		27	9	100	22		0.07		3,200			
	125N16-11T	●		35	11	125	32		0.1		2,600			
MSTA	63N22-5T	●	2.2 (2.25)	15	5	63	16	1.8	0.03	SLT22…	5,100			
	80N22-7T	●		21	7	80			0.05		4,000			
	100N22-9T	●		27	9	100	22		0.08		3,200			
	125N22-11T	●		35	11	125	32		0.12		2,600			
	160N22-14T	●		40	14	160	40		0.3		2,000			
MSTA	63N30-4T	●	3.05	15	4	63	16	2.4	0.05	SLT30…	5,100			
	80N30-6T	●		21	6	80			0.08		4,000			
	100N30-9T	●		27	9	100	22		0.13		3,200			
	125N30-11T	●		35	11	125	32		0.2		2,600			
	160N30-14T	●		40	14	160	40		0.35		2,000			
MSTA	63N40-4T	●	4.05	15	4	63	16	3.4	0.06	SLT40…	5,100			
	80N40-6T	●		21	6	80			0.1		4,000			
	100N40-9T	●		27	9	100	22		0.15		3,200			
	125N40-11T	●		35	11	125	32		0.25		2,600			
	160N40-14T	●		40	14	160	40		0.4		2,000			

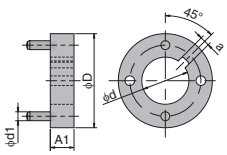
Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singulary. Please purchase two drive rings per one MSTA slot mill..
2. Do not exceed the max. revolution.
3. Do not operate cutting on reverse revolution.
4. Wrench (MS-FRW1) is not attached. Please purchase it separately.

Drive Ring (For Metric)

Shape	Description	Std.	Dimension (mm) φd	φD	A1	a	φd1	Drawing	Applicable Toolholders
Fig.1	DR16-32A	●	16	32	8	4.1	3	Fig.2	MSTA 63N16-5T, 63N22-7T
	DR16-32B	●					4	Fig.1	MSTA 63N30-4T, 63N40-4T
	DR16-38	●		38				Fig.3	MSTA 80N○○-○T
Fig.2	DR22-46	●	22	46	10	6.1	5		MSTA 100N○○-○T
	DR32-55	●	32	55		8.1	6		MSTA 125N○○-○○T
Fig.3	DR40-80	●	40	80	12	10.1	12		MSTA 160N○○-○○T



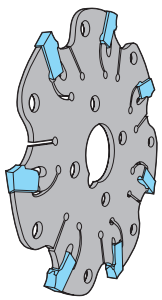


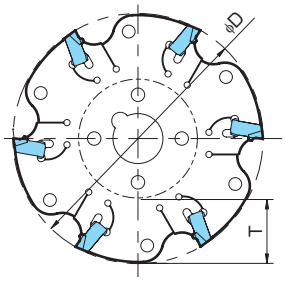


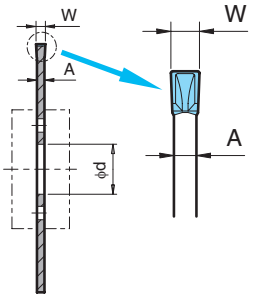
● : Std. Item

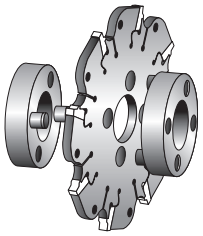
Wrenches and drive rings are sold in 1 piece per 1 box.

MSTA (inch spec)









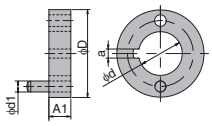
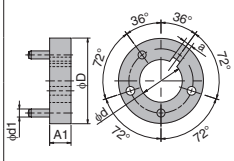
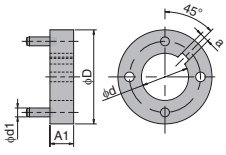
Drive Ring (sold separately)
Assembly Example

Toolholder Dimensions

Description		Std.	Edge Width W (inch)	Slot Depth T (inch)	No. of Inserts	Dimension (inch) φD	Dimension (inch) φd (H7)	Dimension (inch) A	Weight (kg)	Applicable Inserts ➡M144	Max. Revolution (min⁻¹)	Spare Parts Wrench	Recommended Cutting Conditions	Applicable Arbor
MSTA	02N063-5T	○	.063 (1.6mm)	.625 (15.875mm)	5	2.500 (63.5mm)	.625 (15.875mm)	.051 (1.3mm)	0.03	SLT16…	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately) ·How to use Wrench →M145	M145	M165
	03N063-7T	○		.875 (22.225mm)	7	3.000 (76.2mm)			0.04		4,000			
	04N063-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.07		3,200			
	05N063-11T	○		1.375 (34.925mm)	11	5.000 (127mm)	1.250 (31.75mm)		0.1		2,600			
MSTA	03N089-7T	○	.089 (2.2mm) (2.25mm)	.875 (22.225mm)	7	3.000 (76.2mm)	.625 (15.875mm)	.071 (1.8mm)	0.05	SLT22…	4,000			
	04N089-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.08		3,200			
	06N089-14T	○		1.438 (36.525mm)	14	6.000 (152.4mm)	1.250 (31.75mm)		0.3		2,000			
MSTA	02N126-4T	○	.120 (3.05mm)	.625 (15.875mm)	4	2.500 (63.5mm)	.625 (15.875mm)	.095 (2.4mm)	0.05	SLT30…	5,100			
	03N126-6T	○		.875 (22.225mm)	6	3.000 (76.2mm)			0.08		4,000			
	04N126-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.13		3,200			
	05N126-11T	○		1.375 (34.925mm)	11	5.000 (127mm)	1.250 (31.75mm)		0.2		2,600			
	06N126-14T	○		1.438 (36.525mm)	14	6.000 (152.4mm)			0.35		2,000			
MSTA	03N164-6T	○	.160 (4.05mm)	.875 (22.225mm)	6	3.000 (76.2mm)	.625 (15.875mm)	.134 (3.4mm)	0.1	SLT40…	4,000			
	04N164-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.15		3,200			
	05N164-11T	○		1.375 (34.925mm)	11	5.000 (127mm)	1.250 (31.75mm)		0.25		2,600			

Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singulary.
Please purchase two drive rings per one MSTA slot mill.
2. Do not exceed the max. revolution.
3. Do not operate cutting on reverse revolution.
4. Wrench (MS-FRW1) is not attached. Please purchase it separately.

Drive Ring (for Inch spec)

Shape	Description	Std.	Dimension (inch) φd	φD	A1	a	φd1	Drawing	Applicable Toolholders
 Fig.1	DR0625-1250A	○	.625 (15.875mm)	1.250 (31.75mm)	.315 (8mm)	.130 (3.3mm)	.158 (4mm)	Fig.1	MSTA 02N126-4T
 Fig.2	DR0625-1250B	○					.120 (3mm)	Fig.2	MSTA 02N063-5T
 Fig.3	DR0625-1250C	○						Fig.3	MSTA 03N○○○-○T
	DR1000-1875	○	1.000 (25.4mm)	1.875 (47.625mm)	.394 (10mm)	.256 (6.5mm)	.200 (5mm)		MSTA 04N○○○-○T
	DR1250-2250	○	1.250 (31.75mm)	2.250 (57.15mm)		.319 (8.1mm)	.240 (6mm)		MSTA 05N○○○-○T
	DR1250-3125	○	1.250 (31.75mm)	3.125 (79.375mm)	.472 (12mm)	.319 (8.1mm)	.472 (12mm)		MSTA 06N○○○-○T

○ : Check Availability

Wrenches and drive rings are sold in 1 piece per 1 box.

Slot Mill SLT type Insert

Inserts Identification System

S L T	16	-	15	S	KB
(1)	(2)		(3)	(4)	(5)

(1) Insert Symbol

(2) Edge Width

Symbol	Edge Width
16	1.6mm
22	2.2(2.25)mm
30	3.05mm
40	4.05mm

(3) Corner-R (rε)

Symbol	Corner-R (rε)
15	0.15mm
20	0.2mm

(4) Edge Preparation

Symbol	Edge Preparation
S	Chamfered + R-honed

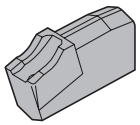
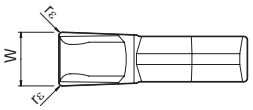
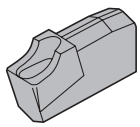
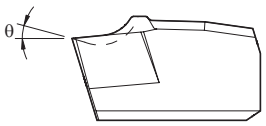
(5) Chipbreaker Symbol

Symbol	Rake Angle
KB	5°
KD	15°

SLT

Classification of usage
●: 1st Choice
○: 2nd Choice

				Ref. to Page for Applicable Toolholders
P	Carbon Steel / Alloy Steel	●	○	
M	Stainless Steel	○	●	
K	Cast Iron	○		
N	Non-ferrous Metals			
S	Heat-resistant Alloys		●	
	Titanium Alloys			

Insert	Description	Dimension (mm) W	Dimension (mm) rε	Rake Angle θ	CVD Coated Carbide CA0835	PVD Coated Carbide PR0735	Ref. to Page for Applicable Toolholders
	SLT 16-15SKB	1.6 +0 -0.1	0.15	5°	●	●	M142 M143
	22-20SKB	2.2 +0.08 -0.05	0.2	5°	●	●	
	30-20SKB	3.05 +0.15 -0	0.2	5°	●	●	
	40-20SKB	4.05 +0.15 -0	0.2	5°	●	●	
 Low Cutting Force	SLT 16-15SKD	1.6 +0 -0.1	0.15	15°	●	●	
	22-20SKD	2.25 +0.15 -0	0.2	15°	●	●	
	30-20SKD	3.05 +0.15 -0	0.2	15°	●	●	
	40-20SKD	4.05 +0.15 -0	0.2	15°	●	●	

Selection of chipbreaker

KB Chipbreaker ··· General purpose chipbreaker for Steel and Cast Iron
KD Chipbreaker ··· Low cutting force chipbreaker for Stainless Steel

Features of Insert Grades

CA0835

- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron.
- For middle to high speed machining.

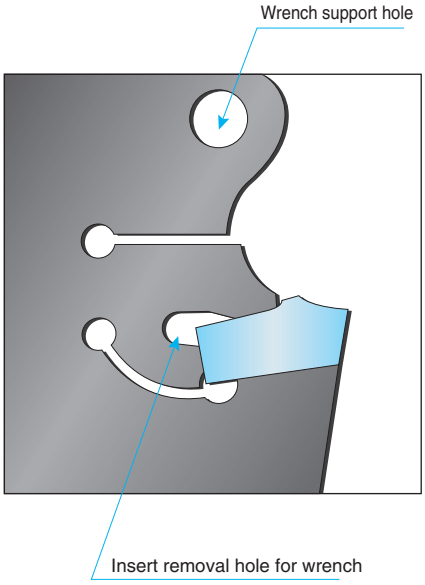
PR0735

- TiN base PVD Coated Carbide
- For Stainless Steel, Heat-resistant Alloys, etc
- For low to middle speed machining

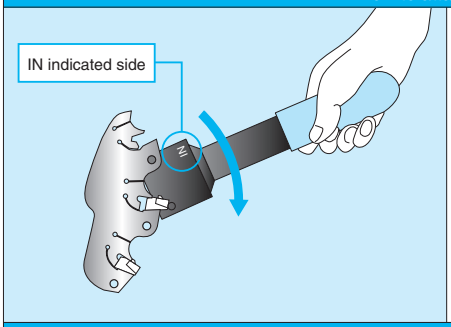
Inserts are sold in 10 piece boxes

● : Std. Item

Set up

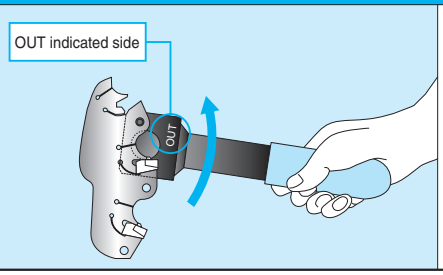


How to attach inserts



1. Put insert inside the slot mill.
2. Insert one of the pins on the wrench (on **IN** indicated side) into the wrench support hole.
3. Using the other pin, push the front relief surface of the insert.
4. Rotate the wrench until insert's back end makes contact with slot mill.

How to detach inserts



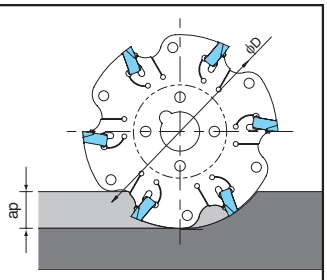
1. Insert one of the pins on the wrench (on **OUT** indicated side) into the wrench support hole, and insert other pin into the insert releasing hole.
2. Insert can be uninstalled by rotating the wrench counterclockwise. (A magnet is installed on **OUT** indicated side.)

Note) Use appropriate wrench for set up.

Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc: m/min)		fz (mm/t)				Remarks
			CVD Coated Carbide	PVD Coated Carbide	Edge Width (mm)				
			CA0835	**PR0735**	1.6	2.2(2.25)	3.05	4.05	
Low Carbon Steel	SS400 S10C～S25C	125	250～310	200～250	0.03～0.12	0.04～0.14	0.06～0.18	0.08～0.20	Coolant
Carbon Steel	S30C～S58C (Annealed)	190	160～190	130～160	0.03～0.12	0.04～0.14	0.06～0.18	0.08～0.20	
	S30C～S58C (Heat treated)	250	140～180	110～150	0.03～0.12	0.04～0.14	0.06～0.18	0.08～0.20	
Alloy Steel	SCM, SCr, etc. (Annealed)	180	140～180	110～150	0.03～0.12	0.04～0.14	0.06～0.18	0.08～0.20	
	SCM, SCr, etc. (Heat treated)	275	120～160	100～130	0.03～0.10	0.04～0.12	0.06～0.16	0.08～0.18	
High Carbon Alloy	SKD11, SKD61, etc.	280	100～140	80～120	0.03～0.10	0.04～0.12	0.06～0.16	0.08～0.18	
Stainless Steel	SUS304, SUS316, SUH310, etc.	220	150～190	80～120	0.03～0.10	0.04～0.12	0.06～0.16	0.08～0.18	
	SUS403, SUS410, SUH430F, etc.	300	140～180	60～80	0.03～0.10	0.04～0.12	0.06～0.16	0.08～0.18	
Gray Cast Iron	FC250～FC350	260	160～200	-	0.03～0.12	0.04～0.14	0.06～0.18	0.08～0.20	Dry
Nodular Cast Iron	FCD400～FCD500	160	130～160	-	0.03～0.12	0.04～0.14	0.06～0.18	0.08～0.20	
	FCD600～FCD800	250	110～140	-	0.03～0.12	0.04～0.14	0.06～0.18	0.08～0.20	

Note) 1. Use down-cut machining.
2. If ap is under 1/10 of Cutter Dia.(ϕD), it is possible to increase feed per tooth fz) 40%.



Identification System

MSTB Slot Mill

Metric

MSTB ○○○ A N ○○○○ - ○ T

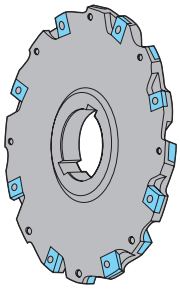
- MSTB: Slot Mill with Up-right Insert
- ○○○: Cutting Dia. (mm)
- A: Without Boss / S: With Boss
- N: Neutral
- ○○○○: Edge Width (mm)
- ○ T: No. of Flutes

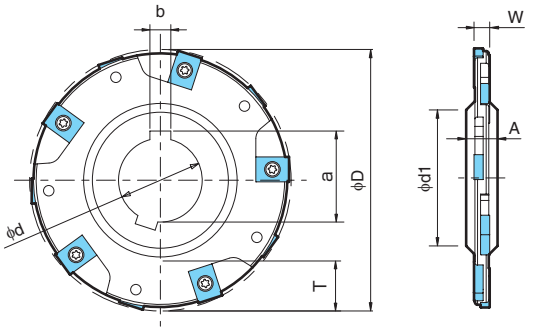
Inch spec

MSTB ○○○○ A N ○○○ - ○ T

- MSTB: Slot Mill with Up-right Insert
- ○○○○: Cutting Dia (inch)
- A: Without Boss
- N: Neutral
- ○○○: Min. Edge Width (inch)
- ○ T: No. of Flutes

Without Boss





In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

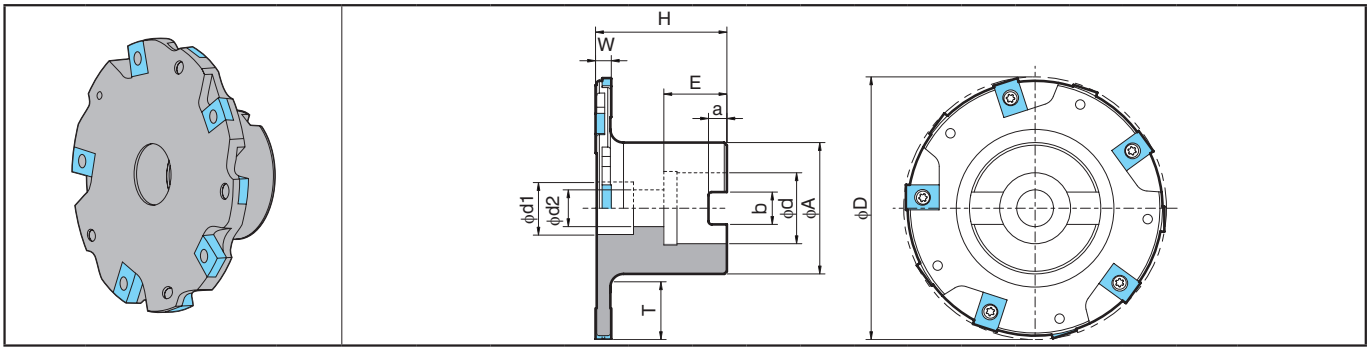
Description		Std.	Edge Width (mm) W (min.)	Edge Width (mm) W (max.)	Slot Depth T (mm)	No. of Inserts	No. of Edge Lines	Dimension (mm) ϕD	ϕd (H7)	ϕd1	A	a	b	Weight (kg)	Max. Revolution (min⁻¹)
MSTB	80AN0607-4T	●	6	7	15	8	4	80	27	44	12	29.8	7	0.3	9,240
	100AN0607-5T	●			21	10	5	100	32	52		34.8	8	0.4	8,270
	125AN0607-6T	●			28	12	6	125	40	63		43.5	10	0.7	7,390
	160AN0607-8T	●			45.5	16	8	160						1.1	6,540
MSTB	80AN0809-4T	●	8	9	16	8	4	80	27	44		29.8	7	0.4	9,240
	100AN0809-5T	●			22	10	5	100	32	52		34.8	8	0.5	8,270
	160AN0809-8T	●			45.5	16	8	160	40	63		43.5	10	1.3	6,540
MSTB	125AN1011-4T	●	10	11	30	12	4	125						0.9	7,390
	160AN1011-5T	●			47.5	15	5	160						1.6	6,540
MSTB	160AN1213-5T	●	12	13	48.5	15	5	160						1.6	6,540

Toolholder Dimensions (inch spec)

Description		Std.	Edge Width (inch) W (min.)	Edge Width (inch) W (max.)	Slot Depth T (inch)	No. of Inserts	No. of Edge Lines	Dimension (inch) ϕD	ϕd (H7)	ϕd1	A	a	b	Weight (kg)	Max. Revolution (min⁻¹)
MSTB	3000AN250-4T	○	.250 (6.35mm)	.289 (7.34mm)	.625 (15.875mm)	8	4	3.000 (76.2mm)	1.000 (25.4mm)	1.500 (38.1mm)	.500 (12.7mm)	1.106 (28.1mm)	.250 (6.35mm)	0.3	9,470
	4000AN250-5T	○			.935 (23.8mm)	10	5	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.3	8,200
	5000AN250-6T	○			1.435 (36.4mm)	12	6	5.000 (127mm)						0.7	7,300
	6000AN250-8T	○			1.750 (44.45mm)	16	8	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.0	6,700
MSTB	4000AN312-5T	○	.312 (7.92mm)	.351 (8.91mm)	.966 (24.5mm)	10	5	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.5	7,400
	5000AN312-6T	○			1.466 (37.2mm)	12	6	5.000 (127mm)						0.8	6,600
	6000AN312-8T	○			1.781 (45.2mm)	16	8	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.1	6,000
MSTB	4000AN375-3T	○	.375 (9.525mm)	.414 (10.52mm)	1.000 (25.4mm)	9	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.5	7,400
	5000AN375-4T	○			1.500 (38.1mm)	12	4	5.000 (127mm)						0.8	6,600
	6000AN375-5T	○			1.812 (46.0mm)	15	5	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.3	6,000
MSTB	4000AN500-3T	○	.500 (12.7mm)	.539 (13.69mm)	1.060 (26.9mm)	9	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.6	4,900
	5000AN500-4T	○			1.560 (39.6mm)	12	4	5.000 (127mm)						1.1	4,400
	6000AN500-5T	○			1.875 (47.6mm)	15	5	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.7	4,000

● : Std. Item
○ : Check Availability

With Boss



Toolholder Dimensions (Metric)

Description		Std.	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)									Weight (kg)	Max. Revolution (min^{-1})
			W (min.)	W (max.)	T (mm)			φD	φd (H7)	φA	H (min.)	E	a	b	φd1	φd2		
MSTB	80SN0607-4T	●	6	7	16	8	4	80	22	40	50	23	6.3	10.4	18	12	0.7	9,240
	100SN0607-5T	●			21	10	5	100	27	50		24	7	12.4	20	14	1.0	8,270
	160SN0607-8T	●			41	16	8	160	40	70		28	9	16.4	33	22	1.9	6,540
MSTB	80SN0809-4T	●	8	9	16	8	4	80	22	40		23	6.3	10.4	18	12	0.8	9,240
	100SN0809-5T	●			21	10	5	100	27	50		24	7	12.4	20	14	1.2	8,270
	160SN0809-8T	●			41	16	8	160	40	70		28	9	16.4	33	22	2.2	6,540
MSTB	125SN1011-4T	●	10	11	26	12	4	125									2.0	7,390
	160SN1011-5T	●			43	15	5	160									2.5	6,540

Note) H (min.) dimension shows in case of minimum of edge width.

Spare Parts and Applicable Inserts

Spare Parts

Description				Spare Parts				Applicable Inserts	Recommended Cutting Conditions	Applicable Arbor
				Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt			
Metric	Without Boss	MSTB	○○○AN0607-○T	SE-40050TRN	TT-15L	MP-1	-	LN12... M148,M149	M150	M165
			○○○AN0809-○T	SE-40068TR						
			○○○AN1011-○T							
			160AN1213-5T	SE-40090TR						
	With Boss	MSTB	80SN0607-4T	SE-40050TRN			HH10X35			
			100SN0607-5T				HH12X35			
			160SN0607-8T				HH20X40			
		MSTB	80SN0809-4T	SE-40068TR			HH10X35			
			100SN0809-5T				HH12X35			
			160SN0809-8T				HH20X40			
		MSTB	○○○SN1011-○T	SE-40068TR			HH20X40			
Inch spec	Without Boss	MSTB	○○○○AN250-○T	SE-40055TR	TT-15L	MP-1	-			
			○○○○AN312-○T	SE-40068TR						
			○○○○AN375-○T							
			○○○○AN500-○T	SE-40090TR						

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Slot Mill LN type Insert

Inserts Identification System

L N E U	12	35	-	03	S
(1)	(2)	(3)		(4)	(5)

(1) Insert Symbol

(2) Insert Length

Symbol	Insert Length
12	12.7mm

(3) Edge Width

Symbol	Edge Width
35	3.5mm
40	4.0mm

(4) Corner-R (rε)

Symbol	Corner-R (rε)
03	0.3mm
04	0.4mm

(5) Edge Preparation

Symbol	Edge Preparation
S	Chamfered + R-honed

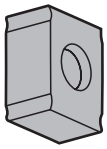
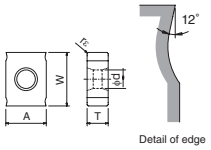
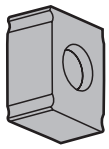
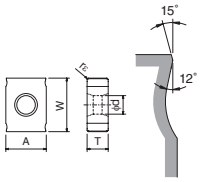
LN

(mm)

Description	W	A
LNEU12	12.7	9.52

Classification of usage
●:1st Choice
○:2nd Choice

P	Carbon Steel / Alloy Steel	●
M	Stainless Steel	●
K	Cast Iron	○
N	Non-ferrous Metals	
S	Heat-resistant Alloys	●
	Titanium Alloys	○

Insert		Description		Usable edges	Dimension (mm) T	Dimension (mm) ϕd	Dimension (mm) rε	PVD Coated Carbide PR0725	Applicable Clamp Screw	Ref. to Page for Applicable Toolholders	Ref. to Page for Recommended Cutting Conditions
 Honed		LNEU	**1235-03-4**	4	3.5	4.4	0.3	●	**SE-40050TRN**	**M146 M147**	**M150**
			1240-08-4	4	4.0	4.4	0.8	●	**SE-40055TR**		
			1245-04	4	4.5	4.2	0.4	●	**SE-40068TR**		
			1245-08				0.8	●			
			1250-04	4	5.0	4.2	0.4	●	**SE-40080TR**		
			1250-08				0.8	●			
			1255-04	4	5.5	4.2	0.4	●	**SE-40090TR**		
			1255-08				0.8	●			
			1260-04	4	6.0	4.2	0.4	●	**SE-40100TR**		
 Tough Edge		LNEU	**1235-03S-4**	4	3.5	4.4	0.3	●	**SE-40050TRN**		
			1240-03S-4	4	4.0	4.4	0.3	●	**SE-40055TR**		
			1245-04S	4	4.5	4.2	0.4	●	**SE-40068TR**		
			1245-08S				0.8	●			
			1250-04S	4	5.0	4.2	0.4	●	**SE-40080TR**		
			1250-08S				0.8	●			

Notes) 1. Please select the applicable clamp screw depending on each insert description.
2. Ref. to page **M149** for insert description and applicable clamp screw depending on edge width.

Features of Insert Grades

PR0725

- TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron.
- For middle speed machining.

Inserts are sold in 10 piece boxes

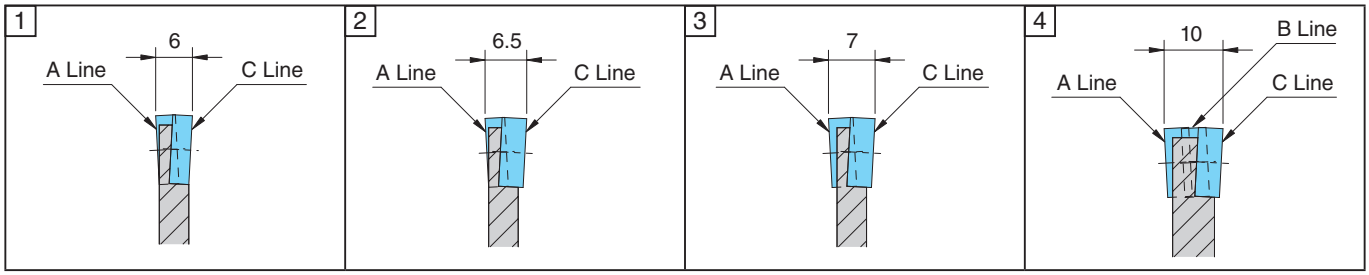
● : Std. Item

Combination of Applicable Inserts

	Description	Clamp Screw (Standard attachment parts)	Edge Width mm	Edge Width inch (mm)	A Line Applicable Inserts	A Line Clamp Screw	B Line Applicable Inserts	B Line Clamp Screw	C Line Applicable Inserts	C Line Clamp Screw	Wrench for Clamp Screw	Tightening Torque (N·m)
Metric	MSTB ○○○AN0607-○T	SE-40050TRN	6	-	LNEU1235..	SE-40050TRN	-	-	LNEU1235..	SE-40050TRN	TT-15L	3
	○○○SN0607-○T		6.5						LNEU1240..	SE-40055TR		
			7		LNEU1240..	SE-40055TR						
	MSTB ○○○AN0809-○T	SE-40068TR	8	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
	○○○SN0809-○T		8.5						LNEU1250..	SE-40080TR		
			9		LNEU1250..	SE-40080TR						
	MSTB ○○○AN1011-○T	SE-40068TR	10	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
	○○○SN1011-○T		10.5						LNEU1250..	SE-40080TR		
			11		LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○AN1213-○T	SE-40090TR	12	-	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
			12.5						LNEU1260...	SE-40100TR		
			13		LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				
Inch spec	MSTB ○○○○AN250-○T	SE-40055TR	-	.250 (6.35mm)	LNEU1240..	SE-40055TR	-	-	LNEU1240..	SE-40055TR		
				.270 (6.86mm)					LNEU1245..	SE-40068TR		
				.289 (7.34mm)	LNEU1245..	SE-40068TR						
	MSTB ○○○○AN312-○T	SE-40068TR	-	.312 (7.92mm)	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
				.332 (8.43mm)					LNEU1250..	SE-40080TR		
				.351 (8.91mm)	LNEU1250..	SE-40080TR						
	MSTB ○○○○AN375-○T	SE-40068TR	-	.375 (9.525mm)	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
				.395 (10.33mm)					LNEU1250..	SE-40080TR		
				.414 (10.52mm)	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○○AN500-○T	SE-40090TR	-	.500 (12.7mm)	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
				.520 (13.21mm)					LNEU1260...	SE-40100TR		
				.539 (13.69mm)	LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				

* For clamp screw, above listed “Standard attachment parts” are attached. In case of necessity of another size of clamp screw by changing slotting width, please purchase separately.

Slot width (edge width) adjustment



The slot width (edge width) of MSTB slot mills is adjustable by a maximum of 1mm (.039") with the combination of inserts.

1. In the case of MSTB ○○○ AN0607-○T the width (W) is 6mm by installing LNEU1235 on both A line and C line.
2. By replacing C line only with LNEU1240 the width (W) is 6.5mm.
3. By replacing A line and C line with LNEU1240 the width (W) is 7mm.
4. If the slotting width (edge width) is 10mm (.375”), the B line (middle edge) is necessary.

* Caution

1) There is no description such as “A line”, “B line”, and “C line” on the actual slot mill. These are only for explanation of the combination of insert.
2) Use proper clamp screws for applicable inserts on the basis of the above chart.
3) Please do not use any slot mills, that have a difference of width of more than 1mm (.039")

Bottom cutting shape of MSTB Slot Mill

Slot bottom shape will be (Fig.1) convex shape.

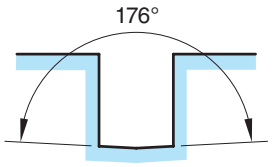


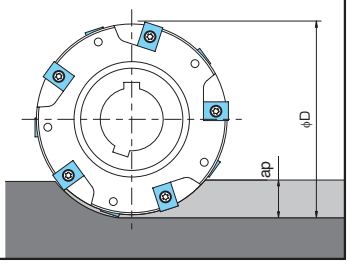
Fig.1 Convex bottom shape

Slot Mill MSTB

Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc: m/min)	fz (mm/t)		Remarks
			PVD Coated Carbide	Insert Thickness (mm)		
			PR0725	3.5~4.0	4.5~6.0	
Low Carbon Steel	SS400 S10C~S25C	125	170~210	0.07~0.20	0.10~0.22	Dry
Carbon Steel	S30C~S58C (Annealed)	190	100~140	0.07~0.20	0.10~0.22	
	S30C~S58C (Heat treated)	250	90~120	0.07~0.20	0.10~0.22	
Alloy Steel	SCM,SCr, etc. (Annealed)	180	90~120	0.07~0.20	0.10~0.22	
	SCM,SCr, etc. (Heat treated)	275	80~110	0.05~0.18	0.08~0.20	
High Carbon Alloy	SKD11, SKD61, etc.	280	70~90	0.05~0.18	0.08~0.20	
Stainless Steel	SUS304,SUS316,SUH310, etc.	220	110~140	0.05~0.18	0.08~0.20	Coolant
	SUS403,SUS410,SUH430F, etc.	300	100~120	0.05~0.18	0.08~0.20	
Heat-resistant Alloys	Ni-base heat-resistant alloys	350	15~30	0.05~0.18	0.08~0.20	
Titanium Alloys	Ti-6Al-4V, etc.	270	20~50	0.05~0.18	0.08~0.20	
Gray Cast Iron	FC250~FC350	260	110~130	0.07~0.22	0.10~0.25	Dry
Nodular Cast Iron	FCD400~FCD500	160	80~100	0.07~0.22	0.10~0.25	
	FCD600~FCD800	250	70~90	0.07~0.22	0.10~0.25	

Note) 1. Use down-cut machining.
2. If ap is under 1/10 of Cutter Dia.(ϕD), it is possible to increase feed per tooth (fz) 40%.



Slot Mill MSTC

Identification System

MSTC Slot Mill

Metric

M S T C ○○○ A N ○○○○ - ○○ - ○○ T

Slot Mill with Lay-down type	Cutting Dia. (mm)	A: Without Boss S: With Boss	N: Neutral R: Right-hand L : Left-hand	Edge Width (mm)	Applicable Inserts 10 : SP..10T3.. 12 : SD..1204..	No. of Inserts

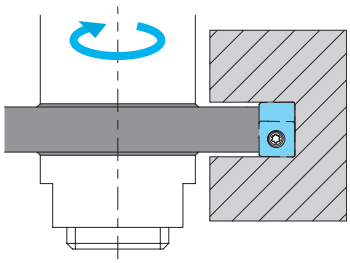
Inch spec

M S T C ○○○ A N ○○○ - ○○○ - ○○

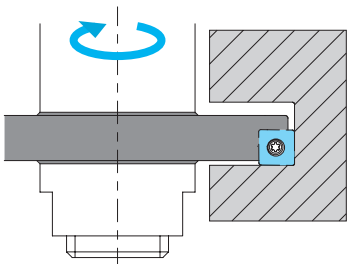
Slot Mill with Lay-down type	Cutting Dia. (inch)	A: Without Boss	N: Neutral R: Right-hand L : Left-hand	Edge Width (inch)	Applicable Inserts 10 : SP..10T3.. 12 : SD..1204..

Cutting Direction of MSTC Slot Mill

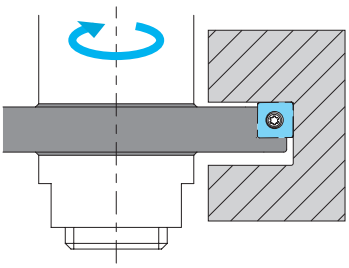
AN Type (Slotting)



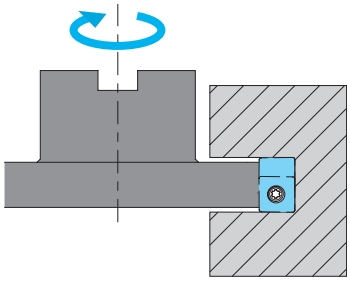
AR Type (Lower surface machining)



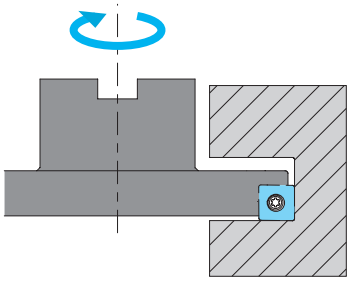
AL Type (Upper surface machining)



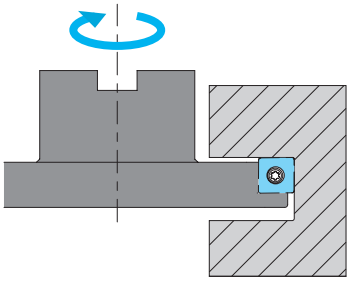
SN Type (Slotting)



SR Type (Lower surface machining)

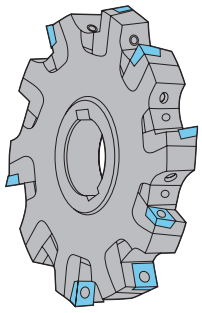


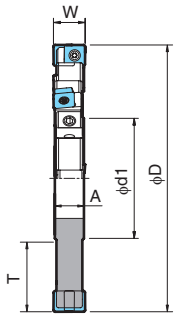
SL Type (Upper surface machining)

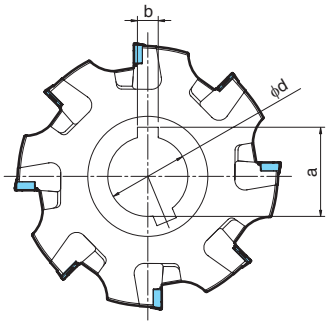


Slot Mill

Without Boss







In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

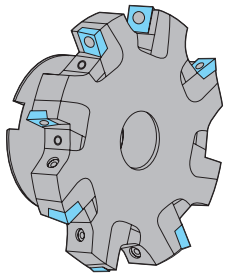
Description		Std.	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)						Weight (kg)	Max. Revolution (min^{-1})
			W (min.)	W (max.)	T (mm)			ϕD	ϕd (H7)	ϕd1	A	a	b		
MSTC	100AN1416-10-3T	●	14	16	25.9	6	3	100	32	46.8	13.9	34.8	8	0.5	17,250
	125AN1416-10-4T	●			34.4	8	4	125	40	54.8		43.5	10	0.8	15,450
	160AN1416-10-5T	●			51.9	10	5	160						1.5	13,650
MSTC	125AN1618-10-4T	●	16	18	34.4	8	4	125			15.9			1.0	15,450
	160AN1618-10-5T	●			51.9	10	5	160						1.8	13,650
MSTC	125AN1820-12-4T	●	18	20.7	34	8	4	125			18.2			1.0	10,350
	160AN1820-12-5T	●			51.5	10	5	160						1.8	9,150
MSTC	125AN2123-12-4T	●	21	23.3	34	8	4	125			20.8			1.2	10,350
	160AN2123-12-5T	●			51.5	10	5	160						2.1	9,150

Toolholder Dimensions (inch spec)

Description		Std.	Edge Width (inch)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (inch)						Weight (kg)	Max. Revolution (min^{-1})
			W (min.)	W (max.)	T (inch)			ϕD	ϕd (H7)	ϕd1	A	a	b		
MSTC	400AN551-630-10	○	.551 (14.0mm)	.630 (16.0mm)	1.030 (26.1mm)	6	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
	500AN551-630-10	○			1.345 (34.1mm)	8	4	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)		1.665 (42.3mm)	.375 (9.52mm)	0.9	15,300
	600AN551-630-10	○			1.845 (46.8mm)	10	5	6.000 (152.4mm)						1.4	14,000
MSTC	500AN630-709-10	○	.630 (16.0mm)	.709 (18.0mm)	1.345 (34.1mm)	8	4	5.000 (127.0mm)			.624 (15.85mm)			1.1	15,300
	600AN630-709-10	○			1.845 (46.8mm)	10	5	6.000 (152.4mm)						1.6	14,000
MSTC	500AN709-813-12	○	.709 (18.0mm)	.813 (20.6mm)	1.331 (33.8mm)	8	4	5.000 (127.0mm)			.716 (18.2mm)			1.1	10,300
	600AN709-813-12	○			1.831 (46.5mm)	10	5	6.000 (152.4mm)						1.7	9,400
MSTC	500AN813-917-12	○	.813 (20.6mm)	.917 (23.2mm)	1.331 (33.8mm)	8	4	5.000 (127.0mm)			.820 (20.8mm)			1.3	10,300
	600AN813-917-12	○			1.831 (46.5mm)	10	5	6.000 (152.4mm)						2.0	9,400

● : Std. Item
○ : Check Availability

With Boss



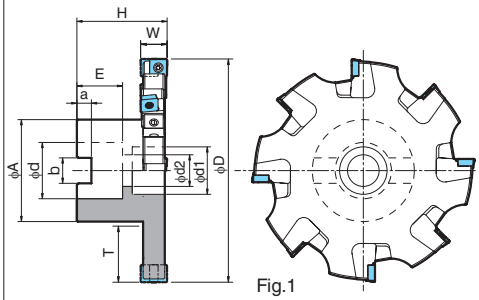


Fig.1

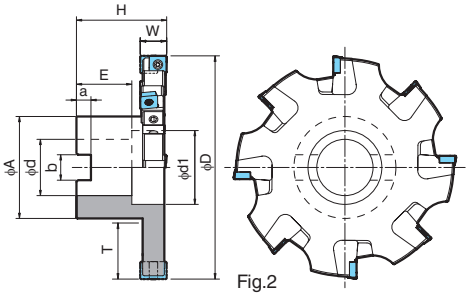


Fig.2

Toolholder Dimensions (Metric)

Description		Std.	Edge Width (mm) W (min.)	Edge Width (mm) W (max.)	Slot Depth T (mm)	No. of Inserts	No. of Edge Lines	Dimension (mm) φD	φd (H7)	φA	H (min.)	E	a	b	φd1	φd2	Drawing	Weight (kg)	Max. Revolution (min^{-1})
MSTC	100SN1416-10-3T	●	14	16	24.4	6	3	100	27	48	50.8	24	7	12.4	20	14	Fig.1	1.0	17,250
	125SN1416-10-4T	●			31.9	8	4	125	32	58		26	8	14.4	27	18		1.6	15,450
	160SN1416-10-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig.2	2.0	13,650
MSTC	125SN1618-10-4T	●	16	18	31.9	8	4	125	32	58	50.8	26	8	14.4	27	18	Fig.1	1.7	15,450
	160SN1618-10-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig.2	2.3	13,650
MSTC	125SN1820-12-4T	●	18	20.7	31.9	8	4	125	32	58	51.0	26	8	14.4	27	18	Fig.1	1.6	10,350
	160SN1820-12-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig.2	2.3	9,150
MSTC	125SN2123-12-4T	●	20.7	23.3	31.9	8	4	125	32	58	51.0	26	8	14.4	27	18	Fig.1	1.7	10,350
	160SN2123-12-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig.2	2.6	9,150

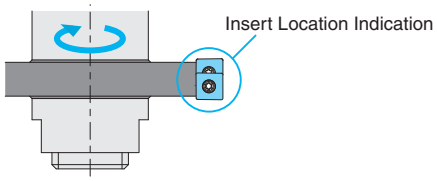
Note) H (min.) dimension shows in case of minimum of edge width.

Recommended Cutting Conditions ➔ **M162**

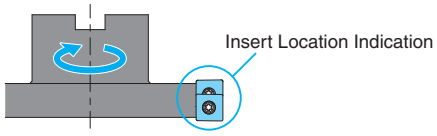
Applicable Insert Installation Method (common to Metric / Inch spec)

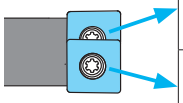
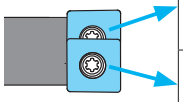
When installing handed inserts, it is necessary to equip same number of right-hand and left-hand inserts as shown in "No. of Edge Lines" respectively.
Please Install as show in the figure below.

MSTC...AN... (Without Boss)



MSTC...SN... (With Boss)



Description	Insert Location Indication	Applicable Inserts ➔ M160-M161 Handed Inserts	Applicable Inserts ➔ M160-M161 Neutral inserts
MSTC...AN...10.. MSTC...SN...10..		SP..10T3...L... SP..10T3...R...	SP..10T3...N...
MSTC...AN...12.. MSTC...SN...12..		SD..1204...L... SD..1204...R...	SD..1204...N...

Spare Parts (common to Metric / Inch spec)

・For spare parts, ref. to page **M158**

Slot width (edge width) adjustment

・Ref. to page **M162~M164**

Applicable Arbor

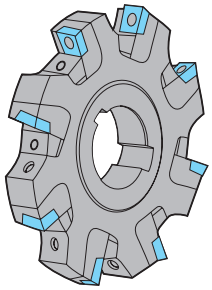
・Ref. to page **M165**

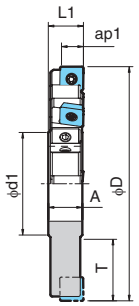
● : Std. Item

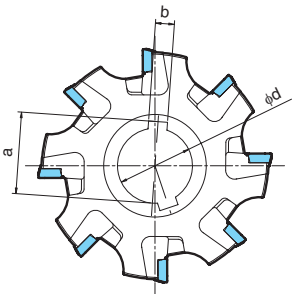
Half Side Slot Mill

Shouldering

Without Boss (Right-hand)







• Right-hand shown

In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

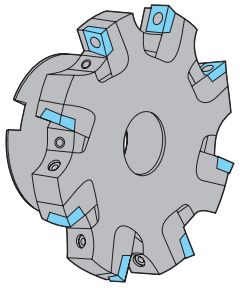
Description		Std.	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
				φD	φd (H7)	φd1	A	L1 (min.)	L1 (max.)	T	ap1 (max.)	a	b		
MSTC	100AR1416-10-6T	○	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
	125AR1416-10-8T	○	8	125	40	54.8				34.4		43.5	10	0.8	15,450
	160AR1416-10-10T	○	10	160						51.9				1.5	13,650
MSTC	125AR1618-10-8T	○	8	125			15.9	15.2	16.2	34.4				1.0	15,450
	160AR1618-10-10T	○	10	160						51.9				1.8	13,650
MSTC	125AR1820-12-8T	○	8	125			18.2	18.1	19.4	34.0	11.7			1.0	10,350
	160AR1820-12-10T	○	10	160						51.5				1.8	9,150
MSTC	125AR2123-12-8T	○	8	125			20.8	20.7	22.0	34.0				1.2	10,350
	160AR2123-12-10T	○	10	160						51.5				2.1	9,150

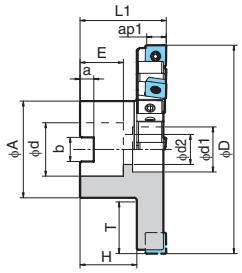
Toolholder Dimensions (inch spec)

Description		Std.	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
				φD	φd (H7)	φd1	A	L1 (min.)	L1 (max.)	T	ap1 (max.)	a	b		
MSTC	400AR551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	1.030 (26.1mm)	.359 (9.1mm)	1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
	500AR551-630-10	○	8	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)				1.345 (34.1mm)		1.665 (42.3mm)	.375 (9.52mm)	0.9	15,300
	600AR551-630-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.4	14,000
MSTC	500AR630-709-10	○	8	5.000 (127.0mm)			.624 (15.85mm)	.627 (15.93mm)	.667 (16.94mm)	1.345 (34.1mm)				1.1	15,300
	600AR630-709-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.6	14,000
MSTC	500AR709-813-12	○	8	5.000 (127.0mm)			.716 (18.2mm)	.712 (18.1mm)	.764 (19.4mm)	1.331 (33.8mm)	.461 (11.7mm)			1.1	10,300
	600AR709-813-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				1.7	9,400
MSTC	500AR813-917-12	○	8	5.000 (127.0mm)			.820 (20.8mm)	.816 (20.7mm)	.868 (22.04mm)	1.331 (33.8mm)				1.3	10,300
	600AR813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				2.0	9,400

○ : Check Availability

With Boss (Right-hand)





• Right-hand shown

Fig.1

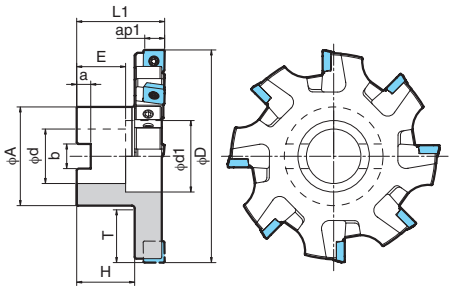


Fig.2

Toolholder Dimensions (Metric)

Description		Std.	No. of Inserts	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min^{-1})
				φD	φd (H7)	φA	H	L1 (min.)	L1 (max.)	T	ap1 (max.)	E	a	b	φd1	φd2			
MSTC	100SR1416-10-6T	○	6	100	27	48	37.7	50.8	51.8	24.4	9.1	24	7	12.4	20	14	Fig.1	1.0	17,250
	125SR1416-10-8T	○	8	125	32	58				31.9		26	8	14.4	27	18		1.6	15,450
	160SR1416-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.0	13,650
MSTC	125SR1618-10-8T	○	8	125	32	58	35.7			31.9		26	8	14.4	27	18	Fig.1	1.7	15,450
	160SR1618-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.3	13,650
MSTC	125SR1820-12-8T	○	8	125	32	58	34.0	51.0	52.3	31.9	11.7	26	8	14.4	27	18	Fig.1	1.6	10,350
	160SR1820-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.3	9,150
MSTC	125SR2123-12-8T	○	8	125	32	58	31.4			31.9		26	8	14.4	27	18	Fig.1	1.7	10,350
	160SR2123-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.6	9,150

Applicable Inserts (common to Metric / Inch spec)

Description	Applicable Inserts ➡ M160-M161	
	Handed Inserts	Neutral inserts
MSTC...AR...10.. MSTC...SR...10..	SP..10T3...R...	SP..10T3...N...
MSTC...AR...12.. MSTC...SR...12..	SD..1204...R...	SD..1204...N...

Recommended Cutting Conditions ➡ M162

Spare Parts (common to Metric / Inch spec)

・For spare parts, ref. to page M159

Slot width (edge width) adjustment

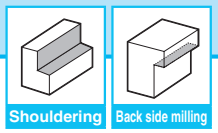
・Ref. to page M162~M164

Applicable Arbor

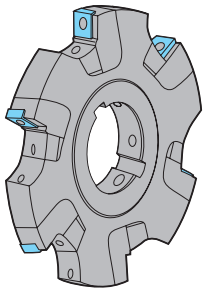
・Ref. to page M165

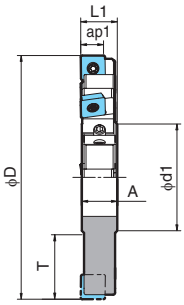
○ : Check Availability

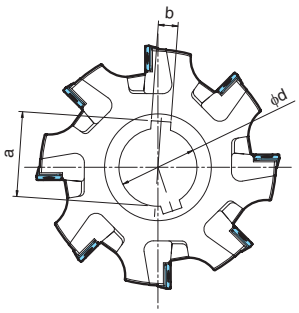
Half Side Slot Mill



Without Boss (Left-hand)







• Left-hand shown

In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

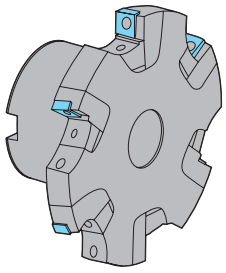
Description		Std.	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
				φD	φd (H7)	φd1	A	L1 (min.)	L1 (max.)	T	ap1 (max.)	a	b		
MSTC	100AL1416-10-6T	○	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
	125AL1416-10-8T	○	8	125	40	54.8				34.4		43.5	10	0.8	15,450
	160AL1416-10-10T	○	10	160						51.9				1.5	13,650
MSTC	125AL1618-10-8T	○	8	125			15.9	15.2	16.2	34.4				1.0	15,450
	160AL1618-10-10T	○	10	160						51.9				1.8	13,650
MSTC	125AL1820-12-8T	○	8	125			18.2	18.1	19.4	34.0	11.7			1.0	10,350
	160AL1820-12-10T	○	10	160						51.5				1.8	9,150
MSTC	125AL2123-12-8T	○	8	125			20.8	20.7	22.0	34.0				1.2	10,350
	160AL2123-12-10T	○	10	160						51.5				2.1	9,150

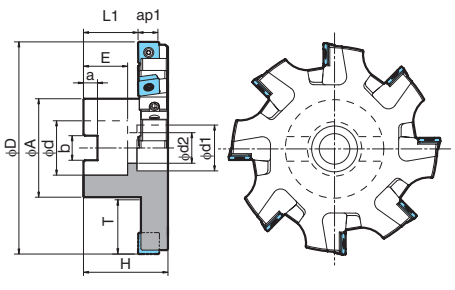
Toolholder Dimensions (inch spec)

Description		Std.	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
				φD	φd (H7)	φd1	A	L1 (min.)	L1 (max.)	T	ap1 (max.)	a	b		
MSTC	400AL551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	1.030 (26.1mm)	.359 (9.1mm)	1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
	500AL551-630-10	○	8	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)				1.345 (34.1mm)		1.665 (42.3mm)	.375 (9.52mm)	0.9	15,300
	600AL551-630-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.4	14,000
MSTC	500AL630-709-10	○	8	5.000 (127.0mm)			.624 (15.85mm)	.627 (15.93mm)	.667 (16.94mm)	1.345 (34.1mm)				1.1	15,300
	600AL630-709-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.6	14,000
MSTC	500AL709-813-12	○	8	5.000 (127.0mm)			.716 (18.2mm)	.712 (18.1mm)	.764 (19.4mm)	1.331 (33.8mm)	.461 (11.7mm)			1.1	10,300
	600AL709-813-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				1.7	9,400
MSTC	500AL813-917-12	○	8	5.000 (127.0mm)			.820 (20.8mm)	.816 (20.7mm)	.868 (22.04mm)	1.331 (33.8mm)				1.3	10,300
	600AL813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				2.0	9,400

○ : Check Availability

With Boss (Left-hand)





• Left-hand shown

Fig.1

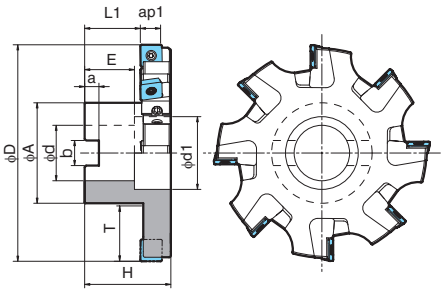


Fig.2

Toolholder Dimensions (Metric)

Description		Std.	No. of Inserts	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min^{-1})
				ϕD	ϕd (H7)	ϕA	H	L1 (min.)	L1 (max.)	T	ap1 (max.)	E	a	b	ϕd1	ϕd2			
MSTC	100SL1416-10-6T	○	6	100	27	48	50	35.8	36.8	24.4	9.1	24	7	12.4	20	14	Fig.1	1.0	17,250
	125SL1416-10-8T	○	8	125	32	58				31.9		26	8	14.4	27	18		1.6	15,450
	160SL1416-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.0	13,650
MSTC	125SL1618-10-8T	○	8	125	32	58		33.8	34.8	31.9		26	8	14.4	27	18	Fig.1	1.7	15,450
	160SL1618-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.3	13,650
MSTC	125SL1820-12-8T	○	8	125	32	58		31.7	33.0	31.9	11.7	26	8	14.4	27	18	Fig.1	1.6	10,350
	160SL1820-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.3	9,150
MSTC	125SL2123-12-8T	○	8	125	32	58		29.1	30.4	31.9		26	8	14.4	27	18	Fig.1	1.7	10,350
	160SL2123-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	—	Fig.2	2.6	9,150

Applicable Inserts (common to Metric / Inch spec)

Description	Applicable Inserts ➡ M160-M161	
	Handed Inserts	Neutral inserts
MSTC...AL...10.. MSTC...SL...10..	SP..10T3...L...	SP..10T3...N...
MSTC...AL...12.. MSTC...SL...12..	SD..1204...L...	SD..1204...N...

Recommended Cutting Conditions ➡ M162

Spare Parts (common to Metric / Inch spec)

・For spare parts, ref. to page M159

Slot width (edge width) adjustment

・Ref. to page M162~M164

Applicable Arbor

・Ref. to page M165

○ : Check Availability

Spare Parts (common to Metric / Inch spec)

Description			Spare Parts										
			Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting bolt
			Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
Without Boss	Metric	MSTC 100AN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 125AN1416-10-4T				W6X20							
		MSTC 160AN1416-10-5T											
		MSTC 125AN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20							
		MSTC 160AN1618-10-5T											
		MSTC 125AN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC 160AN1820-12-5T											
		MSTC 125AN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20								
		MSTC 160AN2123-12-5T											
	Inch spec	MSTC 400AN551-630-10	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9		
		MSTC 500AN551-630-10				W6X20							
		MSTC 600AN551-630-10											
		MSTC 500AN630-709-10	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20							
		MSTC 600AN630-709-10											
		MSTC 500AN709-813-12	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC 600AN709-813-12											
		MSTC 500AN813-917-12	C90SD2023-12R	C90SD2023-12L	WC-20								
		MSTC 600AN813-917-12											
With Boss	Metric	MSTC 100SN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	HH12X35
		MSTC 125SN1416-10-4T											HH16X35
		MSTC 160SN1416-10-5T											-
		MSTC 125SN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16								HH16X35
		MSTC 160SN1618-10-5T											-
		MSTC 125SN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15	MP-1	HH16X35
		MSTC 160SN1820-12-5T											-
		MSTC 125SN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20								HH16X35
		MSTC 160SN2123-12-5T											-

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
Tightening Torque (N·m)	5~6	1.5	4

Spare Parts (common to Metric / Inch spec)

Description				Spare Parts										
				Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting bolt
				Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
Without Boss	Metric	MSTC	100AR1416-10-6T	C90SP1416-10R	-	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
			125AR1416-10-8T				W6X20							
			160AR1416-10-10T											
		MSTC	125AR1618-10-8T	C90SP1618-10R		WC-16	W6X20							
			160AR1618-10-10T											
		MSTC	125AR1820-12-8T	C90SD1820-12R		WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			160AR1820-12-10T											
		MSTC	125AR2123-12-8T	C90SD2023-12R		WC-20								
			160AR2123-12-10T											
		MSTC	100AL1416-10-6T	-	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP		LW-2.5	DTP-9		
			125AL1416-10-8T				W6X20							
			160AL1416-10-10T											
		MSTC	125AL1618-10-8T		C90SP1618-10L	WC-16	W6X20							
			160AL1618-10-10T											
		MSTC	125AL1820-12-8T		C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			160AL1820-12-10T											
		MSTC	125AL2123-12-8T		C90SD2023-12L	WC-20								
			160AL2123-12-10T											
	Inch spec	MSTC	400AR551-630-10	C90SP1416-10R	-	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9		
			500AR551-630-10				W6X20							
			600AR551-630-10											
		MSTC	500AR630-709-10	C90SP1618-10R		WC-16	W6X20							
			600AR630-709-10											
		MSTC	500AR709-813-12	C90SD1820-12R		WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			600AR709-813-12											
		MSTC	500AR813-917-12	C90SD2023-12R		WC-20								
			600AR813-917-12											
		MSTC	400AL551-630-10	-	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP		LW-2.5	DTP-9		
			500AL551-630-10				W6X20							
			600AL551-630-10											
		MSTC	500AL630-709-10		C90SP1618-10L	WC-16	W6X20							
			600AL630-709-10											
		MSTC	500AL709-813-12		C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			600AL709-813-12											
		MSTC	500AL813-917-12		C90SD2023-12L	WC-20								
			600AL813-917-12											
With Boss	Metric	MSTC	100SR1416-10-6T	C90SP1416-10R	-	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	HH12X35
			125SR1416-10-8T											HH16X35
			160SR1416-10-10T											-
		MSTC	125SR1618-10-8T	C90SP1618-10R		WC-16								HH16X35
			160SR1618-10-10T											-
		MSTC	125SR1820-12-8T	C90SD1820-12R		WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		HH16X35
			160SR1820-12-10T											-
		MSTC	125SR2123-12-8T	C90SD2023-12R		WC-20								HH16X35
			160SR2123-12-10T											-
		MSTC	100SL1416-10-6T	-	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP		LW-2.5	DTP-9		HH12X35
			125SL1416-10-8T											HH16X35
			160SL1416-10-10T											-
		MSTC	125SL1618-10-8T		C90SP1618-10L	WC-16								HH16X35
			160SL1618-10-10T											-
		MSTC	125SL1820-12-8T		C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		HH16X35
			160SL1820-12-10T											-
		MSTC	125SL2123-12-8T		C90SD2023-12L	WC-20								HH16X35
			160SL2123-12-10T											-

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
Tightening Torque (N·m)	5~6	1.5	4

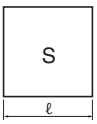
Inserts Identification System

Symbol	Shape
S	Square

(1) Shape

Symbol	Tolerance		
	Corner Height	Thickness	I.C. Size
C	±0.013mm	±0.025mm	±0.025mm
E	±0.025mm		

(3) Tolerance



(5) Edge Length

Symbol	Corner-R(rε)
16	1.6mm
12	1.2mm
08	0.8mm

(7) Corner-R(rε)

Symbol	Hand of Tool
N	Neutral
L	Left-hand
R	Right-hand

(9) Hand of Tool

S	P	C	T	10	T3	08	E	R	-	SD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		(10)

Symbol	Relief Angle
D	15°
P	11°

(2) Relief Angle

Symbol	Shape
T	Single-sided chipbreaker, with hole

(4) Hole / Chipbreaker

Symbol	Thickness
T3	3.97mm
04	4.76mm

(6) Thickness

Symbol	Edge Preparation
E	Honed
F	Sharp Edge
S	Chamfered + R-honed

(8) Edge Preparation

(10) Chipbreaker Symbol

Symbol	Rake Angle
SB	5°
SD	15°
SE	20°

SP..10T3

Applicable Inserts

(mm)

Description	A	T	ϕd	α
SP..10T3	10.0	3.97	3.4	11°

Classification of usage
●:1st Choice
○:2nd Choice

P	Carbon Steel / Alloy Steel	●	●	
M	Stainless Steel	○	●	
K	Cast Iron	○	●	
N	Non-ferrous Metals			●
S	Heat-resistant Alloys		●	
	Titanium Alloys		●	○

Insert (Handed Insert shows Right-hand)		Description	Usable edges	Dimension (mm) rε	Dimension (mm) Z (Wiper Edge)	CVD Coated Carbide CA0835	PVD Coated Carbide PR0725	PVD Coated Carbide PR0110
		SPCT 10T316EN-SD	4	1.6	-		●	
With Wiper Edge		**SPCT 10T308E$^{R}_{L}$-SD**		0.8	2.5		●	
		10T312E$^{R}_{L}$-SD		1.2	1.8		●	
Sharp Edge		**SPCT 10T316FN-SE**		1.6	-			●
Sharp Edge / With Wiper Edge		**SPCT 10T308F$^{R}_{L}$-SE**		0.8	2.7			●
		10T312F$^{R}_{L}$-SE		1.2	2.2			●
With Wiper Edge		**SPET 10T308E$^{R}_{L}$-SB**		0.8	2.7	●	●	
Tough Edge / With Wiper Edge		**SPET 10T308S$^{R}_{L}$-SB**		0.8	2.7	●	●	

Inserts are sold in 10 piece boxes

● : Std. Item

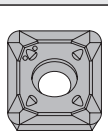
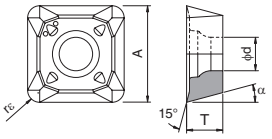
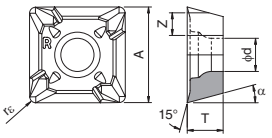
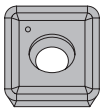
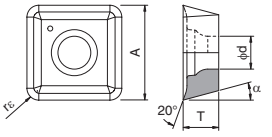
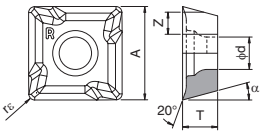
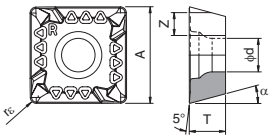
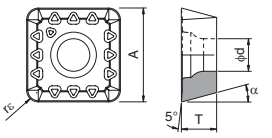
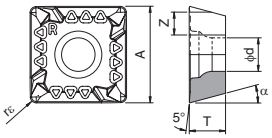
SD..1204

Applicable Inserts (mm)

Description	A	T	φd	α
SD..1204	12.7	4.76	4.4	15°

Classification of usage
●:1st Choice
○:2nd Choice

		CA0835	PR0725	PR0110
P	Carbon Steel / Alloy Steel	●	●	
M	Stainless Steel	○	●	
K	Cast Iron	○	●	
N	Non-ferrous Metals			●
S	Heat-resistant Alloys		●	
	Titanium Alloys		●	○

Insert (Handed Insert shows Right-hand)	Description	Usable edges	Dimension (mm) rε	Dimension (mm) Z (Wiper Edge)	CVD Coated Carbide CA0835	PVD Coated Carbide PR0725	PVD Coated Carbide PR0110
 	**SDCT 120416EN-SD**	4	1.6	-		●	
With Wiper Edge 	**SDCT 120408E$^{R}_{L}$-SD**		0.8	2.5		●	
	120412E$^{R}_{L}$-SD		1.2	1.8		●	
 Sharp Edge 	**SDCT 120416FN-SE**		1.6	-			●
Sharp Edge / With Wiper Edge 	**SDCT 120408F$^{R}_{L}$-SE**		0.8	2.7			●
	120412F$^{R}_{L}$-SE		1.2	1.9			●
With Wiper Edge 	**SDET 120408E$^{R}_{L}$-SB**		0.8	2.5	●	●	
	120412E$^{R}_{L}$-SB		1.2	1.8	●	●	
	**SDET 120416SN-SB**		1.6	-	●	●	
Tough Edge / With Wiper Edge 	**SDET 120408S$^{R}_{L}$-SB**		0.8	2.5	●	●	

Features of Insert Grades

CA0835

- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron.
- For middle to high speed machining.

PR0725

- TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron.
- For middle speed machining.

PR0110

- TiB_2 based PVD Coated Carbide
- For Non-ferrous Metals such as Aluminum Alloys (Si<10%) and Titanium Alloys.
- For high speed machining.

● : Std. Item

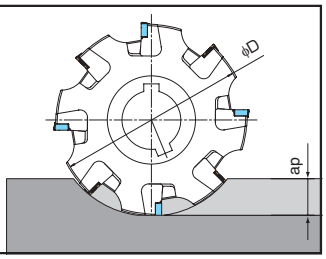
Inserts are sold in 10 piece boxes

Slot Mill MSTC

Recommended Cutting Conditions

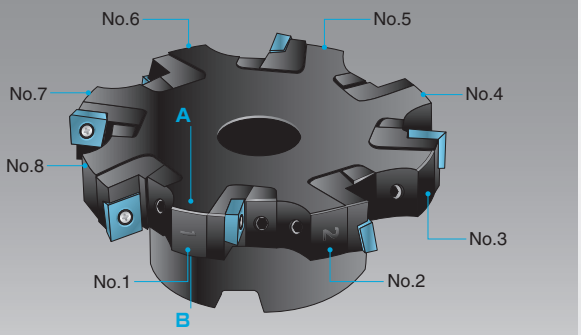
Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc: m/min)			fz (mm/t)				Remarks
			CVD Coated Carbide	PVD Coated Carbide		Chipbreaker				
			CA0835	**PR0725**	**PR0110**	EN-SD ER-SD EL-SD	ER-SB EL-SB	SN-SB SR-SB SL-SB	FN-SE FR-SE FL-SE	
Low Carbon Steel	SS400 S10C～S25C	125	250～310	170～210	-	0.07～0.20	0.10～0.22	0.15～0.3	-	Dry
Carbon Steel	S30C～S58C (Annealed)	190	160～190	100～140	-	0.07～0.20	0.10～0.22	0.15～0.3	-	
	S30C～S58C (Heat treated)	250	140～180	90～120	-	0.07～0.20	0.10～0.22	0.15～0.3	-	
Alloy Steel	SCM,SCr, etc. (Annealed)	180	140～180	90～120	-	0.07～0.20	0.10～0.22	0.15～0.3	-	
	SCM,SCr, etc. (Heat treated)	275	120～160	80～110	-	0.05～0.18	0.08～0.20	0.12～0.25	-	
High Carbon Alloy	SKD11,SKD61, etc.	280	110～130	70～90	-	0.05～0.18	0.08～0.20	0.12～0.25	-	
Stainless Steel	Austenitic related	220	160～200	110～140	-	0.05～0.18	0.08～0.20	0.12～0.25	-	Coolant
	Martensitic related	300	150～180	100～120	-	0.05～0.18	0.08～0.20	0.12～0.25	-	
Heat-resistant Alloys	Ni-base heat-resistant alloys	350	-	15～30	-	0.05～0.18	0.08～0.20	0.12～0.25	-	
Titanium Alloys	Ti-6Al-4V, etc.	270	-	20～50	-	0.05～0.18	0.08～0.20	0.12～0.25	-	
Gray Cast Iron	FC250～FC350	260	160～200	110～130	-	0.07～0.22	0.10～0.25	0.15～0.35	-	Dry
Nodular Cast Iron	FCD400～FCD500	160	130～160	80～100	-	0.07～0.22	0.10～0.25	0.15～0.35	-	
	FCD600～FCD800	250	110～140	70～90	-	0.07～0.22	0.10～0.25	0.15～0.35	-	
Non-ferrous Metals	AC4A, A7050, etc.	-	-	-	750～950	-	-	-	0.07～0.20	Coolant

Note) 1. Use down-cut machining.
2. If ap is under 1/10 of Cutter Dia.(ϕD), it is possible to increase feed per tooth (fz) 40%.

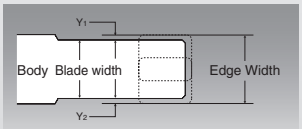


Slot width (edge width) adjustment of MSTC Slot Mill

Slot Width (Edge Width) Measurement and Adjustment



"No.1-No8" in the figure is for explanation. There are no indications on the slot mill body.



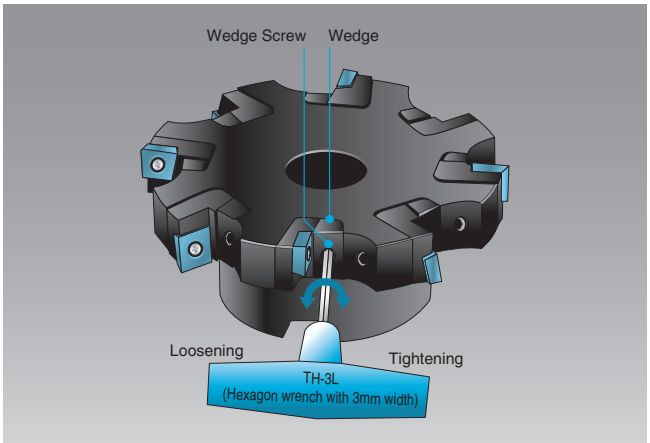
(1) Set up the slot mill on length measuring equipment such as tool presetters.
(2) Choose any one of the edges as a reference position. (No.1)
(3) Measure the blade width of the slot mill body at position No.1. (between point A and B in the figure)
(4) Move the length measuring equipment to the insert corner part and measure the step (Y_1) between the point A and the insert No.1.
(5) Using the same procedure, measure (Y_2) dimension based on point B.

$$\text{Edge Width} = \text{Blade Width} + Y_1 + Y_2$$

(6) Place the point A of the slot mill body near the position No.1 to "0 (zero)" of the length measuring equipment.
(7) Adjust the edge position of the inserts in odd numbered positions (No. 3, 5, 7) to "0 (zero)" with the length measuring equipment.
(8) Adjust the edge position of the inserts in even numbered positions (No. 2, 4, 6, 8) to the required edge width.

For steps (7) and (8), see "In the case of changing the slot width (edge width)" on next page.

In the case of changing the slot width (edge width)

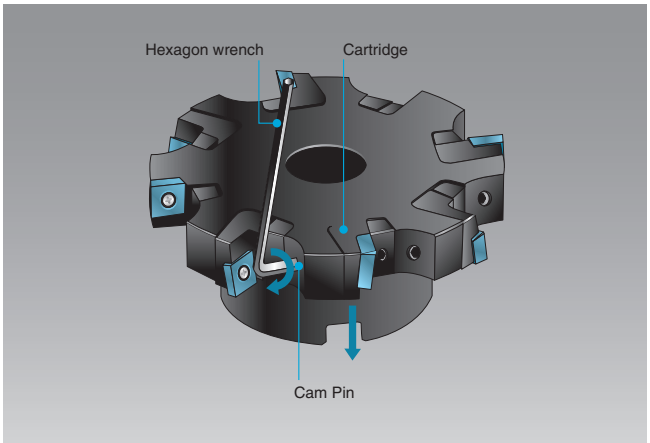


(1) Set up the slot mill on length measuring equipment such as tool presetters.

(2) Insert a Hexagon wrench with 3mm width (TH-3L) into the wedge screw.

(3) Turn TH-3L counterclockwise to loosen the Wedge.

(4) Turn TH-3L clockwise by the torque of 1 N·m to tighten the wedge lightly and make the wedge contact the cartridge and the slot mill body.
In doing so, some resistance occurs against the cartridge.

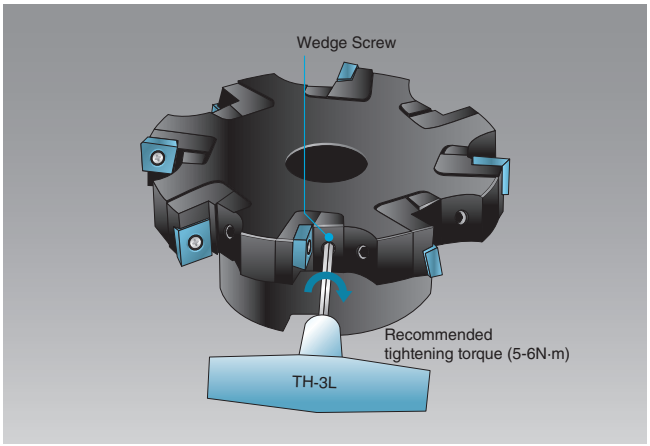


(5) Insert a Hexagon wrench (LW-2.5 or LW-3) into the Cam Pin on the back of the cartridge.

(6) Turn the wrench and adjust the position of the Cartridge.

(7) To secure the adjustment, back-turn the Cam Pin and make sure that it does not touch the groove surface of the back of the Cartridge.

(8) Remove the Hexagon wrench from the Cam Pin.

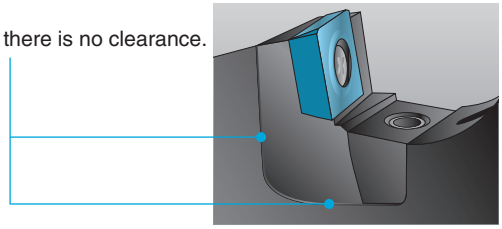


(9) Insert TH-3L into the Wedge Screw.

(10) Tighten the Wedge Screw by the torque of 5-6N·m.
(Use a torque wrench to get the correct torque.)

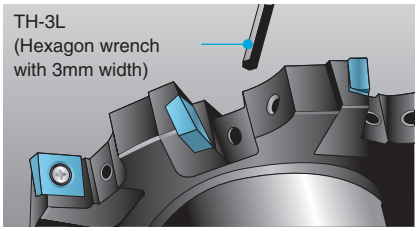
(11) Make sure there is no clearance between the Cartridge and the Slot Mill body.

Make sure there is no clearance.

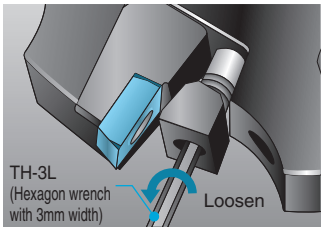


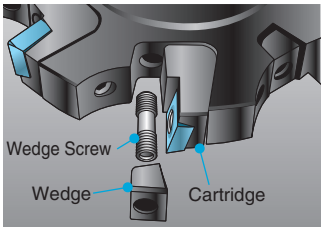
Replacement of the Cartridge

Follow the instruction below to replace the Cartridge.



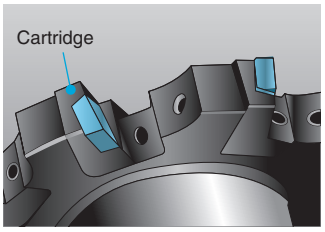
(1) Insert Hexagon wrench with 3mm width (TH-3L) into the Wedge Screw.

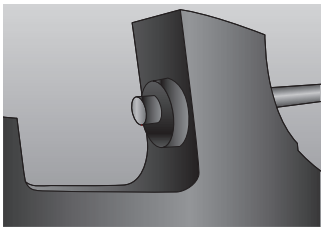




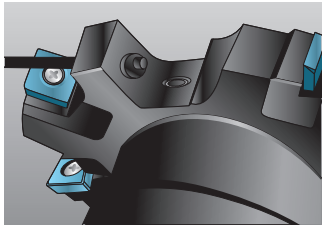
(2) Loosen the Wedge Screw.

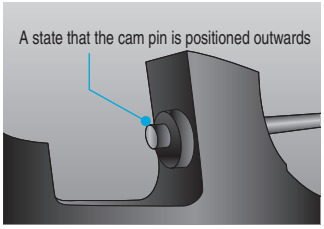
(3) Remove the Wedge Screw and Wedge.



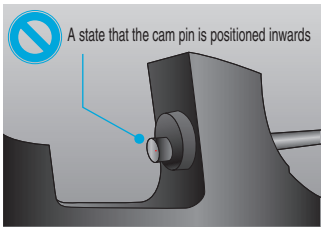


(4) Remove the Cartridge.

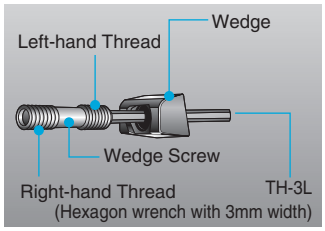


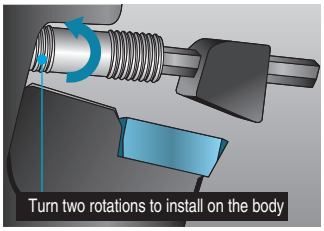


(5) Before replacing the Cartridge, make sure that the Cam Pin is positioned radially-outwards.



(6) If the Cam Pin is in the position shown in the left diagram, assembling the Cartridge is not possible.

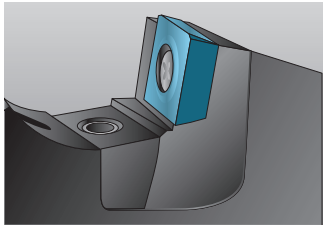




(7) Place the wedge so that its larger slant surface faces toward the Cartridge.

(8) Turn the Wedge Screw two rotations to install the Wedge to the body.

(9) When installing the Wedge Screw to the body, keep the Wedge from rotating and screw it in.



(10) Tighten the Wedge Screw by the torque of 5-6N·m.
Keep the Screw head and the Wedge even (prevent either of those from sticking out).

Slot Mill Applicable Arbor

BT Arbor

Type	Ref. to Page	Description		Bore Dia. (ϕd)	BT Arbor				
					BIG	MST	NIKKEN	SHOWA	NT TOOL
Without Boss	M142	MSTA	63N..	16			BT○○-SCA16..		BT○○-SCA16..
			80N..	16			BT○○-SCA16..		BT○○-SCA16..
			100N..	22			BT○○-SCA22..		BT○○-SCA22..
			125N..	32			BT○○-SCA32..		BT○○-SCA32..
			160N..	40			BT○○-SCA40..		BT○○-SCA40..
	M143	MSTA	02N..	.625 (15.875)			BT○○-SCA15.875..	BT○○-SCA15.875..	BT○○-SCA15.875..
			03N..	.625 (15.875)			BT○○-SCA15.875..	BT○○-SCA15.875..	BT○○-SCA15.875..
			04N..	1.000 (25.4)	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..
			05N..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			06N..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
	M146	MSTB	80AN..	27			BT○○-SCA27..		BT○○-SCA27..
			100AN..	32			BT○○-SCA32..		BT○○-SCA32..
			125AN..	40			BT○○-SCA40..		BT○○-SCA40..
			160AN..	40			BT○○-SCA40..		BT○○-SCA40..
		MSTB	3000AN..	1.000 (25.4)	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..
			4000AN..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			5000AN..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			6000AN..	1.500 (38.1)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
	M152 M154 M156	MSTC	100A○..	32			BT○○-SCA32..		BT○○-SCA32..
			125A○..	40			BT○○-SCA40..		BT○○-SCA40..
			160A○..	40			BT○○-SCA40..		BT○○-SCA40..
		MSTC	400A○..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			500A○..	1.500 (38.1)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
			600A○..	1.500 (38.1)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
With Boss	M147	MSTB	80SN..	22	BBT○○-FMC22..		BT○○-FMC22..	BT○○-FMC22..	BT○○-FMC22..
			100SN..	27	BBT○○-FMC27..		BT○○-FMC27..	BT○○-FMC27..	BT○○-FMC27..
			125SN..	40	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..
			160SN..	40	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..
	M153 M155 M157	MSTC	100S○..	27	BBT○○-FMC27..		BT○○-FMC27..	BT○○-FMC27..	BT○○-FMC27..
			125S○..	32	BBT○○-FMC32..		BT○○-FMC32..	BT○○-FMC32..	BT○○-FMC32..
			160S○..	40	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..

Straight Shank

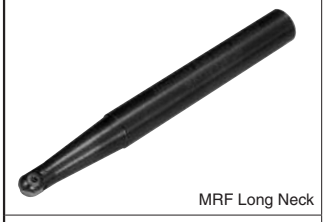
Type	Ref. to Page	Description		Bore Dia. (ϕd)	Straight Shank				
					BIG	MST	NIKKEN	SHOWA	NT TOOL
Without Boss	M142	MSTA	63N..	16					
			80N..	16					
			100N..	22					
			125N..	32					
			160N..	40					
	M143	MSTA	02N..	.625 (15.875)				ST○○-SCA15.875..	
			03N..	.625 (15.875)				ST○○-SCA15.875..	
			04N..	1.000 (25.4)		S○○-SCA25.4..	K○○-SCA25.4..	ST○○-SCA25.4..	
			05N..	1.250 (31.75)				ST○○-SCA31.75..	
			06N..	1.250 (31.75)				ST○○-SCA31.75..	
	M146	MSTB	80AN..	27					
			100AN..	32					
			125AN..	40					
			160AN..	40					
		MSTB	3000AN..	1.000 (25.4)		S○○-SCA25.4..	K○○-SCA25.4..	ST○○-SCA25.4..	
			4000AN..	1.250 (31.75)				ST○○-SCA31.75..	
			5000AN..	1.250 (31.75)				ST○○-SCA31.75..	
			6000AN..	1.500 (38.1)				ST○○-SCA38.1..	
	M152 M154 M156	MSTC	100A○..	32					
			125A○..	40					
			160A○..	40					
		MSTC	400A○..	1.250 (31.75)				ST○○-SCA31.75..	
			500A○..	1.500 (38.1)				ST○○-SCA38.1..	
			600A○..	1.500 (38.1)				ST○○-SCA38.1..	

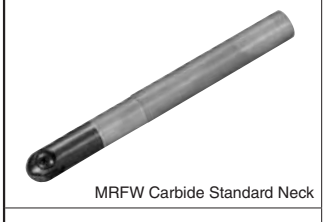
This table is created, based on companies' catalogues and publications, and not officially approved by those companies.

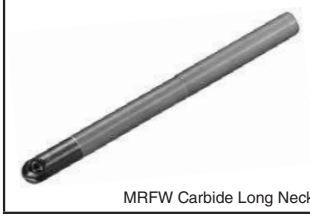
Ball-nose End Mill

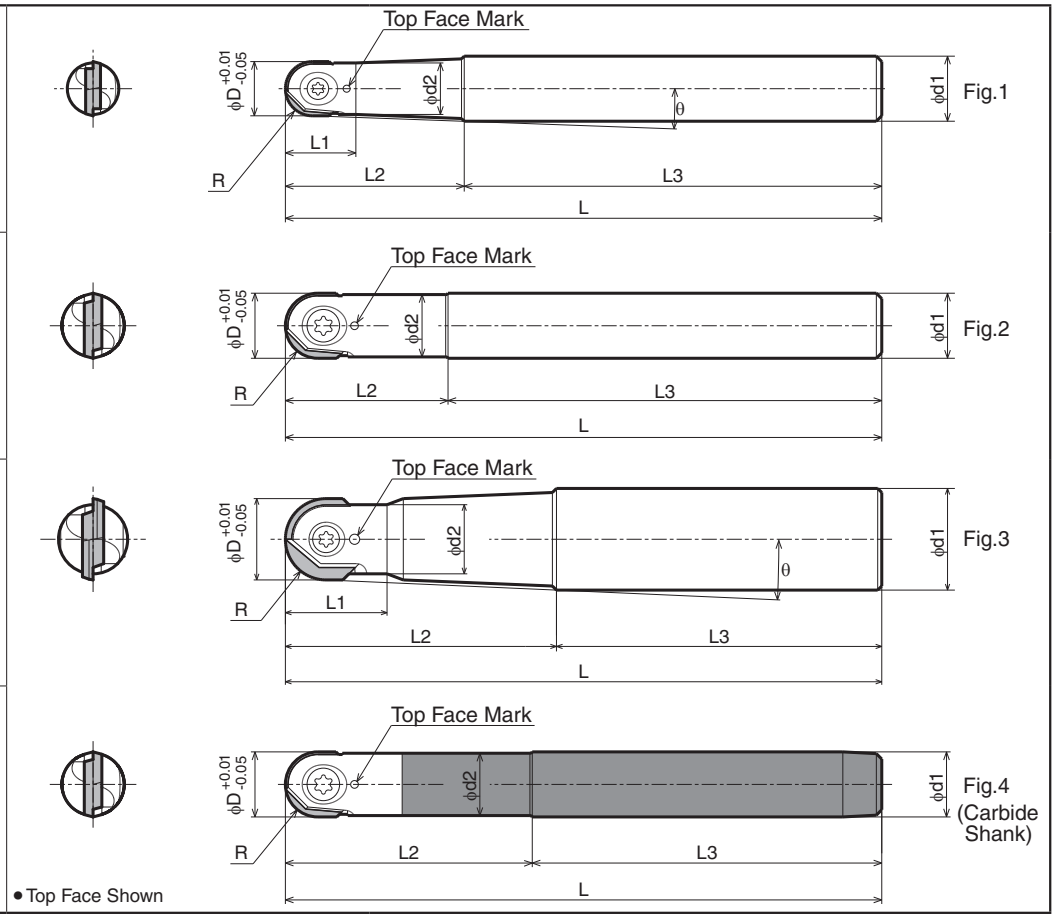
MRF / MRFW (Carbide Shank)

MRF Standard Neck


MRF Long Neck


MRFW Carbide Standard Neck


MRFW Carbide Long Neck



● Top Face Shown

Toolholder Dimensions

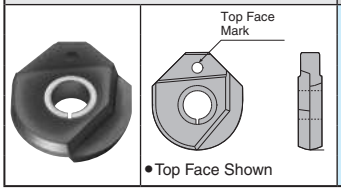
Description			Std.	No. of Inserts	Dimension (mm) R	φD	φd1	φd2	L	L1	L2	L3	θ	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ⇒M21
Standard Neck	MRF	08-S12	●	1	4	8	12	7.5	100	10	22	78	6°20'	Fig.1	SC-30067	DT-8	MP-1	RDFG08FR
		10-S12	●		5	10		9.5		13	25	75	3°		SC-35085	DT-10		RDFG10FR
		12-S12	●		6	12		11.5	110	-	30	80	-	Fig.2	SC-40100	DT-15		RDFG12FR
		16-S20	●		8	16	20	14	130	20	50		2°50'	Fig.1	SC-50130	DT-20		RDFG16FR
		20-S25	●		10	20	25	17	140	25	60		3°	Fig.3	SC-60160	TT-25		RDFG20FR
		25-S32	●		12.5	25	32	22	150	31	70		3°30'		SC-60210	TT-30		RDFG25FR
Long Neck	MRF	08-S12-130	●	1	4	8	12	7.5	130	10	50	80	2°30'	Fig.1	SC-30067	DT-8	MP-1	RDFG08FR
		10-S16-150	●		5	10	16	9.5	150	15		100	3°50'		SC-35085	DT-10		RDFG10FR
		12-S16-160	●		6	12		11.5	160	16	60		2°10'		SC-40100	DT-15		RDFG12FR
		16-S20-160	●		8	16	20	14	160	20	65	95	2°		SC-50130	DT-20		RDFG16FR
		20-S25-180	●		10	20	25	17	180	25	80	100	2°10'	Fig.3	SC-60160	TT-25		RDFG20FR
		25-S32-200	●		12.5	25	32	22	200	31	90	110	2°40'		SC-60210	TT-30		RDFG25FR
Carbide Standard Neck	MRFW	08-S08	●	1	4	8	8	7.4	100	-	30	70	-	Fig.4	SC-30067	DT-8	MP-1	RDFG08FR
		10-S10	●		5	10	10	9.5	100	-	35	65	-		SC-35085	DT-10		RDFG10FR
		12-S12	●		6	12	12	11.5	110	-	45		-		SC-40100	DT-15		RDFG12FR
Carbide Long Neck	MRFW	08-S08-130	●	1	4	8	8	7.4	130	-	65	65	-	Fig.4	SC-30067	DT-8	MP-1	RDFG08FR
		10-S10-140	●		5	10	10	9.5	140	-	75		-		SC-35085	DT-10		RDFG10FR
		12-S12-150	●		6	12	12	11.5	150	-	85		-		SC-40100	DT-15		RDFG12FR

・θ (Toolholder's interference angle) is the angle formed by the tangential line from insert dia. to toolholder's shank dia.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

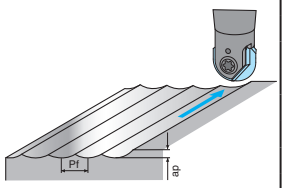
● : Std. Item

Applicable Inserts

Insert	Description
 ●Top Face Shown	RDFG 08FR 10FR 12FR 16FR 20FR 25FR

・Check the Top Face Mark of both insert and toolholder.

Recommended Depth of Cut

Description		Depth of Cut (mm) ap	Depth of Cut (mm) Pf	Applications
Standard Neck	MRF08-S12	0.2 (Max.0.3)	0.8	
	MRF10-S12	0.2	1	
	MRF12-S12	0.5	1.2	
	MRF16-S20	0.5	1.6	
	MRF20-S25	1	2	
	MRF25-S32	1	2.5	
Long Neck	MRF08-S12-130	0.2 (Max.0.3)	0.8	
	MRF10-S12-150	0.2	1	
	MRF12-S12-160	0.5	1.2	
	MRF16-S20-160	0.5	1.6	
	MRF20-S25-180	1	2	
	MRF25-S32-200	1	2.5	
Carbide Standard Neck	MRFW08-S08	0.2 (Max.0.3)	0.8	
	MRFW10-S10	0.2	1	
	MRFW12-S12	0.5	1.2	
Carbide Long Neck	MRFW08-S08-130	0.2 (Max.0.3)	0.8	
	MRFW10-S10-140	0.2	1	
	MRFW12-S12-150	0.5	1.2	

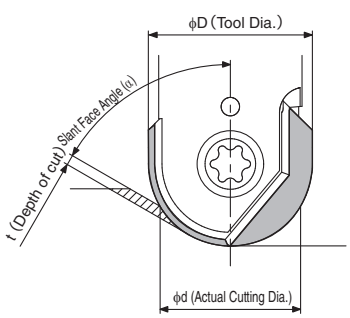
For ϕ8, Holder may be broken because of over load if ap exceeds 0.3mm.

Recommended Cutting Conditions (At Cutting Dia. ϕD)

Workpiece Material	Insert Grades	Vc (m/min)	fz (mm/t)	ϕ8 Vc(m/min) (n:min^{-1})	ϕ8 fz(mm/t) (Vf:mm/min)	ϕ10 Vc(m/min) (n:min^{-1})	ϕ10 fz(mm/t) (Vf:mm/min)	ϕ12 Vc(m/min) (n:min^{-1})	ϕ12 fz(mm/t) (Vf:mm/min)
Carbon Steel	PR915	100~200	0.1~0.3	150 (5,970)	0.2 (2,390)	150 (4,770)	0.2 (1,910)	150 (3,980)	0.2 (1,590)
Alloy Steel	PR915	80~180	0.1~0.3	130 (5,170)	0.2 (2,070)	130 (4,140)	0.2 (1,660)	130 (3,450)	0.2 (1,380)
Mold Steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Stainless Steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Cast Iron	PR915	100~200	0.2~0.4	150 (5,970)	0.3 (3,580)	150 (4,770)	0.3 (2,860)	150 (3,980)	0.3 (2,390)
Workpiece Material	Insert Grades	Vc (m/min)	fz (mm/t)	ϕ16 Vc(m/min) (n:min^{-1})	ϕ16 fz(mm/t) (Vf:mm/min)	ϕ20 Vc(m/min) (n:min^{-1})	ϕ20 fz(mm/t) (Vf:mm/min)	ϕ25 Vc(m/min) (n:min^{-1})	ϕ25 fz(mm/t) (Vf:mm/min)
Carbon Steel	PR915	100~200	0.1~0.3	150 (2,980)	0.2 (1,190)	150 (2,390)	0.2 (950)	150 (1,910)	0.2 (760)
Alloy Steel	PR915	80~180	0.1~0.3	130 (2,590)	0.2 (1,030)	130 (2,070)	0.2 (830)	130 (1,660)	0.2 (660)
Mold Steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Stainless Steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Cast Iron	PR915	100~200	0.2~0.4	150 (2,980)	0.3 (1,790)	150 (2,390)	0.3 (1,430)	150 (1,910)	0.3 (1,150)

Actual Cutting Speed (Vd) Conversion Coefficient Table

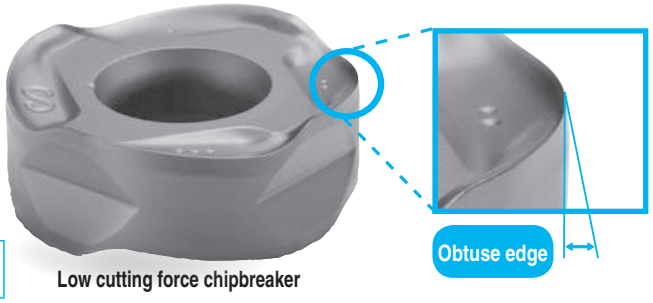
Vd varies depending on ap and slant face angle.
Vd can be obtained by dividing the conversion coefficient into the recommended cutting speed.

Model	Tool Dia. (ϕD)		ϕ8		ϕ10		ϕ12	
	Depth of cut (t:mm)		0.1	0.2	0.1	0.2	0.2	0.5
	Slant Face Angle (α)	15°	1.00	1.00	1.00	1.00	1.00	1.00
		30°	1.05	1.02	1.05	1.03	1.04	1.01
		45°	1.18	1.12	1.20	1.14	1.16	1.07
		60°	1.47	1.34	1.51	1.38	1.42	1.24
		75°	2.15	1.82	2.24	1.92	2.02	1.60
		90° (Horizontal Plane)	4.48	3.22	5.06	3.57	3.92	2.50
	Tool Dia. (ϕD)		ϕ16		ϕ20		ϕ25	
	Depth of cut (t:mm)		0.2	0.5	0.5	1	0.5	1
	Slant Face Angle (α)	15°	1.00	1.00	1.00	1.02	1.00	1.01
		30°	1.05	1.01	1.02	1.00	1.03	1.00
		45°	1.18	1.10	1.12	1.06	1.14	1.08
		60°	1.47	1.30	1.34	1.21	1.38	1.25
		75°	2.14	1.73	1.83	1.53	1.93	1.62
		90° (Horizontal Plane)	4.48	2.87	3.20	2.29	3.57	2.55

e.g.) Suppose tool dia. 8mm, ap=0.1mm, slant face angle 90°: The actual cutting speed Vd for carbon steel machining, when Vc is 150m/mim at the biggest diameter, Vd can be obtained as Vd=150÷4.48=33.5m/min

MRW

Economical and high efficiency New radius cutter with double-sided insert for various types of workpieces



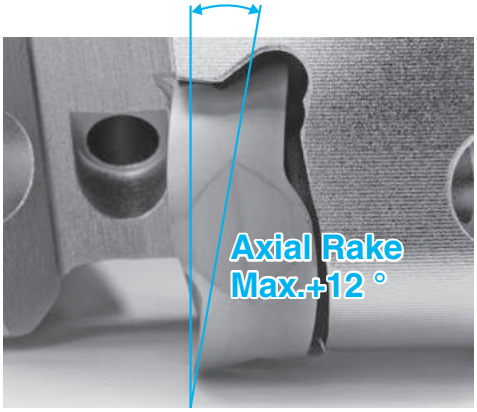
Low cutting force chipbreaker

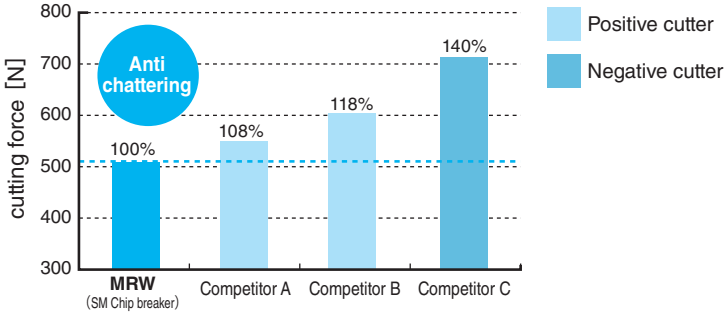
POINT.1 Economical Double-sided 8-edge Insert

POINT.2 Combine sharpness and cutting edge strength

Obtuse edge increases cutting edge toughness

POINT.3 Helical cutting edge design with **maximum axial rake 12°** reduced low cutting force equivalent to positive inserts

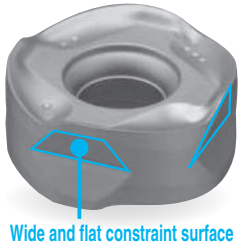




<Cutting Conditions>
Vc=120m/min, ap×ae=1×40mm, fz=0.2mm/t
SUS304, cutter ϕ50

POINT.4 **Flat Lock Structure** to hold insert firmly.

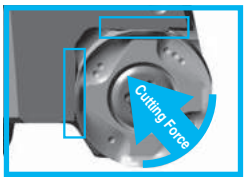
Prevent insert rotation during machining and realizes **stable machining**



Wide and flat constraint surface

Flat Lock Structure

Wide flat constraint surface
·Receives even cutting forces
·Controls insert rotation



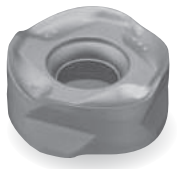
Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

Workpiece Material		Applicable Insert Grades	Applicable Chipbreaker
P Carbon Steel / Alloy Steel / Mold Steel		PR1525	GM/SM/GH Chipbreaker
K Cast Iron		PR1510	GH/GM Chipbreaker
S Ni-base heat-resistant alloys	M Stainless Steel (Martensitic related)	CA6535	SM/GM Chipbreaker
S Ni-base heat-resistant alloys S Titanium Alloys	M Stainless Steel (Austenitic related) M Stainless Steel (Precipitation Hardening)	PR1535	SM/GM Chipbreaker

For Chipbreaker Selection and Recommended Cutting Conditions ➡ M172

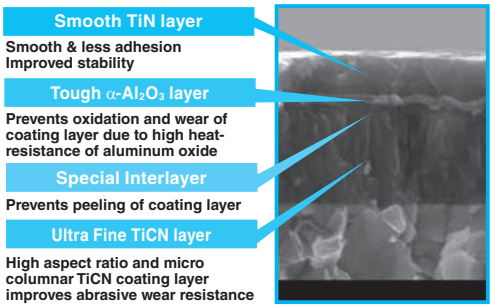
POINT.5 New insert grade for difficult-to-cut material

Controls sudden fracture and realizes stable machining
Suitable for high efficiency machining.



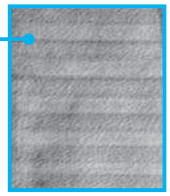
CA6535

For Martensitic stainless steel and Ni-base heat-resistant alloys
High heat resistance and wear resistance with CVD coating
Improved stability due to thin layer coating technology



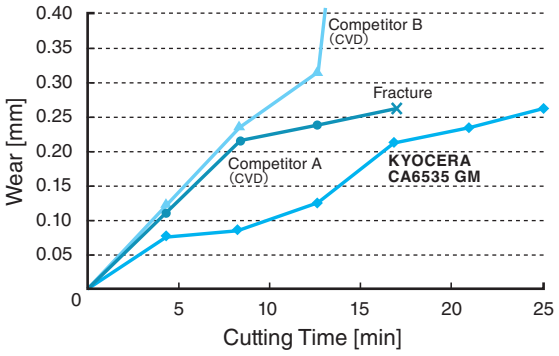
PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable and longer tool life by special nano coating layer MEGACOAT NANO



Tool Life Comparison

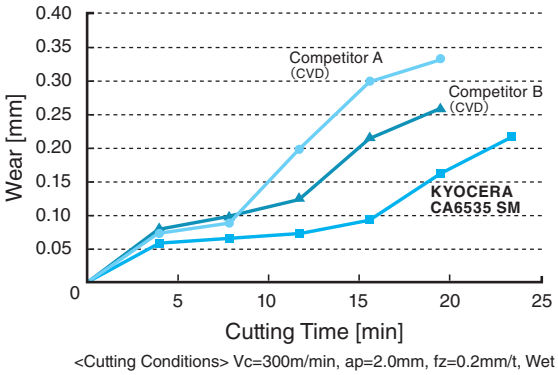
• Ni-base heat-resistant alloys



<Cutting Conditions> Vc=50m/min, ap=1.0mm, fz=0.15mm/t, Wet

1st Choice GM Chipbreaker

• Stainless Steel (Martensitic related)



<Cutting Conditions> Vc=300m/min, ap=2.0mm, fz=0.2mm/t, Wet

1st Choice SM Chipbreaker

MRW Face Mill

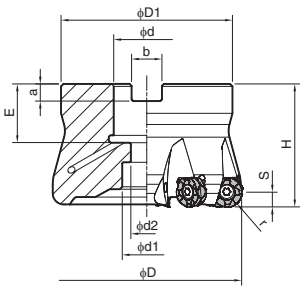


Fig.1

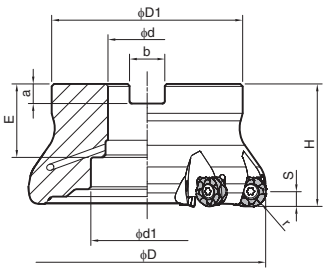


Fig.2

Toolholder Dimensions

	Description	Std.	No. of Inserts	Dimension (mm)											Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				r	ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	S	A.R.	R.R.				
Metric	MRW 050R-12-5T-M	●	5	6	50	48	22	18	11	40	21	6.3	10.4	6.0	+12°	-15.5°	Yes	Fig.1	0.3	16,000
	050R-12-6T-M	●	6																0.3	
	063R-12-6T-M	●	6		63	60		19											0.6	14,000
	063R-12-7T-M	●	7																0.6	
	080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4						1.1	12,000
	080R-12-8T-M	●	8																1.1	
	100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4					Fig.2	1.5	10,600
	100R-12-9T-M	●	9																1.4	
	MRW 063R-16-5T-M	●	5	8	63	60	22	19	11	40	21	6.3	10.4	8.0	+11°	-16.5°		Fig.1	0.5	12,800
	063R-16-6T-M	●	6																0.5	
	080R-16-6T-M	●	6		80	70	27	20	13	50	24	7	12.4						1.1	11,000
	080R-16-7T-M	●	7																1.0	
	100R-16-6T-M	●	6		100	78	32	46	-		30	8	14.4					Fig.2	1.4	9,600
	100R-16-8T-M	●	8																1.3	
	125R-16-8T-M	●	8		125	89	40	55		63	33	9	16.4						2.6	8,560
	125R-16-10T-M	●	10																2.5	
Bore Dia. Inch spec	MRW 080R-12-6T	○	6	6	80	70	25.4	20	13	50	27	6	9.5	6.0	+12°	-15.5°		Fig.1	1.2	12,000
	080R-12-8T	○	8																1.1	
	100R-12-7T	○	7		100	78	31.75	46	-		34	8	12.7					Fig.2	1.5	10,600
	100R-12-9T	○	9																1.4	
	MRW 080R-16-6T	○	6	8	80	70	25.4	20	13	50	27	6	9.5	8.0	+11°	-16.5°		Fig.1	1.1	11,000
	080R-16-7T	○	7																1.1	
	100R-16-6T	○	6		100	78	31.75	46	-		34	8	12.7					Fig.2	1.4	9,600
	100R-16-8T	○	8																1.4	
	125R-16-8T	○	8		125	89	38.1	55		63	38	10	15.9						2.6	8,560
	125R-16-10T	○	10																2.6	

- **Max. Revolution**
  When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
- S is Maximum ap. For more details ref. to page ➡ **M172** below.

Spare Parts and Applicable Inserts

Description	Spare Parts					Applicable Inserts ➡ M16		
	Clamp Screw	Wrench		Anti-seize Compound	Mounting bolt			
		DTPM-15	TTP-20			General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW 050R-12...	SB-4085TRP	DTPM-15 for Insert Clamp Recommended tightening torque 3.5N·m		MP-1	HH10X30	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
063R-12...					HH12X35			
080R-12...					-			
100R-12...								
MRW 063R-16...	SB-50140TRP	TTP-20 for Insert Clamp Recommended tightening torque 4.5N·m		MP-1	HH10X30	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
080R-16...					HH12X35			
100R-16...					-			
125R-16...								

Recommended Cutting Conditions ➡ **M172**

● : Std. Item

MRW End Mill

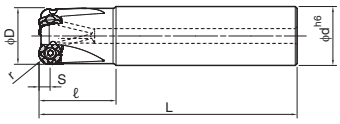


Fig.1

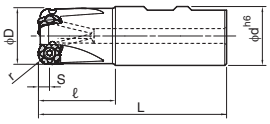


Fig.3

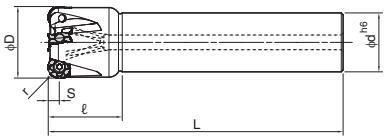


Fig.2

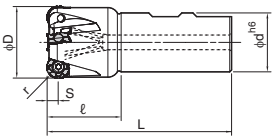


Fig.4

Toolholder Dimensions

	Description		Std.	No. of Inserts	Dimension (mm)						Rake Angle		Coolant Hole	Drawing	Max. Revolution (min^{-1})
					r	φD	φd	L	ℓ	S	A.R. (MAX.)	R.R.			
Straight Shank	MRW	32-S32-12-3T	●	3	6	32	32	140	40	6.0	+12°	-20°	Yes	Fig.1	22,000
		40-S32-12-4T	●	4		40		160				-16.5°		Fig.2	18,800
		50-S42-12-5T	●	5		50	42	170				-15.5°			16,000
	MRW	40-S32-16-3T	●	3	8	40	32	160	40	8.0	+11°	-18°	Yes	Fig.2	17,200
		50-S42-16-4T	●	4		50	42	170				-16.5°			14,800
		63-S42-16-5T	●	5		63			50						12,800
Long Shank	MRW	32-S32-12-2T-200	●	2	6	32	32	200	40	6.0	+12°	-20°	Yes	Fig.1	22,000
		40-S32-12-3T-200	●	3		40						-16.5°		Fig.2	18,800
		50-S42-12-4T-300	●	4		50	42	300				-15.5°			16,000
	MRW	40-S32-16-2T-200	●	2	8	40	32	200	40	8.0	+11°	-18°	Yes	Fig.2	17,200
		50-S42-16-3T-300	●	3		50	42	300				-16.5°			14,800
		63-S42-16-4T-300	●	4		63			50						12,800
Weldon	MRW	32-W32-12-3T	●	3	6	32	32	102	40	6.0	+12°	-20°	Yes	Fig.3	22,000
		40-W32-12-4T	●	4		40		100				-16.5°		Fig.4	18,800
		50-W40-12-5T	●	5		50	40	110				-15.5°			16,000
	MRW	40-W32-16-3T	●	3	8	40	32	100	40	8.0	+11°	-18°	Yes	Fig.4	17,200
		50-W40-16-4T	●	4		50	40	110				-16.5°			14,800
		63-W40-16-5T	●	5		63		120	50						12,800

- **Max. Revolution**
  When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
- S is Maximum ap. For more details ref. to page ➡ **M172** below.

Spare Parts and Applicable Inserts

Description	Spare Parts				Applicable Inserts ➡ **M16**		
	Clamp Screw	Wrench		Anti-seize Compound			
		DTPM-15	TTP-20		General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW ····-12...	SB-4085TRP	DTPM-15 for Insert Clamp Recommended tightening torque 3.5N·m		MP-1	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
MRW ····-16...	SB-50140TRP	TTP-20 for Insert Clamp Recommended tightening torque 4.5N·m		MP-1	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH

Recommended Cutting Conditions ➡ **M172**

● : Std. Item

Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz:mm/t) *Recommended feed rate (Reference value) for ROMU12 type: ap=3mm / for ROMU16 type: ap=4mm			Recommended Insert Grades (Cutting Speed Vc:m/min)			
				MEGACOAT NANO			CVD Coated Carbide
	GM	SM	GH	**PR1535**	**PR1525**	**PR1510**	**CA6535**
Carbon Steel	★ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	☆ 120~180~250	★ 120~180~250	-	-
Alloy Steel	★ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	☆ 100~160~220	★ 100~160~220	-	-
Mold Steel	★ 0.1~0.15~0.25	☆ 0.06~0.12~0.2	☆ 0.15~0.2~0.3	☆ 80~140~180	★ 80~140~180	-	-
Stainless Steel (Austenitic related)	☆ 0.1~0.15~0.2	★ 0.06~0.12~0.2	☆ 0.15~0.2~0.25	★ 100~160~200	☆ 100~160~200	-	-
Stainless Steel (Martensitic related)	☆ 0.1~0.15~0.2	★ 0.06~0.12~0.2	☆ 0.15~0.2~0.25	☆ 150~200~250	-	-	★ 180~240~300
Stainless Steel (Precipitation Hardening)	★ 0.1~0.15~0.2	☆ 0.06~0.12~0.2	☆ 0.15~0.2~0.25	★ 90~120~150	-	-	-
Gray Cast Iron	★ 0.1~0.2~0.3	-	☆ 0.15~0.3~0.35	-	-	★ 120~180~250	-
Nodular Cast Iron	★ 0.1~0.15~0.25	-	☆ 0.15~0.2~0.3	-	-	★ 100~150~200	-
Ni-base heat-resistant alloys	★ 0.1~0.12~0.15	☆ 0.06~0.1~0.15	☆ 0.12~0.15~0.2	☆ 20~30~50	-	-	★ 20~30~50
Titanium Alloys	☆ 0.1~0.12~0.15	★ 0.06~0.1~0.15	-	★ 40~60~80	-	☆ 30~50~70	-

★:1st Recommendation ☆:2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
* **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Recommended feed rate is the reference value when ap is r/2 (3mm for ROMU12, 4mm for ROMU16). For lower ap than the above conditions, the conversion factor in the following table is recommended.

Insert	ap (recommended)	Max. ap	Conversion factor for feed per tooth fz				
			ap=0.5mm	ap=1mm	ap=2mm	ap=3mm	ap=4mm
ROMU12 type	3mm or less	6mm	2.1	1.5	1.1	1.0 (Standard)	—
ROMU16 type	4mm or less	8mm	2.4	1.7	1.3	1.1	1.0 (Standard)

* Example (ROMU12 type, Carbon Steel, GM chipbreaker, ap=1mm)

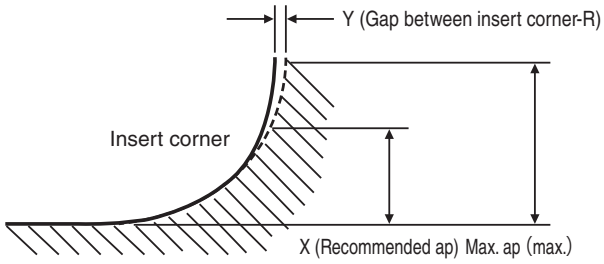
fz=0.2mm/t (Reference value for carbon steel and GM chipbreaker) × **1.5** (Conversion factor for ROMU12 type, ap=1mm) = **fz=0.3mm/t** (Recommended feed rate)

* Recommended ap: 3mm or less for ROMU12, 4mm or less for ROMU16
  Except the case that ap temporally surpass the recommended ap, machining under the recommended ap is recommended.

Corner-R shape during processing

Corner-R shape during processing with MRW (Ref. to the right figure)

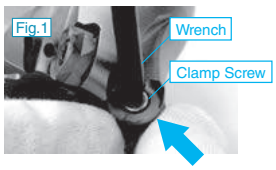
Insert	Max. ap	X	Y
ROMU12 type	6mm	3mm	0.1mm
ROMU16 type	8mm	4mm	0.1mm

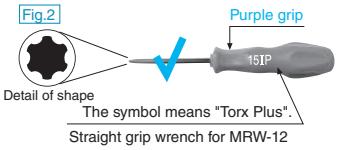


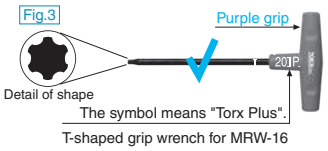
* When machining with larger ap than recommended ap (X), there is a gap (Y) between the workpiece corner and insert corner-R(r).
* The above figure is estimation. There would be ±0.2mm variation depending on the cutting conditions.

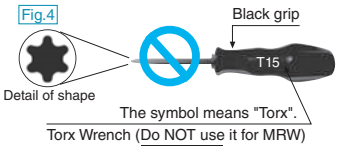
How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp screw
   (1) Apply anti-seize compound on portion of taper and thread of clamp screw.
   (2) Attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. Wrenches and clamp screws are "Torx Plus".
   (1) Fig. 2 wrench is for MRW-12. (Straight grip)
   (2) Fig. 3 wrench is for MRW-16. (T-shaped grip)
   Please use a "Torx Plus" Wrench for tightening cramp screw.
   * If a "Torx" Wrench (Fig. 4) is used to tighten, the screw head might become damaged and then the screw cannot be removed.
4. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended tightening torque **Ref. to page M170・M171**
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.



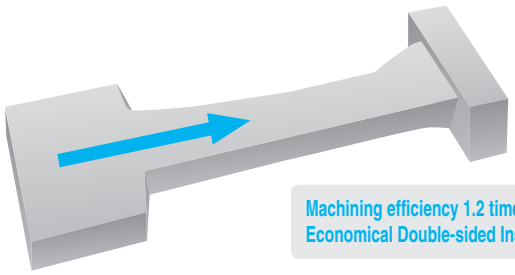






Case Studies

12Cr Steel



Machining efficiency 1.2 times
Economical Double-sided Insert

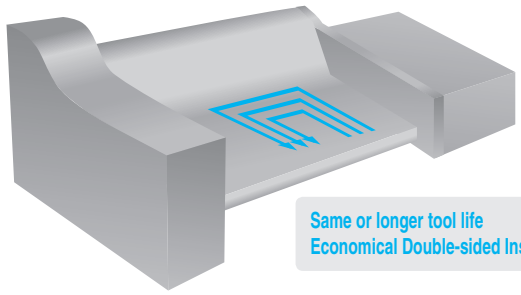
・Turbine Blade ・Vc=270m/min ・fz=0.278mm/t
・ap=0.5~1.0mm ae=max.35mm ・Dry
・MRW050R-12-6T-M (6 inserts) ・ROMU1204M0ER-SM（CA6535）

CA6535	**Stable machining**
Competitor A (Positive Cutter)	**Unstable machining with large noise**

MRW improved machining efficiency by 1.2 times with same tool life compared with Competitor A.
MRW has cost advantage due to double-sided inserts.

(Evaluation by the user)

12Cr Steel



Same or longer tool life
Economical Double-sided Insert

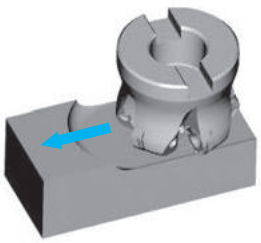
・Turbine Blade ・Vc=250m/min ・fz=0.16mm/t
・ap=2.0mm ae=5~30mm ・Wet
・MRW050R-12-5T-M (5 inserts) ・ROMU1204M0ER-SM（CA6535）

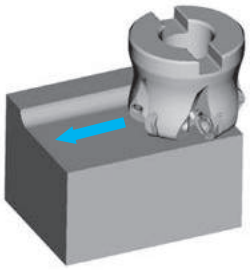
CA6535	**Stable, available for further machining**
Competitor B (Positive Cutter)	**Unstable machining with large noise**

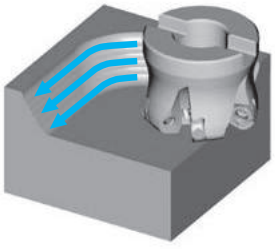
MRW showed less damage on the cutting edge and reduced machining noise.
MRW has equal or longer tool life and cost advantage due to double sided inserts.

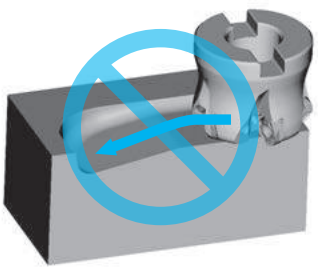
(Evaluation by the user)

Applications


Facing


Shouldering


Contouring

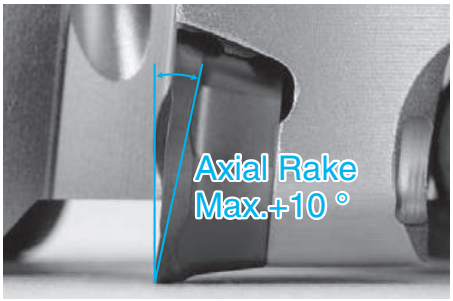

Plunging / Profiling

* MRW type is not available for 3D machining such as Plunging and Profiling.

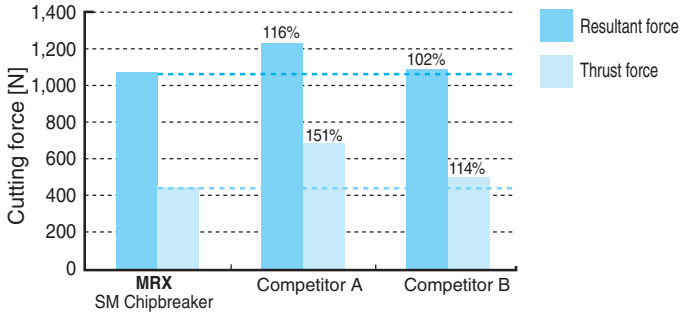
MRX

Excellent cutting performance due to low cutting force design
High efficiency radius cutter

POINT.1 Low cutting force due to helical cutting-edge design



• Cutting Force Comparison



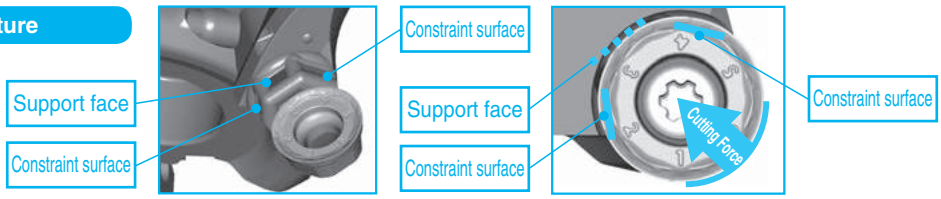
<Cutting Conditions>
Vc=120m/min, ap×ae=2×25mm, fz=0.2mm/t, SUS304, Cutter ϕ50

POINT.2 Flat Lock Structure to hold insert firmly.

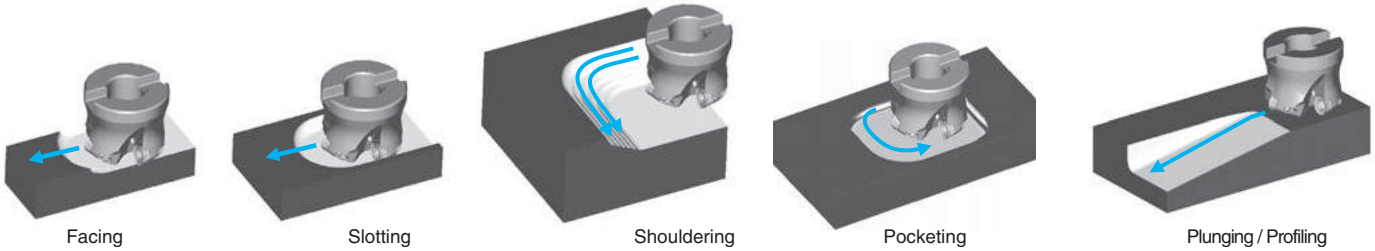
Prevent insert rotation during machining and realizes **stable machining**

Flat Lock Structure

Wide flat constraint surface
·Receives even cutting forces
·Controls insert rotation



POINT.3 Various applications



Facing | Slotting | Shouldering | Pocketing | Plunging / Profiling

POINT.4

New insert grades **CA6535 / PR1535** for difficult-to-cut material are available
Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

Cost-effective M-class inserts are available.

MRX Face Mill

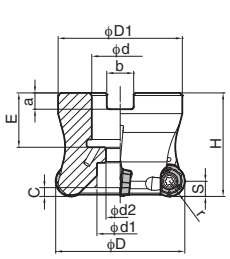


Fig.1

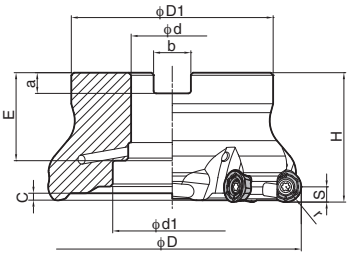


Fig.2

Toolholder Dimensions

	Description	Std.	No. of Inserts	Dimension (mm) r	φD	φD1	φd	φd1	φd2	H	E	a	b	C	S	Rake Angle A.R.	R.R.	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
Metric	MRX 040R-10-5T-M	●	5	5	40	38	16	15	9	40	19	5.6	8.4	2.9	5	+10°	-5.5°	Yes	Fig.1	0.2	20,000
	050R-10-6T-M	●	6		50	48	22	18	11		21	6.3	10.4							0.3	17,500
	063R-10-7T-M	●	7		63	60														0.6	15,000
	MRX 040R-12-4T-M	●	4	6	40	38	16	13.5	9	40	19	5.6	8.4	3.4	6	+10°	-5.5°		Fig.1	0.2	21,000
	050R-12-4T-M	●	4		50	48	22	18	11		21	6.3	10.4							0.3	18,000
	050R-12-5T-M	●	5																	0.3	18,000
	063R-12-5T-M	●	5		63	60														0.6	15,500
	063R-12-6T-M	●	6																	0.6	15,500
	080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4							1.2	13,500
	080R-12-8T-M	●	8																	1.1	13,500
	100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4						Fig.2	1.4	12,000
	100R-12-9T-M	●	9																	1.4	12,000
	MRX 063R-16-4T-M	●	4	8	63	60	22	18	11	40	21	6.3	10.4	4.4	8	+10°	-5.5°		Fig.1	0.5	13,500
	063R-16-5T-M	●	5																	0.5	13,500
	080R-16-5T-M	●	5		80	70	27	20	13	50	24	7	12.4							1.1	11,500
	080R-16-6T-M	●	6																	1.1	11,500
	100R-16-6T-M	●	6		100	78	32	46	-		30	8	14.4						Fig.2	1.4	10,000
	100R-16-7T-M	●	7																	1.4	10,000
	125R-16-6T-M	●	6		125	89	40	55		63	33	9	16.4							2.6	9,000
	125R-16-8T-M	●	8																	2.6	9,000
Bore Dia. Inch spec	MRX 080R-12-6T	○	6	6	80	70	25.4	20	13	50	27	6	9.5	3.4	6	+10°	-5.5°		Fig.1	1.2	13,500
	080R-12-8T	○	8																	1.1	13,500
	100R-12-7T	○	7		100	78	31.75	46	-		34	8	12.7						Fig.2	1.5	12,000
	100R-12-9T	○	9																	1.5	12,000
	MRX 080R-16-5T	○	5	8	80	70	25.4	20	13	50	27	6	9.5	4.4	8	+10°	-5.5°		Fig.1	1.1	11,500
	080R-16-6T	○	6																	1.1	11,500
	100R-16-6T	○	6		100	78	31.75	46	-		34	8	12.7						Fig.2	1.4	10,000
	100R-16-7T	○	7																	1.4	10,000
	125R-16-6T	○	6		125	89	38.1	55		63	38	10	15.9							2.7	9,000
	125R-16-8T	○	8																	2.7	9,000

Spare Parts and Applicable Inserts

Description	Spare Parts: Clamp Screw	Wrench: DTPM	Wrench: TTP	Anti-seize Compound	Mounting bolt	Applicable Inserts ➡ M16
MRX 040R-10...	SB-3070TRP	DTPM-10		MP-1	HH8X25	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH *1
050R-10...	for Insert Clamp Recommended tightening torque 2.0N·m				HH10X30	
063R-10...						
MRX 040R-12...	SB-4090TRPN	DTPM-15		MP-1	HH8X25	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH *2
050R-12...	for Insert Clamp Recommended tightening torque 3.5N·m				HH10X30	
063R-12...						
080R-12...					HH12X35	
100R-12...					-	
MRX 063R-16...	SB-50120TRP	TTP-20		MP-1	HH10X30	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH *3
080R-16...	for Insert Clamp Recommended tightening torque 4.5N·m				HH12X35	
100R-16...					-	
125R-16...						

● Max. Revolution
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

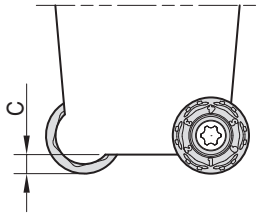
● Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

*1··· Not compatible with the conventional RPMT10T3M0.
*2··· Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.
*3··· Not compatible with the conventional RPMT1606M0-H.

Recommended Cutting Conditions ➡ M178

● : Std. Item

MRX End Mill



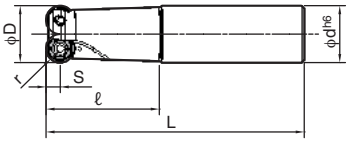


Fig.1

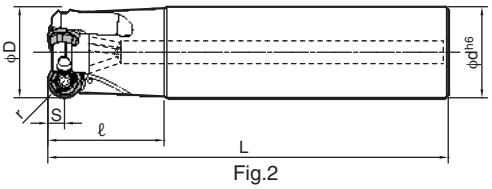


Fig.2

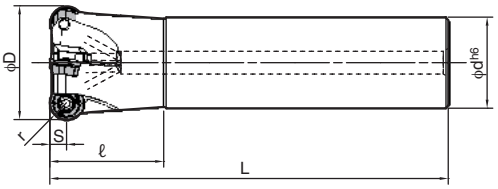


Fig.3

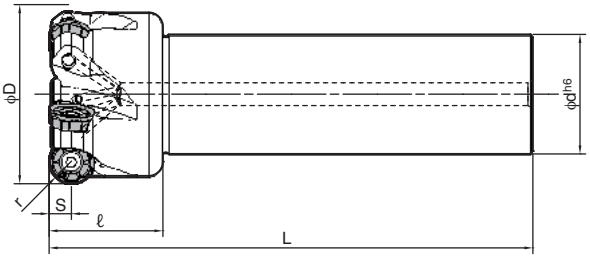


Fig.4

Fig.5

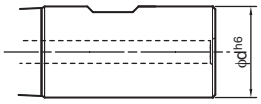


Fig.6

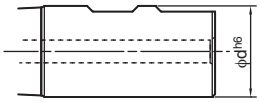


Fig.7

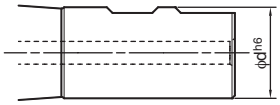


Fig.8

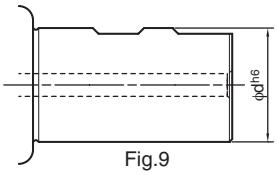


Fig.9

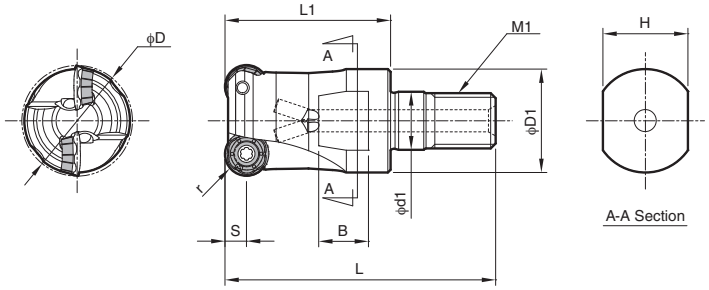
Toolholder Dimensions

	Description	Std.	No. of Inserts	Dimension (mm)							Rake Angle		Coolant Hole	Drawing	Max. Revolution (min^{-1})
				r	ϕD	ϕd	L	ℓ	C	S	A.R. (MAX.)	R.R.			
Straight Shank	MRX 16-S16-08-2T	●	2	4	16	16	110	40	2.4	4.0	+3°	-5.5°	No	Fig.1	38,000
	20-S20-08-2T	●	2		20	20	120				+10°		Yes	Fig.2	32,000
	25-S25-08-4T	●	4		25	25									28,000
	MRX 20-S20-10-2T	●	2	5	20	20	120	40	2.9	5.0	+5°	-8°	No	Fig.1	30,000
	25-S25-10-3T	●	3		25	25					+10°	-5.5°	Yes	Fig.2	28,000
	32-S32-10-4T	●	4		32	32	140								22,500
	MRX 32-S32-12-3T	●	3	6	32	32	140	40	3.4	6.0	+10°	-5.5°	Yes	Fig.2	24,500
	40-S32-12-4T	●	4		40									Fig.3	21,000
	50-S42-12-5T	●	5		50	42	170								18,000
	MRX 40-S32-16-2T	●	2	8	40	32	140	40	4.4	8.0	+10°	-5.5°	Yes	Fig.3	18,000
	50-S42-16-4T	●	4		50	42	170								15,500
	63-S42-16-5T	●	5		63									Fig.4	13,500
Weldon	MRX 16-W16-08-2T	●	2	4	16	16	89	40	2.4	4.0	+3°	-5.5°	No	Fig.5	38,000
	20-W20-08-2T	●	2		20	20	91				+10°		Yes	Fig.6	32,000
	25-W25-08-4T	●	4		25	25	97							Fig.7	28,000
	MRX 20-W20-10-2T	●	2	5	20	20	91	40	2.9	5.0	+5°	-8°	No	Fig.5	30,000
	25-W25-10-3T	●	3		25	25	97				+10°	-5.5°	Yes	Fig.7	28,000
	32-W32-10-4T	●	4		32	32	101								22,500
	MRX 32-W32-12-3T	●	3	6	32	32	101	40	3.4	6.0	+10°	-5.5°	Yes	Fig.7	24,500
	40-W32-12-4T	●	4		40									Fig.8	21,000
	50-W40-12-5T	●	5		50	40	111								18,000
	MRX 40-W32-16-2T	●	2	8	40	32	101	40	4.4	8.0	+10°	-5.5°	Yes	Fig.8	18,000
	50-W40-16-4T	●	4		50	40	111								15,500
	63-W40-16-5T	●	5		63		112							Fig.9	13,500
Long Shank	MRX 16-S16-08-2T-160	●	2	4	16	16	160	70	2.4	4.0	+3°	-5.5°	No	Fig.1	38,000
	20-S20-08-2T-180	●	2		20	20	180	80			+10°		Yes	Fig.2	32,000
	25-S25-08-4T-180	●	4		25	25									28,000
	MRX 20-S20-10-2T-180	●	2	5	20	20	180	80	2.9	5.0	+5°	-8°	No	Fig.1	30,000
	25-S25-10-2T-180	●	2		25	25					+10°	-5.5°	Yes	Fig.2	28,000
	32-S32-10-4T-200	●	4		32	32	200								22,500
	MRX 32-S32-12-2T-200	●	2	6	32	32	200	80	3.4	6.0	+10°	-5.5°	Yes	Fig.2	24,500
	40-S32-12-4T-200	●	4		40			40						Fig.3	21,000
	50-S42-12-4T-300	●	4		50	42	300								18,000
	MRX 40-S32-16-2T-200	●	2	8	40	32	200	40	4.4	8.0	+10°	-5.5°	Yes	Fig.3	18,000
	50-S42-16-4T-300	●	4		50	42	300								15,500
	63-S42-16-4T-300	●	4		63									Fig.4	13,500

- **Max. Revolution**
  When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

MRX type Head



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) r	φD	φD1	φd1	L	L1	M1	H	B	S	Rake Angle A.R. (MAX.)	Rake Angle R.R.	Coolant Hole	Applicable Inserts	Max. Revolution (min^{-1})
MRX 16-M08-08-2T	●	2	4	16	14.7	8.5	43	25	M8xP1.25	12	8	4	+3°	-5.5°	No	RDMT08 RDGT08	38,000
20-M10-08-2T	●	2		20	18.7	10.5	49	30	M10xP1.5	15	9		+10°		Yes		32,000
25-M12-08-4T	●	4		25	23	12.5	57	35	M12xP1.75	19	10						28,000
MRX 20-M10-10-2T	●	2	5	20	18.7	10.5	49	30	M10xP1.5	15	9	5	+5°	-8°	No	RPMT10 RPGT10	30,000
25-M12-10-3T	●	3		25	23	12.5	57	35	M12xP1.75	19	10		+10°	-5.5°	Yes		28,000
32-M16-10-4T	●	4		32	30	17	63	40	M16xP2.0	24	12						22,500
MRX 32-M16-12-3T	●	3	6	32	30	17	63	40	M16xP2.0	24	12	6	+10°	-5.5°	Yes	RPMT12 RPGT12	24,500
40-M16-12-4T	●	4		40													21,000
MRX 40-M16-16-2T	●	2	8	40	30	17	63	40	M16xP2.0	24	12	8	+10°	-5.5°	Yes	RPMT16 RPGT16	18,000

Ref. to page M58 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts and Applicable Inserts

Description	Clamp Screw	Wrench DTPM	Wrench TTP	Anti-seize Compound	Applicable Inserts M16
MRX ····-08···	SB-2555TRP	DTPM-8		MP-1	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM RDMT0803M0EN-GH *1
	for Insert Clamp Recommended tightening torque 1.2N·m				
MRX····-10···	SB-3070TRP	DTPM-10		MP-1	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH *2
	for Insert Clamp Recommended tightening torque 2.0N·m				
MRX····-12···	SB-4090TRPN	DTPM-15		MP-1	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH *3
	for Insert Clamp Recommended tightening torque 3.5N·m				
MRX····-16···	SB-50120TRP	TTP-20		MP-1	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH *4
	for Insert Clamp Recommended tightening torque 4.5N·m				

- **Max. Revolution**
  "When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force."

- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

*1··· Not compatible with the conventional RDMT08T2M0-H.
*2··· Not compatible with the conventional RPMT10T3M0.
*3··· Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.
*4··· Not compatible with the conventional RPMT1606M0-H.

Recommended Cutting Conditions M178

● : Std. Item

◆ Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz : mm/t) * RD**08 type: ap=2mm, RP**10 type: ap=2.5mm RP**12 type: ap=3mm, RP**16 type: ap=4mm				Recommended Insert Grades (Cutting Speed Vc : m/min)			
					MEGACOAT NANO			CVD Coated Carbide
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	PR1535	PR1525	PR1510	CA6535
Carbon Steel	★0.1~0.2~0.3	☆0.1~0.2~0.3	☆0.06~0.15~0.2	☆0.15~0.3~0.35	☆120~180~250	★120~180~250	–	–
Alloy Steel	★0.1~0.2~0.3	☆0.1~0.2~0.3	☆0.06~0.15~0.2	☆0.15~0.3~0.35	☆100~160~220	★100~160~220	–	–
Mold Steel	★0.1~0.15~0.25	☆0.1~0.15~0.25	☆0.06~0.12~0.2	☆0.15~0.2~0.3	☆80~ 140~180	★80~ 140~180	–	–
Stainless Steel (Austenitic related)	☆0.1~0.15~0.2	☆0.1~0.15~0.2	★0.06~0.12~0.2	☆0.15~0.2~0.25	★100~160~200	☆100~160~200	–	–
Stainless Steel (Martensitic related)	☆0.1~0.15~0.2	☆0.1~0.15~0.2	★0.06~0.12~0.2	☆0.15~0.2~0.25	☆150~200~250	–	–	★180~240~300
Stainless Steel (Precipitation Hardening)	☆0.1~0.15~0.2	★0.1~0.15~0.2	☆0.06~0.12~0.2	☆0.15~0.2~0.25	★90~120~150	–	–	–
Gray Cast Iron	★0.1~0.2~0.3	☆0.1~0.2~0.3	–	☆0.15~0.3~0.35	–	–	★120~180~250	–
Nodular Cast Iron	★0.1~0.15~0.25	☆0.1~0.15~0.25	–	☆0.15~0.2~0.3	–	–	★100~150~200	–
Ni-base heat-resistant alloys	☆0.1~0.12~0.15	★0.1~0.12~0.15	☆0.06~0.1~0.15	☆0.12~0.15~0.2	☆20~30~50	–	–	★20~30~50
Titanium Alloys	☆0.1~0.12~0.15	☆0.1~0.12~0.15	★0.06~0.1~0.15	–	★40~60~80	–	☆30~50~70	–

★:1st Recommendation ☆:2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
* RDGT/RPGT are recommended for stainless steel, Ni-base heat-resistant alloys and titanium alloy.
* **The bold-faced number** indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Recommended feed rate in the table is the reference value when ap is r/2. (2mm for RD**08 / 2.5mm for RP**10 / 3mm for RP**12 / 4mm for RP**16) For other ap, calculate the recommended feed rate based on the conversion factor below.
* For MRX16-S16-08-2T(-160), MRX16-W-08-2T, MRX20-S20-10-2T(-180) and MRX20-W20-10-2T, set the feed rate not higher than 50% of the recommended cutting conditions.

■ Conversion factor for feed per tooth by depth of cut (ap)

Insert	Max. ap	Conversion factor for feed per tooth fz									
		ap=0.5mm	ap=1mm	ap=1.5mm	ap=2mm	ap=2.5mm	ap=3mm	ap=4mm	ap=5mm	ap=6mm	ap=8mm
RD**08 type (GM/SM/GH chipbreaker)	4mm	1.7	1.3	1.1	1 (Standard)	0.9	0.8	0.8	—	—	—
RP**10 type (GM/SM/GH chipbreaker)	5mm	1.9	1.4	1.2	1	1 (Standard)	0.9	0.8	0.8	—	—
RP**12 type (GM/SM/GH chipbreaker)	6mm	2.1	1.5	1.3	1.1	1	1 (Standard)	0.9	0.8	0.8	—
RP**16 type (GM/SM/GH chipbreaker)	8mm	2.4	1.7	1.4	1.3	1.1	1.1	1 (Standard)	0.9	0.8	0.8

· Example (RPMT12 type, Carbon Steel, GM chipbreaker, ap=1mm)

fz=0.2mm/t (Reference value for carbon steel and GM chipbreaker)	×	1.5 (Conversion factor for RP**12 type, ap=1mm)	=	fz=0.3mm/t (Recommended feed rate)

■ Recommended cutting conditions for Drilling / Ramping / Helical milling

Tool spec.		Max. ap	Drilling		Ramping			Helical Milling		
Insert	Tool Dia.	ap	Max. Cutting Depth Pd	Min. cutting length X for flat bottom surface	Max. ramping angle α_{max}(°)	tan α_{max}	Max. Cutting Length L at Max. Ramping Angle	Min. Cutting Dia. ϕDh1	Min. Cutting Dia. for flat bottom facing ϕDh2	Max. Cutting Dia. ϕDh3
RD**08 type	16	4	0.7	9	8	0.141	28	20	24	30
	20		1.4	13	9	0.158	25	26	32	38
	25			18	5	0.087	45	36	42	48
RP**10 type	20	5	0.6	11	5	0.087	57	26	30	38
	25		1.9	16	10	0.176	28	33	40	48
	32			23	6	0.105	47	47	54	62
	40			31	4	0.070	71	63	70	78
	50			41	3	0.052	95	83	90	98
	63			54	2	0.035	143	109	116	124
RP**12 type	32	6	2.4	21	9	0.158	37	43	52	62
	40			29	5	0.087	68	59	68	78
	50			39	4	0.070	85	79	88	98
	63			52	2	0.035	171	105	114	124
	80			69				139	148	158
	100			89	1	0.017	343	179	188	198
RP**16 type	40	8	3.4	25	11	0.194	41	51	64	78
	50			35	7	0.123	65	71	84	98
	63			48	4	0.070	114	97	110	124
	80			65	3	0.052	152	131	144	158
	100			85	2	0.035	229	171	184	198
	125			110	1	0.017	458	221	234	248

* Above is the value considering the clearance 1mm between the tool body and the workpiece.

Unit : mm

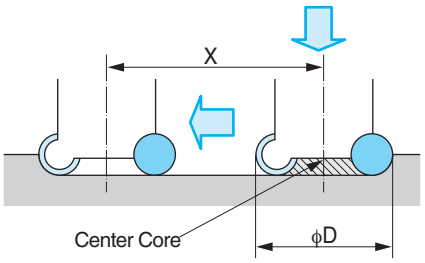
Guide for Drilling

[Depth of Drilling]

Refer to Max. Cutting Depth (Pd) shown in the lower table of **M178**.
(Pd Shows the maximum plunge depth.)

[When Traversing after Drilling]

(1) Reduce the table feed by 50% until the center core part (do not forget to grind) is completely cut off.
(The internal cutting edge's radial rake angle is large in the negative direction)
(2) The min. cutting length "X" for flat bottom surface is as follows **M178**.

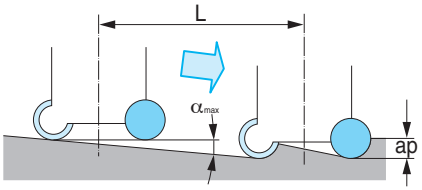


Guide for Ramping (Slant Milling)

- Ramping angle should be under α_{max} (Maximum ramping angle) in the above cutting conditions.
- Feed rate should be under 70% of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

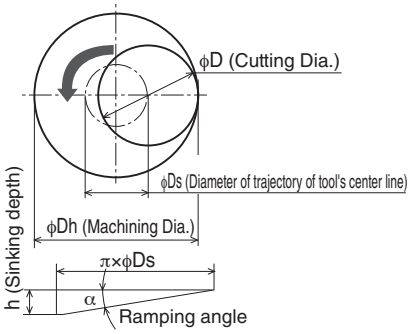
$$L = \frac{ap}{\tan \alpha_{max}}$$



Guide for Helical milling

- Sinking depth (h) at helical milling should be under Max. ap in the above cutting conditions. Ramping angle α (with trajectory of the center line of tool) should be under α_{max} (Maximum ramping angle) in the above cutting conditions.
- Feed rate should be under 70% of the above cutting conditions.
- Down-cut machining is recommended.

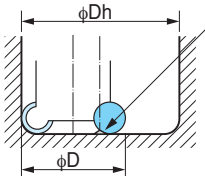
Helical Milling Factors



ϕDs (How to find diameter of trajectory of tool's center line)
ϕDs=ϕDh-ϕD

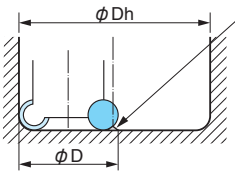
Formula for sinking depth (h)
h=π×ϕDs×tanα
(h should be under ap)
(α should be under α_{max})

[When cutting dia. ϕDh1≤ϕDh<ϕDh2]



Center core part remains after machining. (Not removable with the same cutter)

[When cutting dia. ϕDh2≤ϕDh≤ϕDh3]



Center core part remains after machining. (Removable by traversing with the same cutter)

Please refer to M178 the list for ϕDh1~Dh3.

Max. ap and usable edges

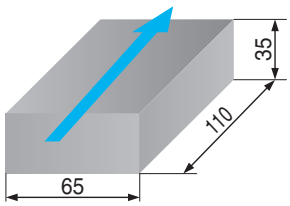
(mm)

Usable edges	Insert Corner-R			
	R4	R5	R6	R8
3 edges	ap=2.0~4.0	ap=2.5~5.0	ap=3.0~6.0	ap=4.0~8.0
6 edges	ap=2.0 Less than	ap=2.5 Less than	ap=3.0 Less than	ap=4.0 Less than

Case Studies

SUS304

- Nozzle parts
- Vc=113m/min
- fz=0.14mm/t
- ap×ae=1.0×65mm
- Dry
- MRX100R-12-9T-M (9 inserts)
- RPGT1204M0ER-SM (PR1535)



4.5 times longer tool life

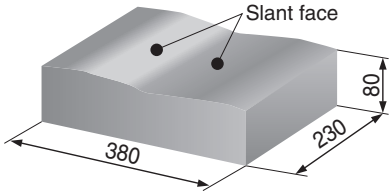
PR1535	450 pcs/edge
Conventional	100 pcs/edge

- High cost efficiency due to 4.5 times longer tool life and 1.5 times more insert edges.
- MRX prevented burr formation and improved surface finish.

(Evaluation by the user)

SKD61 (47~49HRC)

- Mold Part
- Vc=125m/min
- fz=0.25mm/t
- ap×ae=1.0 ~ 2.0×10mm
- Dry
- MRX20-S20-08-2T (2 inserts)
- RDGT0803M0ER-GM (PR1525)



More than double tool life

PR1525	2 pcs and more Stable tool life
Conventional	1 pc Unstable tool life

- Conventional tool machined only 1 pc of workpiece due to unstable tool life, but MRX doubled the tool life with stable machining.

(Evaluation by the user)

MRP-S End Mill

Standard

Long Shank

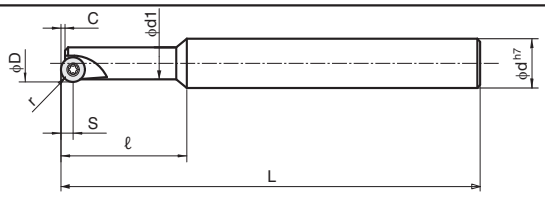


Fig.1

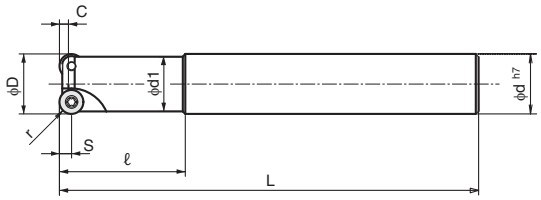


Fig.2

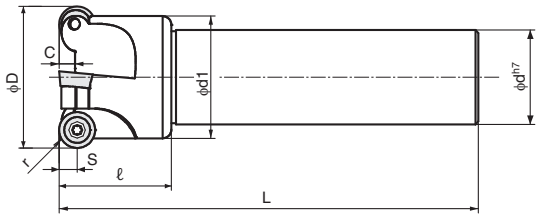


Fig.3

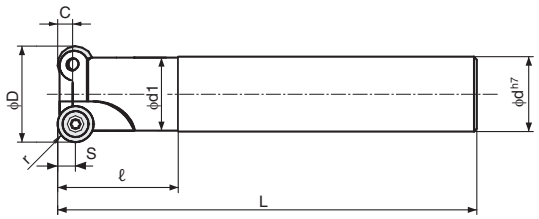


Fig.4

Toolholder Dimensions

	Description	Std.	No. of Inserts	Dimension (mm) r	φD	φd	φd1	L	ℓ	C	Pd	S	Rake Angle A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ M21
Standard	MRP 012-S16-08	○	1	4	12	16	10.4	110	40	3.0	N/A	4	-8.5°	-5.5°	Fig.1	SB-3060TR	DT-10	RDMT08T2M0-H
	016-S16-08	○	2	4	16	16	14.4	110	40	3.0	0.5	4	0°	-5.5°	Fig.2	SB-3060TR	DT-10	RDMT08T2M0-H
	020-S20-08	○	2	4	20	20	17	120	40	3.0	2.0	4	+5°	-4°	Fig.2	SB-3060TR	DT-10	RDMT08T2M0-H
	MRP 025-S25-10-3T	○	3	5	25	25	21	120	40	3.5	2.5	5	+2°	-6°	Fig.2	SB-3080TR	DT-10	RPMT10T3M0
	032-S32-10-4T	○	4	5	32	32	28	140	40	3.5	2.5	5	+2°	-6°	Fig.2	SB-3080TR	DT-10	RPMT10T3M0
	MRP 032-S25-12	○	2	6	32	25	24.4	140	40	5.0	4.0	6	+5°	-4°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	040-S32-12	○	3	6	40	32	31.4	160	40	5.0	4.0	6	+5°	-5°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	040-S32-12-4T	○	4	6	40	32	31.4	140	40	4.5	3.5	6	+5°	-5°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	050-S42-12	○	4	6	50	42	41.4	170	40	5.0	4.0	6	+5°	-5°	Fig.3	SB-40115TR	DT-15	RPMT1204M0-H RPMT1204M0
	MRP 040-S32-16	○	2	8	40	32	31.4	160	40	7.0	6.0	8	+5°	-3°	Fig.3	SB-50120TR	DT-20	RPMT1606M0-H
	050-S42-16	○	3	8	50	42	41.4	170	40	7.0	6.0	8	+5°	-3°	Fig.3	SB-50120TR	DT-20	RPMT1606M0-H
	063-S42-16	○	4	8	63	42	54.4	170	50	7.0	6.0	8	+5°	-3°	Fig.4	SB-50120TR	DT-20	RPMT1606M0-H
Long Shank	MRP 012-S16-08-160	○	1	4	12	16	10.4	160	40	3.0	N/A	4	-8.5°	-5.5°	Fig.1	SB-3060TR	DT-10	RDMT08T2M0-H
	016-S16-08-160	○	2	4	16	16	14.4	160	40	3.0	0.5	4	0°	-5.5°	Fig.2	SB-3060TR	DT-10	RDMT08T2M0-H
	020-S20-08-180	○	2	4	20	20	17	180	40	3.0	2.0	4	+5°	-4°	Fig.2	SB-3060TR	DT-10	RDMT08T2M0-H
	MRP 025-S25-10-3T-180	○	3	5	25	25	21	180	40	3.5	2.5	5	+2°	-6°	Fig.2	SB-3080TR	DT-10	RPMT10T3M0
	032-S32-10-4T-200	○	4	5	32	32	28	200	40	3.5	2.5	5	+2°	-6°	Fig.2	SB-3080TR	DT-10	RPMT10T3M0
	MRP 032-S25-12-300	○	2	6	32	25	24.4	300	40	5.0	4.0	6	+5°	-4°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	040-S32-12-300	○	3	6	40	32	31.4	300	40	5.0	4.0	6	+5°	-5°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	040-S32-12-4T-200	○	4	6	40	32	31.4	200	40	4.5	3.5	6	+5°	-5°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	050-S42-12-300	○	4	6	50	42	41.4	300	40	5.0	4.0	6	+5°	-5°	Fig.3	SB-40115TR	DT-15	RPMT1204M0-H RPMT1204M0
	MRP 040-S32-16-300	○	2	8	40	32	31.4	300	40	7.0	6.0	8	+5°	-3°	Fig.3	SB-50120TR	DT-20	RPMT1606M0-H
	050-S42-16-300	○	3	8	50	42	41.4	300	40	7.0	6.0	8	+5°	-3°	Fig.3	SB-50120TR	DT-20	RPMT1606M0-H
	063-S42-16-300	○	4	8	63	42	54.4	300	50	7.0	6.0	8	+5°	-3°	Fig.4	SB-50120TR	DT-20	RPMT1606M0-H

・ Pd: Max. Plunging Depth

Recommended Cutting Conditions ➡ M182

○ : Check Availability

MRP Face Mill

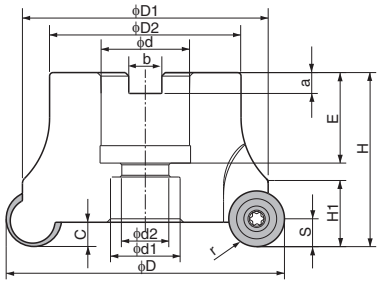


Fig.1

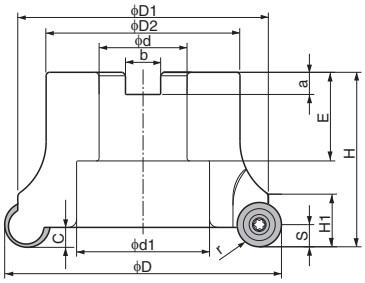


Fig.2

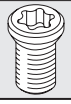
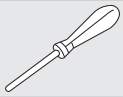
Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)															Rake Angle		Drawing	Weight (kg)
				r	φD	φD1	φD2	φd	φd1	φd2	H	H1	E	a	b	C	Pd	S	A.R.	R.R.		
MRP	050R-10-6T	○	6	5	50	45.0	38	22.0	18	12	50	13	20	6.3	10.4	3.5	2.5	5.0	+5°	-5°	Fig.1	0.4
	063R-10-7T	○	7		63	57.9	50	25.4	20	14			26	6.0	9.5							0.5
MRP	050R-12	○	4	6	50	41.4	38	22.0	18	12		15	20	6.3	10.4	5.0	4.0	6.0	+5°	-5°	Fig.1	0.4
	063R-12	○	5		63	54.4	50	25.4	20	14			26	6.0	9.5							0.5
	080R-12	○	6		80	71.4	55													-3°		0.7
	080R-12-7T	○	7			74.4	59									4.5	3.5			-5°		
MRP	080R-16	○	5	8	80	70.6	55	25.4	20	14	50	19	26	6.0	9.5	7.0	6.0	8.0	+5°	-3°	Fig.1	0.8
	100R-16	○	6		100	90.5	70	31.75	48	-	63		32	8.0	12.7					-5°	Fig.2	1.0
	100R-16-7T	○	7			93.0										6.0	5.0			-6°		
	125R-16	○	6		125	115.5	80	38.10	58				38	10.0	15.9	7.0	6.0			-5°		1.7
MRP	080R-20	○	4	10	80	67.3	55	25.4	20	14	50	23	24	6.0	9.5	8.5	N.A.	10.0	+5°	-3°	Fig.1	0.8
	100R-20	○	5		100	87.3	70	31.75	48	-	63		32	8.0	12.7					-5°	Fig.2	1.0

・ Pd: Max. Plunging Depth
・ Use BT ○○ -FMC22 (TMT Standard in the market) for MRP050R-10-6T and MRP050R-12.

Recommended Cutting Conditions ➡ M182

Spare Parts

Description		Clamp Screw	Wrench	Applicable Inserts ➡ M21
				
MRP	050R-10-6T	SB-3080TR	DT-10	RPMT10T3M0
	063R-10-7T			
MRP	050R-12	SB-40115TR	DT-15	RPMT1204M0-H RPMT1204M0
	063R-12			
	080R-12	SB-4085TR		
	080R-12-7T			
MRP	080R-16	SB-50120TR	DT-20	RPMT1606M0-H
	100R-16			
	100R-16-7T			
	125R-16			
	125R-16-8T			
MRP	080R-20	SB-60120TR	DT-25	RPMT2006M0-H
	100R-20			

・ Mounting bolt (HH10X25) is included for MRP050R.
・ Mounting bolt (HH12X35) is included for MRP063R.
・ Mounting bolt (HH12X35) is included for MRP080R.

○ : Check Availability

MRP

Applicable Inserts

Description		Applicable Inserts ➡ M21		
		Tough Edge	Tough Edge	
MRP	…-08	RDMT08T2M0-H	-	-
	…-10	-		RPMT10T3M0
	…-12		RPMT1204M0-H	RPMT1204M0
	…-16		RPMT1606M0-H	-
	…-20		RPMT2006M0-H	

Top surface of insert

Low cutting force and good chip evacuation owing to chipbreaker design.
"-H" type insert has a second cutting edge next to the first cutting adds edge strength.

Ratchet design prevents the insert's movement and holds the insert firmly in the insert pocket even during the heavy milling (Only RPMT)

Bottom Face

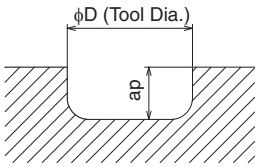
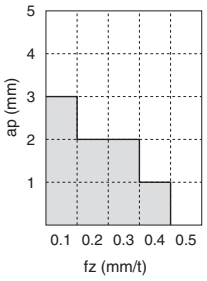
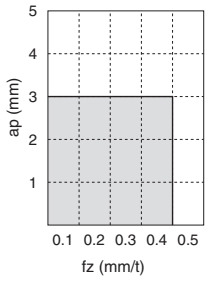
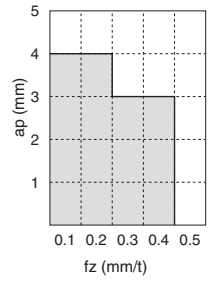
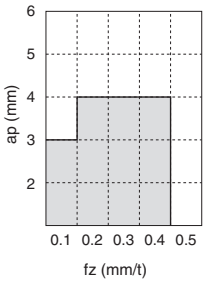
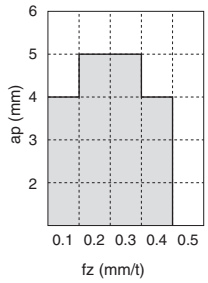
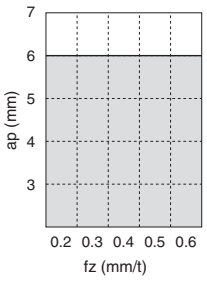
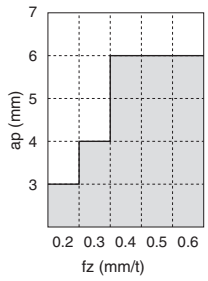
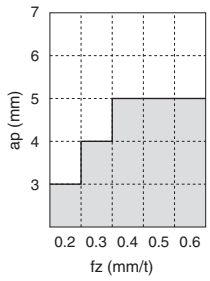
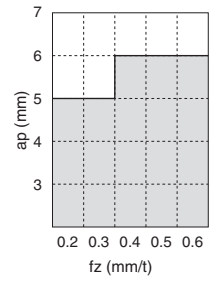
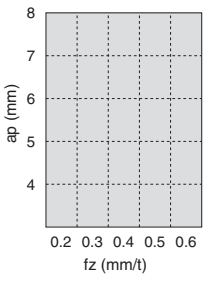
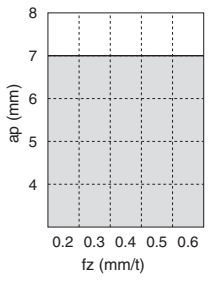
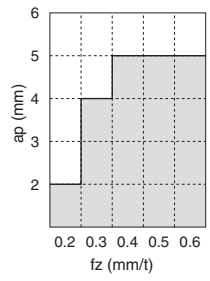
Insert Description	Land at Edge	Applications	Remarks
RPMT10T3M0 **RPMT1204M0**	No	Low cutting force	Even if the workpiece clamp is weak, or if the workpiece is thin, sharp cutting performance and less chattering is demonstrated.
RPMT08T2M0-H **RPMT1204M0-H** **RPMT1606M0-H** **RPMT2006M0-H**	Parallel Land 0.2mm Width	Tough Edge	Used for General Roughing.

Recommended Cutting Conditions

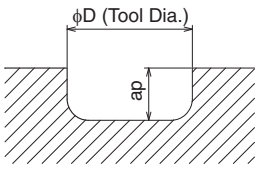
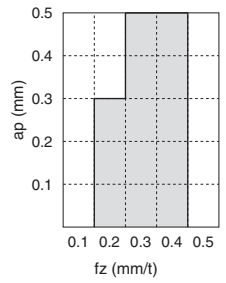
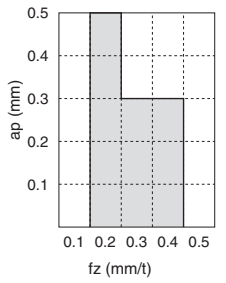
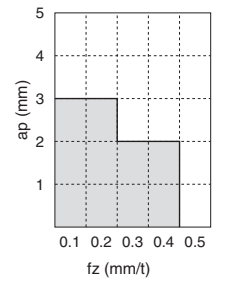
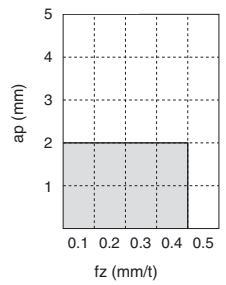
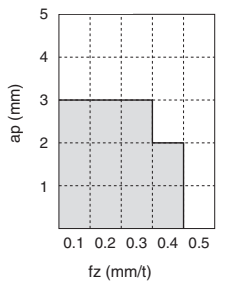
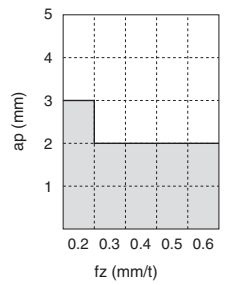
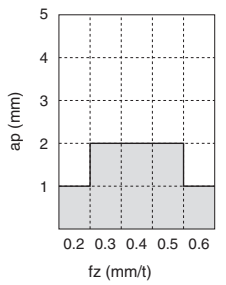
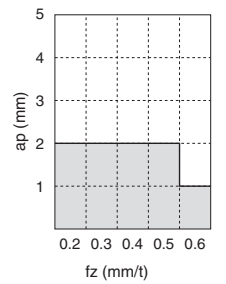
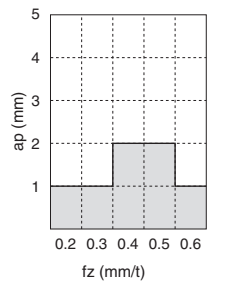
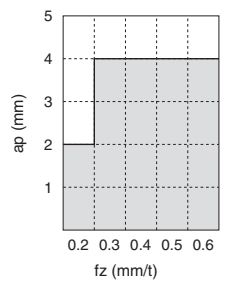
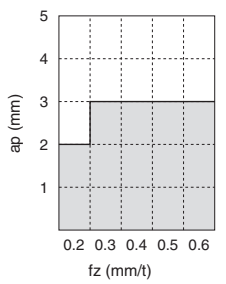
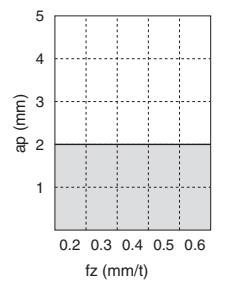
Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)			
		Cermet	MEGACOAT		Carbide
		TN100M	**PR1230**	**PR1210**	**KW10**
Carbon Steel	~0.6	★ 120~200	★ 120~250	-	-
Alloy Steel	~0.6	★ 100~180	★ 100~220	-	-
Mold Steel	~0.5	★ 100~180	★ 80~180	-	-
Stainless Steel	~0.4	☆ 120~200	★ 120~220	-	-
Cast Iron	~0.6	-	-	★ 100~220	☆ 80~150
Non-ferrous Metals	~0.6	-	-	-	★ 100~300

Notes) Reduce the ap by 20-50% when machining with long overhang length or using long shank types. ★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Cutting Performance of Radius Mill (Standard type)

Workpiece Material	Slotting			
S50C	 ● Cutting Conditions Toolholder: Standard type Vc=120,150 m/min Dry Overhang Length=L_1			
Insert Description				
08 type (RDMT08T2M0-H)	MRP012-S16-08 n=3,980min^{-1}(Vc=150m/min) L_1=42mm 	MRP016-S16-08 n=2,980min^{-1}(Vc=150m/min) L_1=42mm 	MRP020-S20-08 n=2,390min^{-1}(Vc=150m/min) L_1=42mm 	
10 type (RPMT10T3M0)	MRP025-S25-10-3T n=1,910min^{-1}(Vc=150m/min) L_1=60mm 	MRP032-S32-10-4T n=1,490min^{-1}(Vc=150m/min) L_1=80mm 		
12 type (RPMT1204M0-H)	MRP032-S25-12 n=1,490min^{-1}(Vc=150m/min) L_1=80mm 	MRP040-S32-12 n=1,195min^{-1}(Vc=150m/min) L_1=80mm 	MRP040-S32-12-4T n=1,195min^{-1}(Vc=150m/min) L_1=80mm 	MRP050-S42-12 n=765min^{-1}(Vc=120m/min) L_1=80mm 
16 type (RPMT1606M0-H)	MRP040-S32-16 n=1,195min^{-1}(Vc=150m/min) L_1=90mm 	MRP050-S42-16 n=765min^{-1}(Vc=120m/min) L_1=90mm 	MRP063-S42-16 n=605min^{-1}(Vc=120m/min) L_1=90mm 	

◆ Cutting Performance of Radius Mill (Long Shank)

Workpiece Material	Slotting			
S50C	 ● Cutting Conditions Toolholder: Long Shank Vc=120,150 m/min Dry Overhang Length=L_1			
Insert Description				
08 type (RDMT08T2M0-H)	MRP012-S16-08-160 n=3,980min^{-1}(Vc=150m/min) L_1=80mm 	MRP016-S16-08-160 n=2,980min^{-1}(Vc=150m/min) L_1=80mm 	MRP020-S20-08-180 n=2,390min^{-1}(Vc=150m/min) L_1=90mm 	
10 type (RPMT10T3M0)	MRP025-S25-10-3T-180 n=1,910min^{-1}(Vc=150m/min) L_1=90mm 	MRP032-S32-10-4T-200 n=1,490min^{-1}(Vc=150m/min) L_1=100mm 		
12 type (RPMT1204M0-H)	MRP032-S25-12-300 n=1,490min^{-1}(Vc=150m/min) L_1=150mm 	MRP040-S32-12-300 n=1,195min^{-1}(Vc=150m/min) L_1=150mm 	MRP040-S32-12-4T-200 n=1,195min^{-1}(Vc=150m/min) L_1=100mm 	MRP050-S42-12-300 n=765min^{-1}(Vc=120m/min) L_1=150mm 
16 type (RPMT1606M0-H)	MRP040-S32-16-300 n=1,195min^{-1}(Vc=150m/min) L_1=150mm 	MRP050-S42-16-300 n=765min^{-1}(Vc=120m/min) L_1=150mm 	MRP063-S42-16-300 n=605min^{-1}(Vc=120m/min) L_1=150mm 	

Guide for Drilling

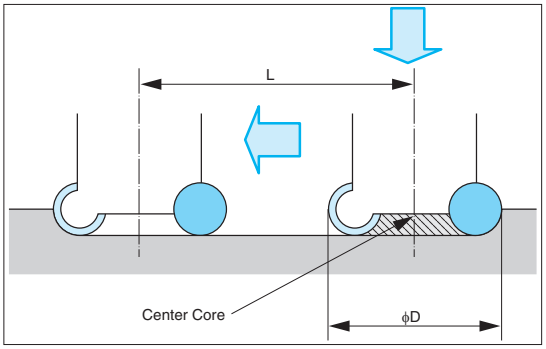
[Depth of Drilling]

・Ref. to Pd value of Toolholder Dimension Table on Page **M180, M181**
(Pd Shows the maximum plunge depth.)

[When Traversing after Drilling]

(1) Reduce the table feed by 50% until the center core part (do not forget to grind) is completely cut off.
(The internal cutting edge's radial rake angle is large in the negative direction)

(2) The min. cutting length "L" for flat bottom surface is as below



Insert Description	L (mm)
RDMT08T2M0-H	ϕD-7
RPMT10T3M0	ϕD-9
RPMT1204M0 **RPMT1204M0-H**	ϕD-11
RPMT1606M0-H	ϕD-15

Guide for Ramping (Slant Milling)

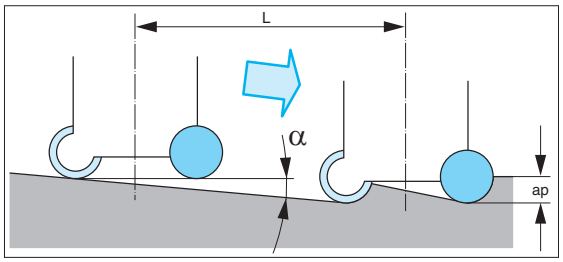
The transfer length "L" at the maximum slant angle α in the ramping operation depends on the ap.

Description		Angle α(°)	tan α
MRP	012-S16-08(-160)	Ramping is not available	
	016-S16-08(-160)	4°	0.070
	020-S20-08(-180)	14°	0.249
MRP	025-S25-10-3T(-180)	14°	0.249
	032-S32-10-4T(-200)	8°	0.141
MRP	032-S25-12(-300)	15°	0.268
	040-S32-12(-300)	10°	0.176
	040-S32-12-4T(-200)	9°	0.158
	050-S42-12(-300)	7°	0.123
MRP	040-S32-16(-300)	20°	0.364
	050-S42-16(-300)	13°	0.231
	063-S42-16(-300)	8°	0.141
MRP	050R-10-6T	4°	0.070
	063R-10-7T	3°	0.052
MRP	050R-12	7°	0.123
	063R-12	5°	0.087
	080R-12	3°	0.052
	080R-12-7T	3°	0.052
MRP	080R-16	6°	0.105
	100R-16	4°	0.070
	100R-16-7T	3°	0.052
	125R-16	3°	0.052
	125R-16-8T	2°	0.035
MRP	080R-20	8°	0.141
	100R-20	6°	0.105

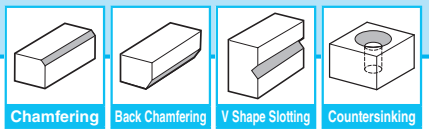
* Above is the value considering the clearance 1mm between the tool body and the workpiece.

Formula of the cutting length "L" at Max. ramping angle

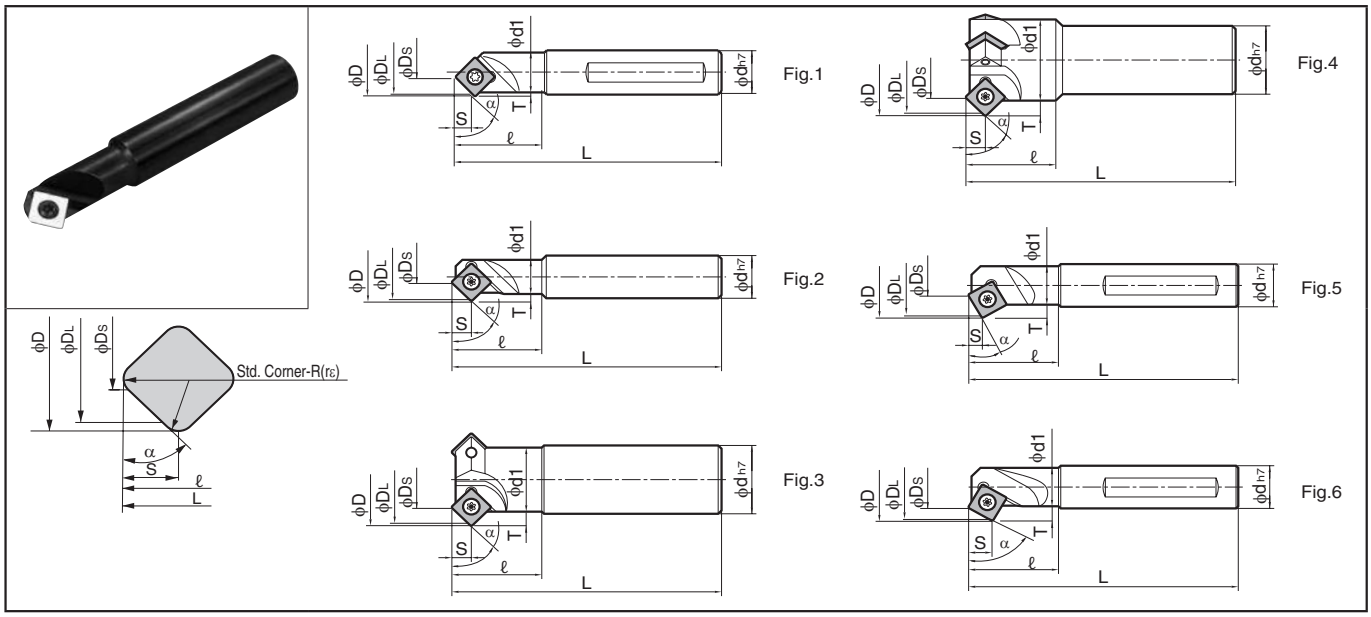
$$L = \frac{ap}{\tan\alpha}$$



Chamfering End Mill MCSE



MCSE

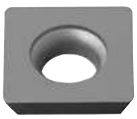


Toolholder Dimensions

Description			Std.	No. of Inserts	Dimension (mm)									Std. Corner-R (rε)	Angle	Rake Angle		Drawing	Spare Parts	
					ϕD	ϕDL	ϕDs	ϕd	ϕd1	L	ℓ	S	T		α	A.R.	R.R.		Clamp Screw	Wrench
Cylindrical	MCSE	104	●	1	16	15	4	16	15	85	30	6.5	0.5	0.4	45°	0°	-4.5°	Fig.1	SB-3060TR	DT-10
		106	●		22	21	6	20	16	120	40	8.6	3.0	0.8			-1°	Fig.2	SB-5090TR	LTW-20
		115	●		31	30	15		18				6.5				+5°			
		227	●	2	43	42	27	32	30				6.5				+8°	Fig.3		
		336	●	3	52	51	36		38				7.0				+10°	Fig.4		
	MCSE	104-30D	●	1	19	18	4	16	15	85	30	4.7	2.0	0.4	30°	0°	-4°	Fig.5	SB-3060TR	DT-10
		108-30D	●		28	27	8	20	19	110	40	6.3	4.5	0.8			-2.5°		SB-5090TR	LTW-20
		110-30D	●		30	28	10		18	120			6.0				0°			
	MCSE	108-60D	●		19.5	19	8	20	19	110	40	10	0.25	0.8	60°	0°	-3.5°	Fig.6	SB-5070TR	LTW-20
		120-60D	●		31	30	20		18	120			6.5				0°		SB-5090TR	
Weldon	MCSE	106-W	●	1	22	21	6	20	16	92	40	8.6	3.0	0.8	45°	0°	-1°		SB-5090TR	LTW-20
		115-W	●		31	30	15		18				6.5				+5°			
		227-W	●	2	43	42	27	32	30	120			6.5				+8°			
		336-W	●	3	52	51	36		38	105	45		7.0				+10°			

・Dimension T indicates available back chamfering dimension.

Applicable Inserts

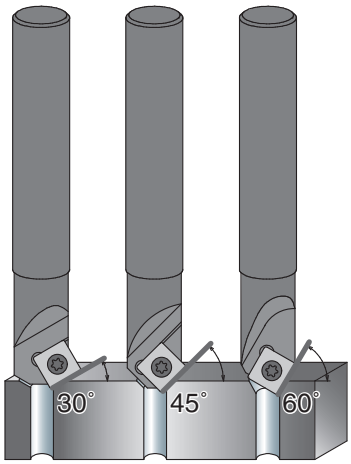
Description		Applicable Inserts ➡ M22		
				
MCSE	104 104-30D	SDKW09T204TN	SDKW09T204FN	SDMT09T204C
MCSE	106 115 227 336	SEKW120304TN 120308TN	SEKW120304FN 120308FN	SEMT120304C
MCSE	108-30D 110-30D			
MCSE	108-60D 120-60D			

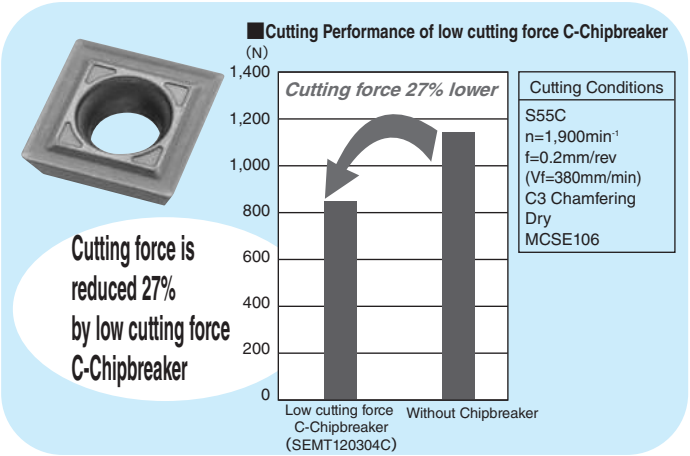
● : Std. Item

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
			Cermet	MEGACOAT	Carbide
	ϕDs (ϕ4~ϕ20)	ϕDs (ϕ27~ϕ36)	**TN100M**	**PR1225**	**KW10**
Carbon Steel	0.05~0.25	0.2~0.4	★ 100~180	★ 120~250	-
Alloy Steel	0.05~0.25	0.2~0.4	★ 100~180	★ 100~220	-
Mold Steel	0.05~0.25	0.2~0.4	★ 100~150	★ 80~180	-
Stainless Steel	0.05~0.2	0.1~0.3	☆ 100~180	★ 120~220	-
Cast Iron	0.1~0.3	0.3~0.5	-	-	☆ 80~150
Non-ferrous Metals	0.1~0.3	0.3~0.5	-	-	★ 100~300

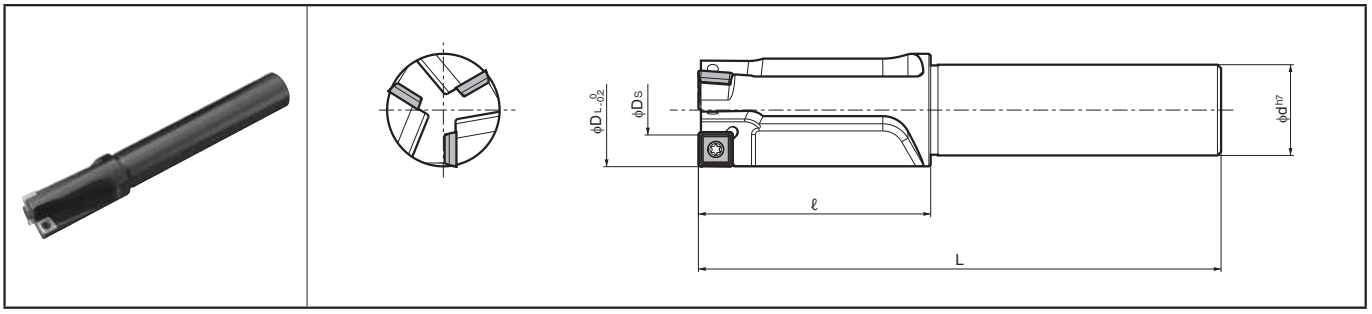
★ : 1st Recommendation ☆ : 2nd Recommendation





Bolt Countersink End Mill MEF

MEF

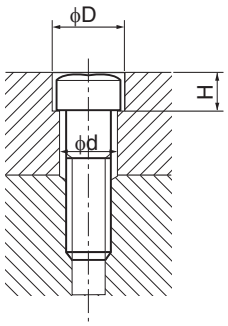


Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) φDL	φDs	φd	L	ℓ	Std. Corner-R(rε)	Rake Angle A.R.	R.R.	Objective Bolt Size	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ M24
MEF	11-S10	●	1	11	3.0	10	103	23	0.4	+5°	-13°	M6	SB-2250TR	DT-7	SPMT060204E-Z 060208E-Z
	14-S12	●	1	14	4.5	12	108	28				M8	SB-2260TR		
	17-S16	●	2	17.5	7.3	16	115	35				M10			
	18-S16	●	2	18	7.7		117	38				-			
	20-S16	●	3	20	9.5		120	40			-12°	M12			
	22-S20	●	3	22	11.4	20	124	44				-			
	23-S20	●	3	23	12.4		126	46				M14			
	24-S20	●	3	24	13.4		128	48				-			
	25-S20	●	3	25	14.4		130	50				-			
	26-S25	●	3	26	9.8	25	132	52	0.8		-13°	M16	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	27-S25	●	3	27	10.6		134	54				-			
	28-S25	●	3	28	11.5		136	56				-			
	29-S25	●	3	29	12.6		138	58				M18			
	30-S25	●	3	30	13.5		140	60				-			
	32-S25	●	3	32	15.5		144	64				M20			
	35-S32	●	3	35	18.4	32	150	70				M22			
	39-S32	●	4	39	22.5		158	78				M24			
	43-S32	●	4	43	26.2		166	86			-12°	M27			
	48-S32	●	4	48	31.3		176	96				M30			

・Although Corner-R(rε) pertains to MEF11-S10, φDs=3.0mm.

Bolt Countersink (Hexagon Socket Head Cap Screw)



Nominal Screw Size	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
φD (mm)	11	14	17.5	20	23	26	29	32	35	39	43	48
H (mm)	6.5	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5	29	32
φd (mm)	6.6	9	11	14	16	18	20	22	24	26	30	33
Applicable End Mill	MEF11	MEF14	MEF17	MEF20	MEF23	MEF26	MEF29	MEF32	MEF35	MEF39	MEF43	MEF48

● : Std. Item

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)		
		MEGACOAT		Carbide
		PR1225	**PR1210**	**KW10**
Carbon Steel	0.1~0.15	★ 120~220	-	-
Alloy Steel	0.1~0.15	★ 120~220	-	-
Mold Steel	0.05~0.1	★ 100~180	-	-
Stainless Steel	0.05~0.1	★ 80~180	-	-
Cast Iron	0.1~0.2	-	★ 100~220	☆ 80~120
Non-ferrous Metals	0.1~0.2	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

■ Points at Bolt Countersinking

(1) Carbon Steel

Increase the feed rate to fz=0.1~0.15 (mm/t) for preventing long chips at low feed rates.
Chip control is good when setting (Vc=80m/min) for MEF11~MEF25, and (Vc=120m/min) for MEF26~MEF48.

Description	Cutting Speed Vc (m/min)	fz (mm/t)
MEF11~MEF25	80	0.1~0.15
MEF26~MEF48	120	0.1~0.15

(2) Sticky Materials

Step feed is recommended for good chip control
Increase the feed rate to fz=0.1~0.15 (mm/t) for preventing long chips at low feed rate (fz=0.05mm/t).
Use cover to prevent accidents or injury by thick chips at higher feed rates.

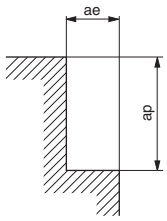
Description	Cutting Speed Vc (m/min)	fz (mm/t)	Step Feed (mm)
MEF11~MEF48	80~150	0.1~0.15	0.5~1.5

(3) Stainless Steel

Use a lower Cutting Speed. High Cutting Speeds cause chattering.

■ Cutting Performance when Shouldering

MEF Bolt Countersink End Mill is also recommended of shouldering.



Vc=80~120m/min
S55C
Dry
Overhang Length:
Same as ℓ in the dimension table

・When shouldering, both side edge and bottom edges function.
Both edges wear at the same time depending on ap.
The insert uses 2 edges instead of 4. (Ref. to Fig.1)

・MEF type's side edge is designed to have a slight clearance for the countersinking.
Therefore, worked side wall is approx. 1° inclined against the vertical face. (Ref. to Fig.2)

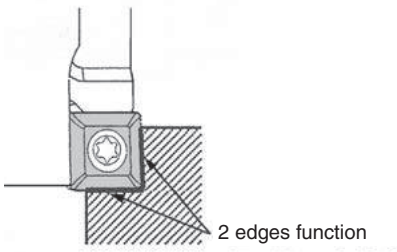


Fig.1

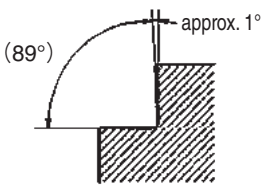
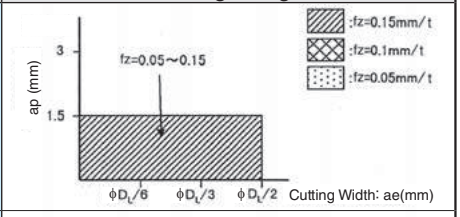
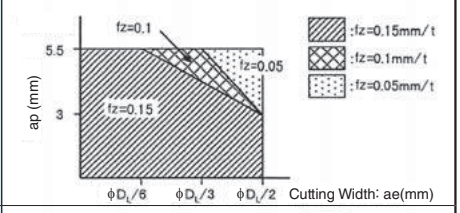
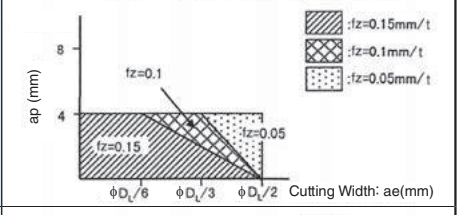
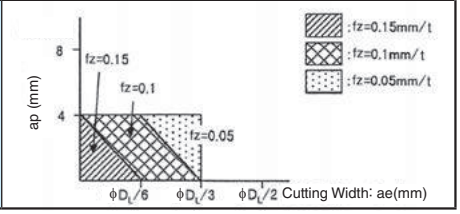


Fig.2

Description	Cutting Range
MEF11-S12 **MEF14-S12** **MEF17-S16** **MEF18-S16**	
MEF20-S16 **MEF22-S20** ≀ **MEF25-S20**	
MEF26-S25 ≀ **MEF32-S25** **MEF35-S32**	
MEF39-S32 **MEF43-S32** **MEF48-S32**	

M
Milling

T-Slot Mill METS

T-Slotting | Back side milling

METS

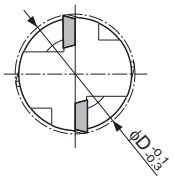


Fig.1

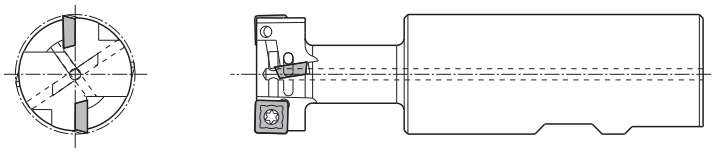


Fig.2

Toolholder Dimensions

Description		Std.	No. of Inserts	No. of Flutes	Dimension (mm) φD	φd	φd1	ℓ	L1	L2	L3	L4	L5	Rake Angle A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ M22
METS	21-S25	●	2	1	21	25	10.5	9	109	29	32	12	17	+9°	-10°	Fig.1	SB-2560TR	DT-8	SDMT060304E-K
	25-S25	●	4	2	25		12.5	11	112	32									
	32-S32	●	4	2	32	32	15.5	14	120	38	36	14	19		-12°		SB-3060TR	DT-10	SDMT080308E-K
	40-S32	●			40		20.5	18	130	50							SB-4085TR	DT-15	SDMT120408E-K
	50-S32	●			50		26.5	22	140	60									
METS	21-S25-H	●	2	1	21	25	10.5	9	109	29	32	12	17	+9°	-10°	Fig.2	SB-2560TR	DT-8	SDMT060304E-K
	25-S25-H	●	4	2	25		12.5	11	112	32									
	32-S32-H	●	4	2	32	32	15.5	14	120	38	36	14	19		-12°		SB-3060TR	DT-10	SDMT080308E-K
	40-S32-H	●			40		20.5	18	130	50							SB-4085TR	DT-15	SDMT120408E-K
	50-S32-H	●			50		26.5	22	140	60									

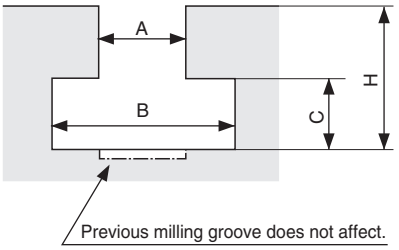
・METS····H type has air holes

Applicable Inserts

Description		Applicable Inserts ➡ M22
METS	21-S25 21-S25-H 25-S25 25-S25-H	SDMT060304E-K
METS	32-S32 32-S32-H	SDMT080308E-K
METS	40-S32 40-S32-H 50-S32 50-S32-H	SDMT120408E-K

JIS Standard of T-Slot (Extracted from B0952) (Unit : mm)

A (Nominal Size)	B	C	H Max.	H Min.
12	19^{+2}_{0}	8^{+1}_{0}	25	20
14	23^{+2}_{0}	9^{+2}_{0}	28	23
18	30^{+2}_{0}	12^{+2}_{0}	36	30
22	37^{+3}_{0}	16^{+2}_{0}	45	38
28	46^{+4}_{0}	20^{+2}_{0}	56	48

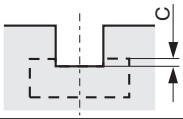
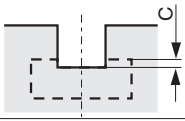
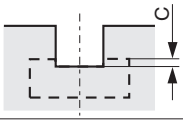
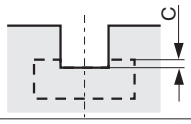
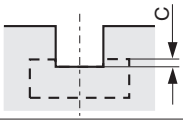
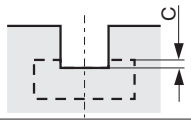
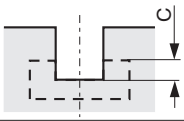
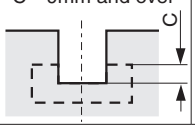
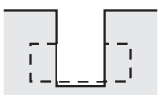


● : Std. Item

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)		
		MEGACOAT		Carbide
		PR1230	**PR1210**	**KW10**
Carbon Steel	0.1~0.15	★ 100~200	-	-
Alloy Steel	0.08~0.12	★ 100~200	-	-
Mold Steel	0.05~0.1	★ 80~150	-	-
Cast Iron	0.1~0.15	-	★ 100~200	☆ 80~120
Non-ferrous Metals	0.1~0.15	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

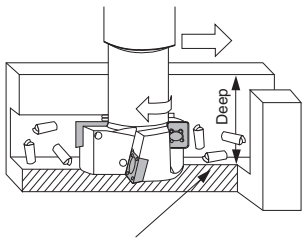
Description (T-Slot Nominal Size)	Steel			Cast Iron		
	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering
METS21-S25(-H) (Nominal Size 12)	C=1~3mm 	Vc=120 fz=0.1 (n=1,820) (Vf=182)	Vc=60 fz=0.15 (n=920) (Vf=137)	C=1mm and over 	Vc=120 fz=0.12 (n=1,820) (Vf=218)	Vc=80 fz=0.15 (n=1,210) (Vf=182)
METS25-S25(-H) (Nominal Size 14)	C=1~3mm 	Vc=120 fz=0.1 (n=1,530) (Vf=306)	Vc=60 fz=0.15 (n=760) (Vf=228)	C=1mm and over 	Vc=120 fz=0.12 (n=1,530) (Vf=367)	Vc=80 fz=0.15 (n=1,020) (Vf=306)
METS32-S32(-H) (Nominal Size 18)	C=1~3mm 	Vc=100 fz=0.1 (n=1,000) (Vf=200)	Vc=60 fz=0.15 (n=600) (Vf=180)	C=1mm and over 	Vc=120 fz=0.12 (n=1,190) (Vf=286)	Vc=80 fz=0.15 (n=800) (Vf=240)
METS40-S32(-H) (Nominal Size 22)	C=9mm 	Vc=80 fz=0.15 Chattering is likely when set to shallower than C=9mm.	Vz=60 fz=0.15 (n=480) (Vf=144)	C=9mm and over 	Vc=120 fz=0.15 (n=960) (Vf=228)	Vc=80 fz=0.15 (n=640) (Vf=192)
METS50-S32(-H) (Nominal Size 28)	Not recommended for steel because of chattering				Vc=120 fz=0.15 (n=760) (Vf=228)	Vc=80 fz=0.15 (n=510) (Vf=153)

[Cutting Speed : Vc(m/min), Revolution:n(min^{-1}), Feed Rate fz(mm/t),Table Feed Vf(mm/min)]

・Chattering is likely when fz is less than fz=0.1mm/t. Keep feed rate between fz=0.1~0.15mm/t.
・For cast iron machining, the bigger the C-dimension becomes, the less chattering occurs.

■ How to prevent damaging chips when steel machining

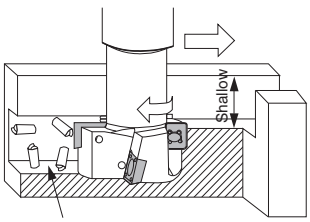
Before Improvement (Deep Groove at Pre-Process)



Chips stay in the pre-process groove.

Improvement of chip biting

After Improvement (Shallow Groove at Pre-Process)

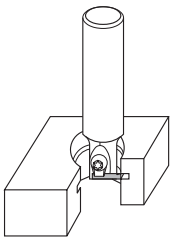


Chips are evacuated backward and chances of damaging chips are less.

Make pre-process groove shallower to prevent the tool damage from chips.
Use compressed air to aid in chip evacuation.

Grooving End Mill MGI

MGI



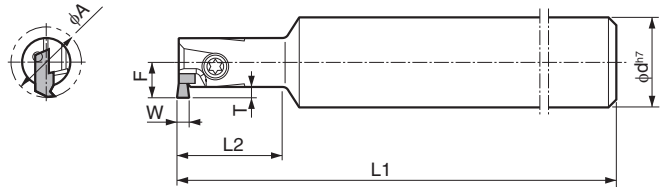


Fig.1

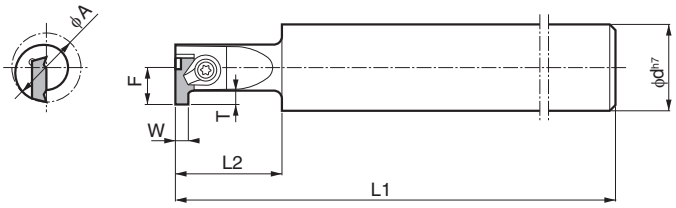


Fig.2

Toolholder Dimensions

Description		Std.	Min. Bore Dia. ϕA	Dimension (mm) ϕd	L1	L2	F	T	Edge Width W	Drawing	Spare Parts: Clamp Set 5F	Clamp Set 6F	Clamp Screw	Wrench	Applicable Inserts ➡ M193
MGI	**1420-1SS**	●	14	20	100	20	6.8	2.2	1.0~3.0	Fig.1	-		SB-4065TR	FT-15	GVR...-020SS
	1620-1S	●	16		110	25	7.8				-		SB-4085TR	FT-15	GVR...-020S
	2020-1A	●	20			30	9.8	2.2	1.0~3.4	Fig.2	CPS-5F		-	FT-15	GVR...-020A GVR...-...AR
	2220-1B	●	22				11	2.8	1.45~4.0						GVR...-020B GVR...-...BR
	3225-1C	●	32	25	120	35	16	5.5 (4.5)	2.8~4.0		CPS-6F		-	LW-3	GVR...-020C
	4025-1C	●	40			40	20								

FT, LW

・Dimension T shows available grooving depth.

・GVR280-020C, GVR300-020C is available to the groove depth up to 4.5mm.

・GVR430~500-020C can be installed to MGI3225-1C and 4025-1C, but not recommended for steel machining because of toolholder's rigidity.

Recommended Cutting Conditions

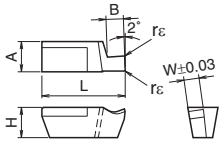
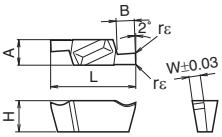
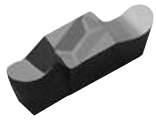
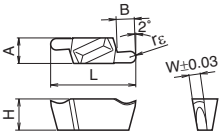
Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN90	Cermet TC40N	Cermet TC60M	MEGA COAT PR1225	PVD Coated Carbide PR930	Carbide KW10
Carbon Steel	0.05~0.15	★ 120~200	☆ 120~200	☆ 100~180	★ 80~150	☆ 80~150	-
Alloy Steel	0.05~0.15	★ 120~200	☆ 120~200	☆ 100~180	★ 80~150	☆ 80~150	-
Mold Steel	0.03~0.12	★ 100~180	☆ 100~180	☆ 80~150	★ 60~130	☆ 60~130	-
Stainless Steel	0.03~0.12	☆ 100~180	☆ 100~180	★ 80~150	★ 60~130	☆ 60~130	-
Cast Iron	0.05~0.2	★ 100~150	☆ 100~150	-	-	-	★ 80~150
Non-ferrous Metals	0.05~0.2	-	-	-	-	-	★ 100~300

・Use down-cut machining.

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item

Applicable Inserts

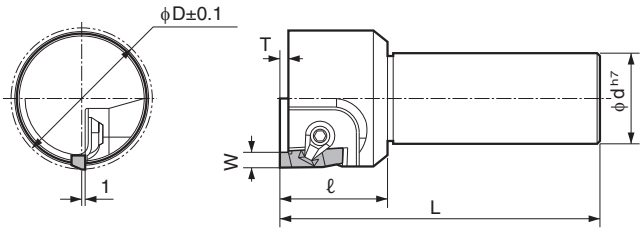
Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)						Insert Grades					
										Cermet			MEGA COAT	PVD Coated Carbide	Carbide
				W	B	rε	A	L	H	TN90	TC40N	TC60M	PR1225	PR930	KW10
1-edge		GVR	100-020SS	1.00	2.3	0.2	3.6	9	3.0	●		●	●	●	●
			125-020SS	1.25						●		●	●	●	●
			145-020SS	1.45						●		●	●	●	●
			200-020SS	2.00						●		●	●	●	●
			250-020SS	2.50						●		●	●	●	●
			300-020SS	3.00						●		●	●	●	●
		GVR	100-020S	1.00	2.3	0.2	4.0	11	4.0	●	●	●	●	●	●
			125-020S	1.25						●	●	●	●	●	●
			145-020S	1.45						●	●	●	●	●	●
			185-020S	1.85						●	●	●	●	●	●
			200-020S	2.00						●	●	●	●	●	●
			250-020S	2.50						●	●	●	●	●	●
			340-020S	3.40							●	●	●	●	●
2-edge		GVR	100-020A	1.00	2.3	0.2	4.0	12	5.0	●	●	●	●	●	●
			125-020A	1.25						●	●	●	●	●	●
			145-020A	1.45						●	●	●	●	●	●
			185-020A	1.85						●	●	●	●	●	●
			200-020A	2.00						●	●	●	●	●	●
			250-020A	2.50						●	●	●	●	●	●
			300-020A	3.00						●	●	●	●	●	●
			340-020A	3.40						●	●	●	●	●	●
		GVR	145-020B	1.45	2.8	0.2	4.5	15	5.5	●	●	●	●	●	●
			185-020B	1.85						●	●	●	●	●	●
			200-020B	2.00	3.2					●	●	●	●	●	●
			230-020B	2.30						●	●	●	●	●	●
			250-020B	2.50						●	●	●	●	●	●
			280-020B	2.80						●	●	●	●	●	●
			300-020B	3.00	4.2					●	●	●	●	●	●
			340-020B	3.40						●	●	●	●	●	●
			400-020B	4.00						●	●	●	●	●	●
		GVR	280-020C	2.80	4.5	0.2	5.8	21	6.5	●	●	●	●	●	●
			300-020C	3.00						●	●	●	●	●	●
			340-020C	3.40	5.5					●	●	●	●	●	●
			400-020C	4.00						●	●	●	●	●	●
			(430-020C)	4.30	6.3					●	●	●	●	●	●
			(460-020C)	4.60							●	●	●	●	●
			(500-020C)	5.00						●	●	●	●	●	●
 2-edge Full-R		GVR	200-100AR	2.00	2.3	1.00	4.0	12	5.0			●	●	●	●
			250-125AR	2.50		1.25						●	●	●	●
			300-150AR	3.00		1.50						●	●	●	●
		GVR	200-100BR	2.00	3.2	1.00	4.5	15	5.5	●		●	●	●	●
			300-150BR	3.00	4.2	1.50				●		●	●	●	●

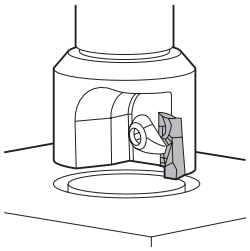
・Only Right-hand insert is applicable.

● : Std. Item

Ring Grooving End Mill MVG

MVG



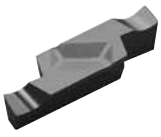
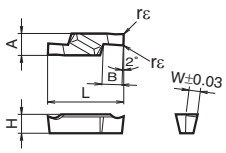


Toolholder Dimensions

Description		Std.	Dimension (mm)					Edge Width	Spare Parts	
			ϕD	ϕd	L	ℓ	T	W	Clamp Set	Wrench
MVG	3032	●	30	32	120	40	5.2	4.00 ~ 4.90	CPS-6V	LW-3
	3532	●	35							
	4032	●	40							
	4532	●	45							
	5032	●	50							
	5532	●	55							
	6032	●	60							

・Dimension T shows available grooving depth.

Applicable Inserts

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)						Insert Grades					
										Cermet			MEGA COAT	PVD Coated Carbide	Carbide
				W	B	rε	A	L	H	TN90	TC40N	TC60M	PR1225	PR930	KW10
		GVFR	400-020B	4.00	5.3	0.2	5.8	20	5.0	●	●	●	●	●	●
			430-020B	4.30							●	●	●	●	●
			460-020B	4.60							●	●	●	●	●
			490-020B	4.90							●	●	●	●	●

・GVFR430B-020B is applicable for sealing groove of G-series
For other ring grooving, GVFR400B~490B-020B are applicable.
・Only Right-hand insert is applicable.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades(Cutting Speed Vc: m/min)					
		Cermet			MEGA COAT	PVD Coated Carbide	Carbide
		TN90	TC40N	TC60M	PR1225	PR930	KW10
Carbon Steel	0.05~0.15		★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Alloy Steel	0.05~0.15		★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Mold Steel	0.03~0.12		★ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Stainless Steel	0.03~0.12		☆ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Cast Iron	0.05~0.2		-	-	-	-	★ 80~150
Non-ferrous Metals	0.05~0.2		-	-	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item

Recommended Cutting Conditions

Cutting Conditions Table

◆ Recommended Cutting Conditions (MSD45 ➡ M43, MSP15 ➡ M51)

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)								
		Cermet			MEGACOAT		CVD Coated Carbide	Carbide	PCD	
		TN60	TN100M	TC60M	PR1225	PR1210	CA420M	KW10	KPD001	KPD010
Carbon Steel	~0.3		★ 120~200		★ 120~250	-	-	-	-	-
Alloy Steel	~0.3		★ 100~180		★ 100~220	-	-	-	-	-
Mold Steel	~0.25		★ 100~180		★ 80~180	-	-	-	-	-
Stainless Steel	~0.25		☆ 120~200		★ 120~220	-	-	-	-	-
Cast Iron	~0.3		-		-	★ 100~220	★ 170~300	☆ 80~150	-	-
Non-ferrous Metals	~0.2		-		-	-	-	★ 100~300	★ 300~800	☆ 300~800

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Recommended Cutting Conditions (MSO45 ➡ M44)

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)								
		Cermet			MEGACOAT		Carbide		PCD	
		TN60	TN100M	TC60M	PR1225	PR1210	PW30	KW10	KPD230	
Carbon Steel	~0.3		★ 120~200		★ 120~250	-		-	-	
Alloy Steel	~0.3		★ 100~180		★ 100~220	-		-	-	
Mold Steel	~0.25		★ 100~180		★ 80~180	-		-	-	
Stainless Steel	~0.25		☆ 120~200		★ 120~220	-		-	-	
Cast Iron	~0.3		-		-	★ 100~220		☆ 80~150	-	
Non-ferrous Metals	~0.2		-		-	-		★ 100~300	★ 300~800	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Recommended Cutting Conditions (MSO45··−09 ➡ M45)

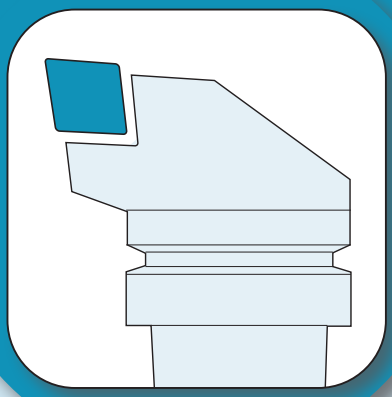
Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)								
		Cermet			MEGACOAT		Carbide		PCD	
		TN60	TN100M	TC60M	PR1225	PR1210	PW30	KW10	KPD001	KPD010
Carbon Steel	~0.3		★ 120~200					-		
Alloy Steel	~0.3		★ 100~180					-		
Mold Steel	~0.25		★ 100~180					-		
Stainless Steel	~0.25		☆ 120~200					-		
Cast Iron	~0.3		-					☆ 80~150		
Non-ferrous Metals	~0.2		-					★ 100~300		

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Recommended Cutting Conditions (MSE15 ➡ M51)

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)								
		Cermet			MEGACOAT		Carbide		PCD	
		TN60	TN100M	TC60M	PR1225	PR1210	PW30	KW10	KPD001	KPD010
Carbon Steel	~0.25		★ 120~200							
Alloy Steel	~0.25		★ 100~180							
Mold Steel	~0.20		★ 100~180							
Stainless Steel	~0.20		☆ 120~200							
Cast Iron	~0.25		-							
Non-ferrous Metals	-		-							

★ : 1st Recommendation ☆ : 2nd Recommendation



Tools for Turning Mill

N1~N10

Tools for Turning Mill N2~N10

HSK-T (ICTM Standard) Tooling N2

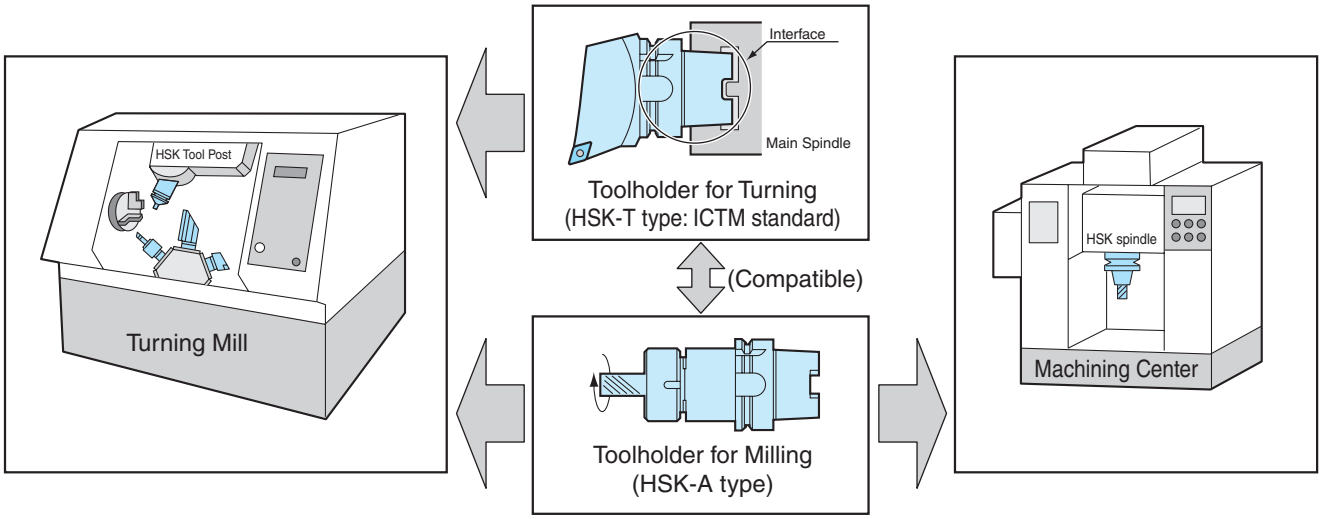
N

Tools for Turning Mill

- The turning mill is a machine that combines turning and milling functions. Now an interface (between workpiece and toolholder - equivalent to the arbor for milling) is available for the turning mill that fulfils the ICTM standard.
- ICTM standard was developed by 16 companies in Japan, as the interface between turning mill machines. It is based on the two-face restraint type standard “ISO 12164-1:2001 HSK Standard Shank”
- This standard became an International Standard as ISO Standard “ISO12164-3:2008” in 2008. Description is indicated as HSK-T○○.

Features

(1) Compatible with HSK-A type for Machining Center.



(2) Machining precision for turning has improved by minimizing the gap between the drive key slot on toolholder side and the drive key on toolpost side.

Table 1: Comparison of the gap of a key and key slot

(Unit: mm)

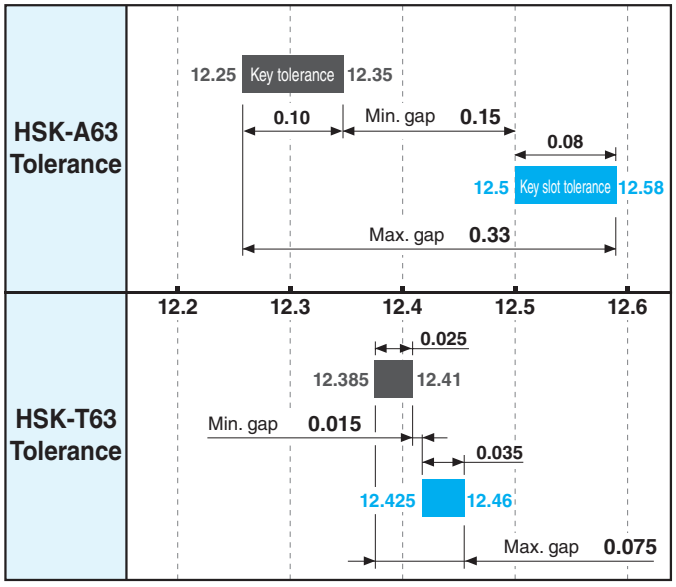
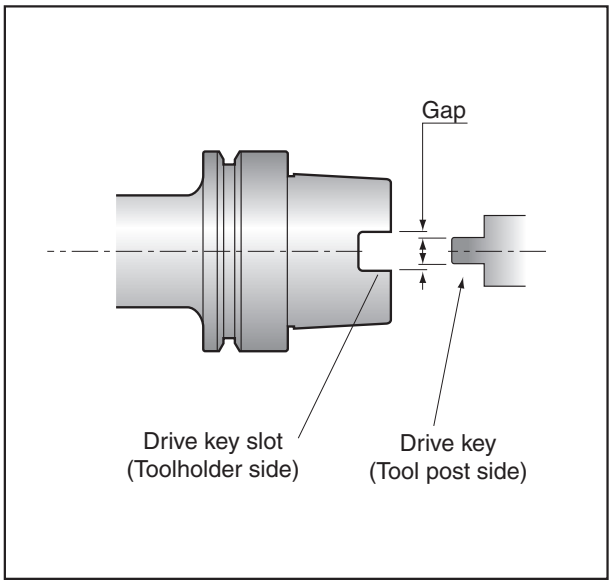


Table 2: Effect of the gap



Identification System (For External)

Interface Size	Manual Clamp Hole	Shank Size	Hard of Tool	Toolholder Length
T63:HSK-T63 T100:HSK-T100	H: Yes No Code: No	25mm square (Height / Width)	R: Right-hand L: Left-hand	(mm) Length from Gauge Line

T63 **H** – **S2525** **R** – **105** ··· (Toolholder for Square Shank)

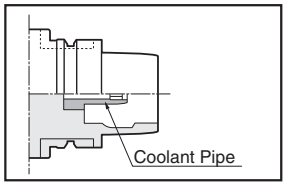
A63 (Previous Description)

P **C** **L** **N** **R** – **DX** **12** ··· (Solid type)

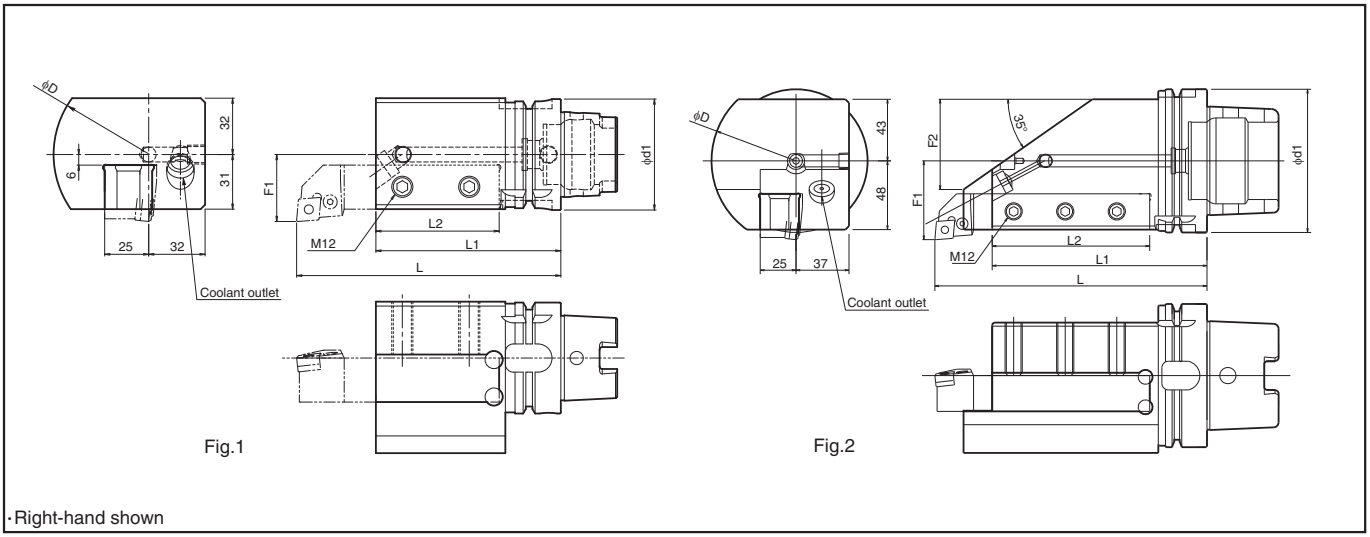
Clamping System	Insert Shape	Cutting Edge Angle	Insert Relief Angle	Hand of Tool	Toolholder Length (Length from Gauge Line) (mm)	Insert Size
P : Lever Lock M : Multi Lock W : Wedge Lock S : Screw Clamp	C : 80° Rhombic D : 55° Rhombic T : 60° Triangle V : 35° Rhombic W : 80° Trigon	E: 60° G: 90° J: 93° L: 95° M: 95° N: 50° 63° V: 72.5°	N : 0° B : 5°	R: Right-hand L: Left-hand N: Neutral	DX : 65 H : 100 L : 140	T, C, D, V, L

Coolant Pipe

· Coolant pipe is built into toolholder.



Toolholder for Square Shank (External / Facing)



·Right-hand shown

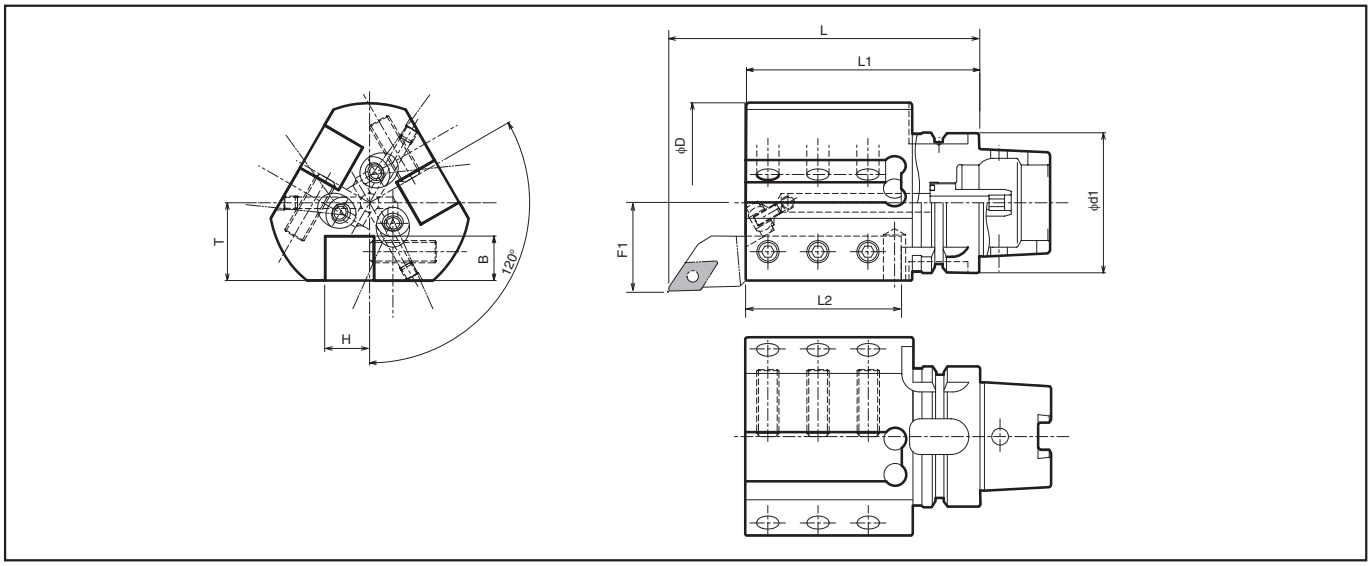
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)							Drawing	Spare Parts		
					ϕd1	ϕD	L	L1	L2	F1	F2		Clamp Screw	Wrench	Coolant Pipe
T63H-	**S2525R-105**	**A63-WH-**	**S2525R-105**	●	63	108	150	105	70	38	-	Fig.1	HS12X25	LW-6	CL63-1
	S2525L-105		**S2525L-105**	●											
T100H-	**S2525R-150**	-		●	100	118	190	150	110	55	63	Fig.2	HS12X30		CL100-1
	S2525L-150			●											

· Coolant outlet direction is adjustable.
· For 25mm square shank.

● : Std. Item

Toolholder for Square Shank (External / Facing)

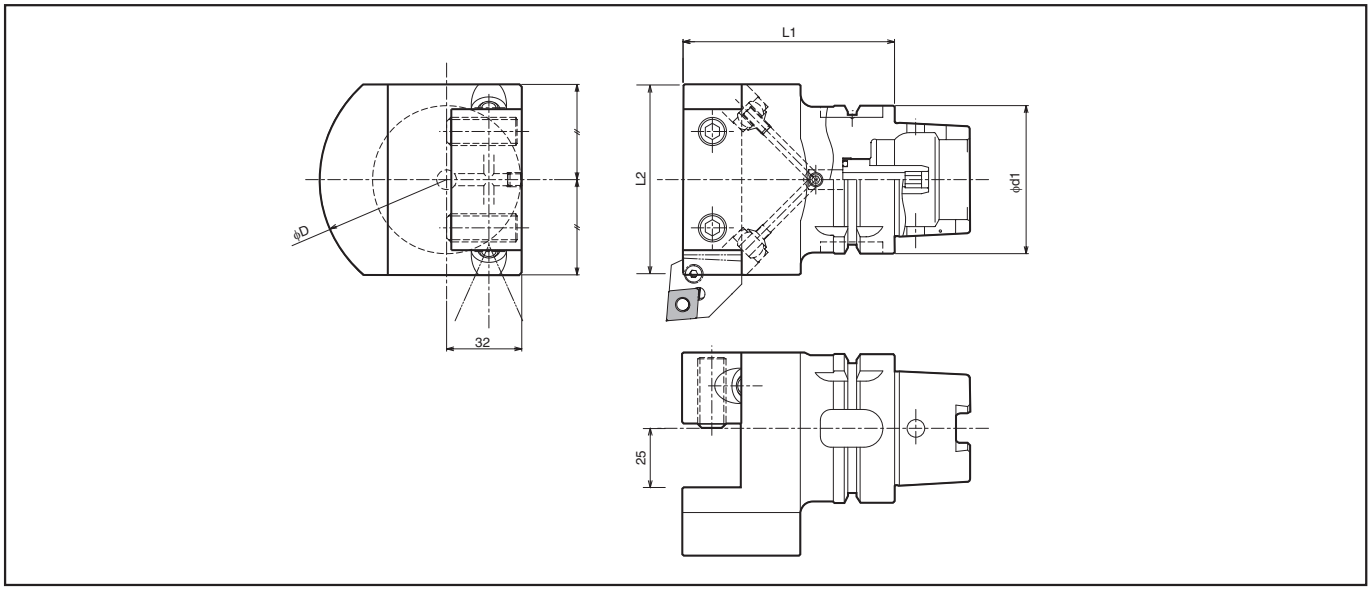


Toolholder Dimensions

Description		Attachment toolholder Shank Dimension	Std.	Dimension (mm)									Spare Parts		
													Clamp Screw	Wrench	Coolant Pipe
				φd1	φD	H	B	T	L	L1	L2	F1			
T63H-	S2020R-105T	(20mm square)	●	63	90	20	20	35	150	105	70	40	HS12X30	LW-6	CL63-1
T100H-	S2525R-150T	(25mm square)	●	100	118	25	25	48	190	150	110	55	HS12X35		CL100-1

·Coolant outlet direction is adjustable.

Toolholder for Square Shank (Facing / External)



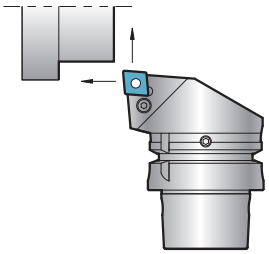
Toolholder Dimensions

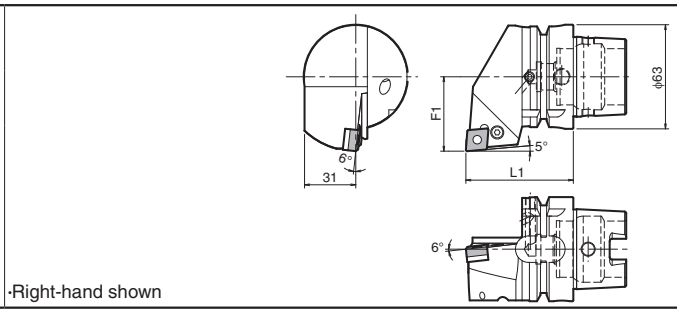
Description		Attachment toolholder Shank Dimension	Std.	Dimension (mm)				Spare Parts		
								Clamp Screw	Wrench	Coolant Pipe
				φd1	φD	L1	L2			
T63H-	S2525-90F	(25mm square)	●	63	108	90	81	HS12X30	LW-6	CL63-1
	S2525-120F		●			120				
T100H-	S2525-105F	(25mm square)	●	100	118	105	96			CL100-1
	S2525-150F		●			150				

·Coolant outlet direction is adjustable.

● : Std. Item

PCLN (External / Facing)





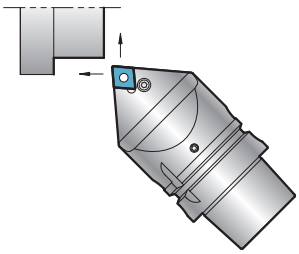
·Right-hand shown

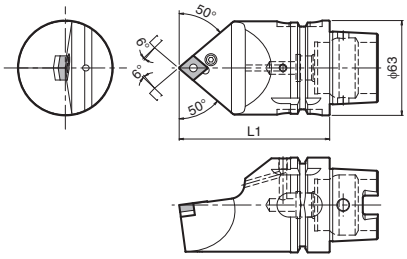
Applicable Inserts	
CN□A CN□G CN□M	1204..

Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
					L1	F1	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PCLNR-DX12	A63-WH-	PCLNR-DX12	●	65	45	LL-2N	LS-2N	LC-42N	LSP-2	PC-2	LW-3	CL63-1
	PCLNL-DX12		PCLNL-DX12	●									

PCMN (External / Facing)



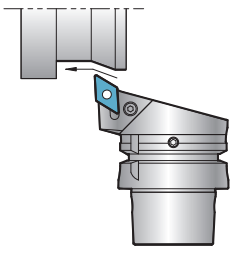


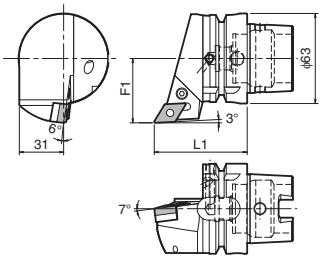
Applicable Inserts	
CN□A CN□G CN□M	1204..

Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts						
					L1	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PCMNN-H12	A63-WH-	PCMNN-H12	●	100	LL-2N	LS-2N	LC-42N	LSP-2	PC-2	LW-3	CL63-1
	PCMNN-L12		PCMNN-L12	●	140							

PDJN (External / Copying)





·Right-hand shown

Applicable Inserts	
DN□A DN□G DN□M	1504..

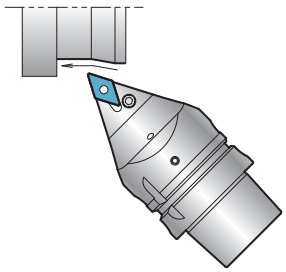
Toolholder Dimensions

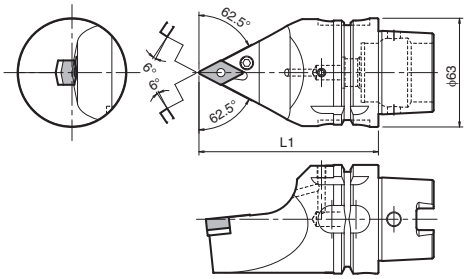
Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
					L1	F1	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PDJNR-DX15	A63-WH-	PDJNR-DX15	●	65	45	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2	LW-3	CL63-1
	PDJNL-DX15		PDJNL-DX15	●									

·When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

● : Std. Item

PDNN (External / Copying)





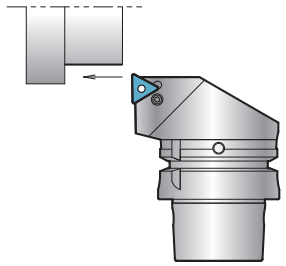
Applicable Inserts	
DN□A DN□G DN□M	1504..

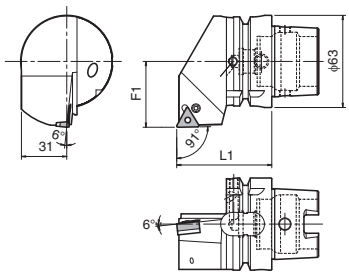
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts						
						Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
					L1							
T63H-	PDNNN-H15	A63-WH-	PDNNN-H15	●	100	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2	LW-3	CL63-1
	PDNNN-L15		PDNNN-L15	●	140							

·When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

PTGN (External)





·Right-hand shown

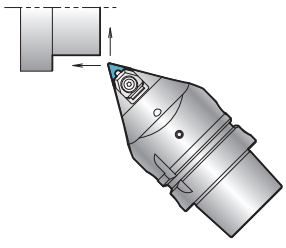
Applicable Inserts	
TN□A TN□G TN□M	1604..

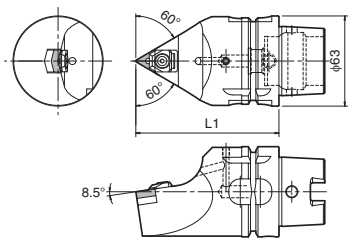
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
							Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
					L1	F1							
T63H-	PTGNR-DX16	A63-WH-	PTGNR-DX16	●	65	45	LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5	CL63-1
	PTGNL-DX16		PTGNL-DX16	●									

·When using inserts whose corner-R(rε) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

WTEN (External)





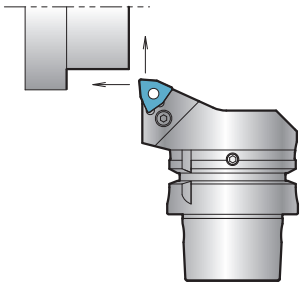
Applicable Inserts	
TN□A TN□G TN□M	1604..

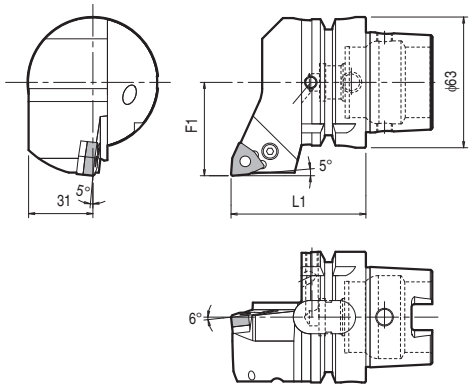
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts						
						Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Spacer	Coolant Pipe
					L1							
T63H-	WTENN-H16	A63-WH-	WTENN-H16	●	100	WCS-1N	WTN-33	WP-1S	WN-1	LW-3	WSP-1	CL63-1
	WTENN-L16		WTENN-L16	●	140							

● : Std. Item

PWLN (External / Facing)

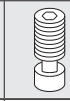




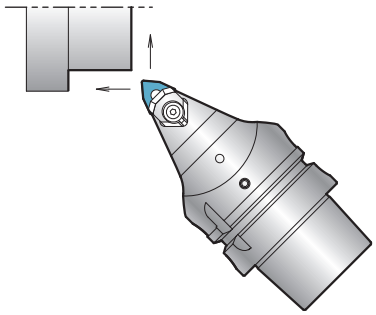
·Right-hand shown

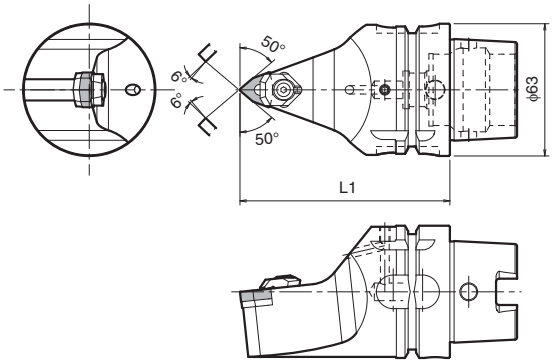
Applicable Inserts	
WN□A WN□G WN□M	0804..

Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
							Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
					L1	F1							
T63H-	PWLNR-DX08	A63-WH-	PWLNR-DX08	●	65	45	LL-2N	LS-2N	LW-42N	LSP-2	PC-2	LW-3	CL63-1
	PWLNL-DX08		PWLNL-DX08	●									

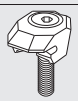
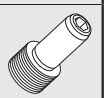
WWMN (External / Facing)





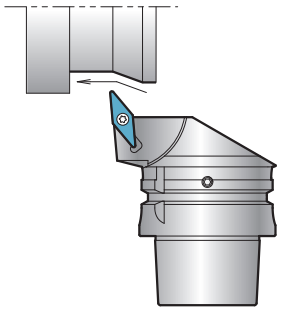
Applicable Inserts	
WN□A WN□G WN□M	0804..

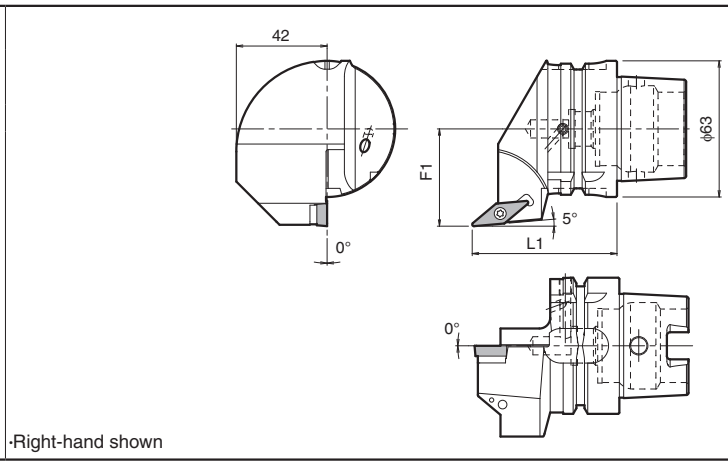
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts					
						Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Coolant Pipe
					L1						
T63H-	WWMNN-H08	A63-WH-	WWMNN-H08	●	100	WCS-8	WWN-42	WP5X15	WN-1	LW-3	CL63-1
	WWMNN-L08		WWMNN-L08	●	140						

● : Std. Item

SVLB (External / Copying)





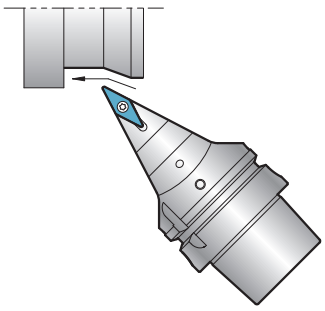
·Right-hand shown

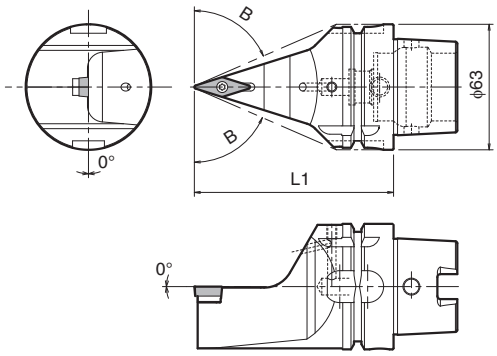
Applicable Inserts	
VB□T VBGW VCGT	1604..

Toolholder Dimensions

Description		Std.	Dimension (mm)		Spare Parts					
					Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)	Coolant Pipe
			L1	F1						
T63H-	SVLBR-DX16N	●	65	45	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4	CL63-1
	SVLBL-DX16N	●								

SVVB (External / Copying)





Applicable Inserts	
VB□T VBGW VCGT	1604..

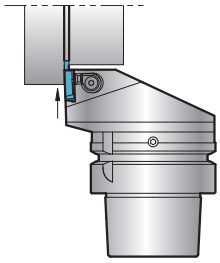
Toolholder Dimensions

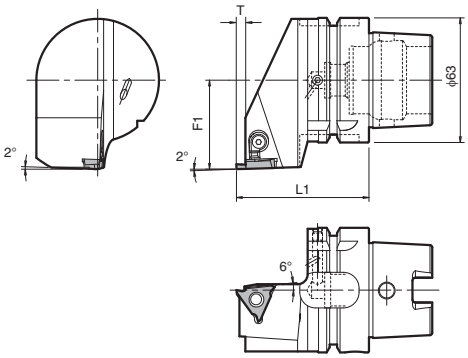
Description		Std.	Dimension (mm)		Spare Parts					
					Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)	Coolant Pipe
			L1	*B(°)						
T63H-	SVVBN-H16N	●	100	66.5	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4	CL63-1
	SVVBN-L16N	●	140	72.5						

* Angle B shows the interference angle from the line of cutting edge point and toolholder.

● : Std. Item

KGBA (External Grooving)





·Right-hand shown

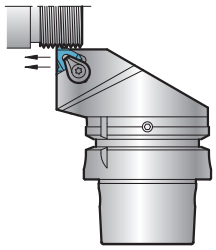
Right-hand Insert for Right-hand Toolholder
Left-hand Insert for Left-hand Toolholder.

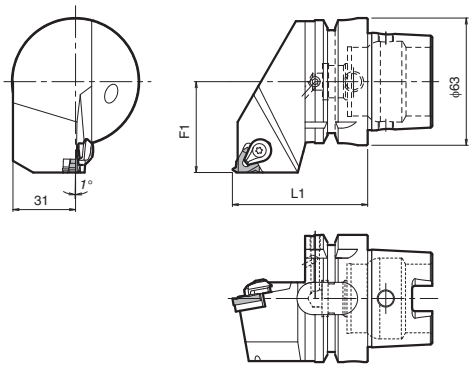
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)			Spare Parts			Applicable Inserts ➡G6~G8
					L1	F1	T	Clamp Set	Wrench	Coolant Pipe	
T63H-	KGBAR-16	A63-WH-	KGBAR-16	●	67	45	2.5	LGBA-16RS	FT-15	CL63-1	GBA32R Type
	KGBAR-22-15		KGBAR-22-15	●	67	45	4.0	LGBA-22RS	FT-15	CL63-1	GBA43R Type
	KGBAR-22-25		KGBAR-22-25	●			4.5				
	KGBAR-22-35		KGBAR-22-35	●			5.5				
T63H-	KGBAL-16	A63-WH-	KGBAL-16	●	67	45	2.5	LGBA-16LS	FT-15	CL63-1	GBA32L Type
	KGBAL-22-15		KGBAL-22-15	●	67	45	4.0	LGBA-22LS	FT-15	CL63-1	GBA43L Type
	KGBAL-22-25		KGBAL-22-25	●			4.5				
	KGBAL-22-35		KGBAL-22-35	●			5.5				

* For details of applicable inserts, please refer to **G6~G8**.
·Dimension T shows the distance from the Toolholder to the cutting edge.

KTN (Threading)





Right-hand Insert for Right-hand Toolholder

Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts					Applicable Inserts ➡J6, J8,J10, J12,J14
					L1	F1	Clamp Set	Wrench	Shim	Shim Screw	Coolant Pipe	
T63H-	KTNR-16	A63-WH-	KTNR-16	●	67	45	CPS-5S	FT-15	TN-32	SP3X8	CL63-1	16ER Type
	KTNR-22		KTNR-22	●			CPS-6S	LW-3	TN-43			22ER Type

* For details of applicable inserts, please refer to **J6**,**J8**,**J10**,**J12**,**J14**.

● : Std. Item

Identification System (For Boring Bar / Drill)

T63 H — N 08 — 70

Interface Size
T63:HSK-T63 T100:HSK-T100

Manual Clamp Hole	
H	Yes
No Code	No

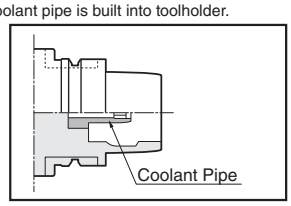
Toolholder	
N	For Boring Bar
C	For Drill

Internal Dia.	
08	ϕ8
10	ϕ10
⋮	

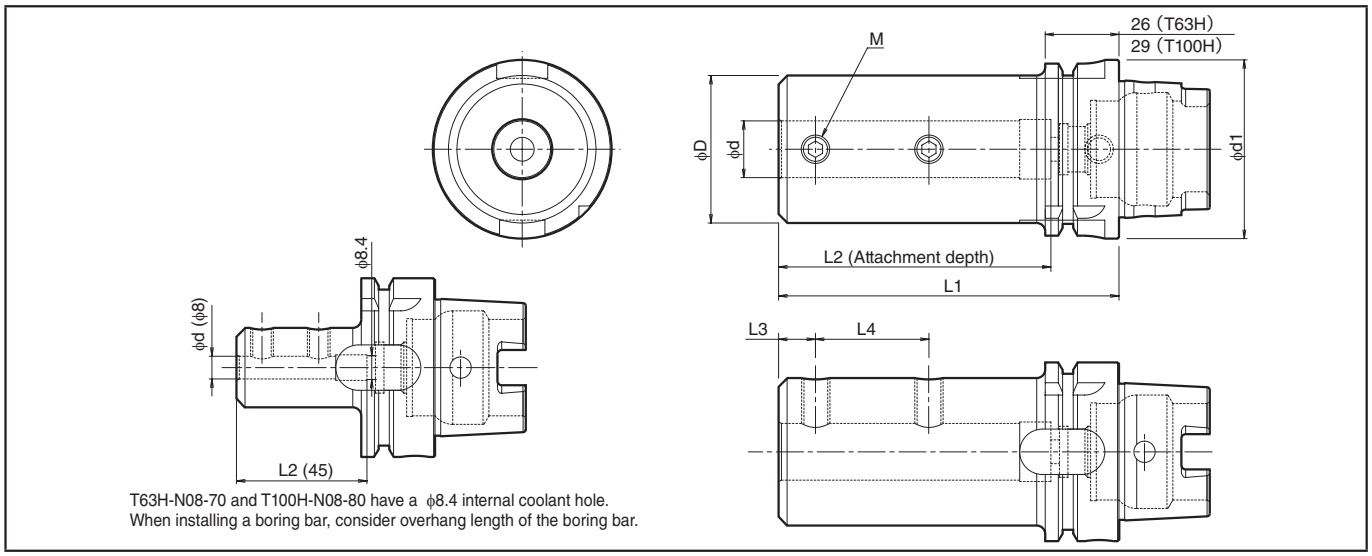
Toolholder Length (mm)
Length from Gauge Line

Coolant Pipe

·Coolant pipe is built into toolholder.



Toolholder for Boring Bar / Drill



T63H-N08-70 and T100H-N08-80 have a ϕ8.4 internal coolant hole.
When installing a boring bar, consider overhang length of the boring bar.

Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)								Spare Parts			Remarks
					ϕd	ϕd1	ϕD	L1	L2	L3	L4	M	Clamp Screw	Wrench	Coolant Pipe	
T63H-	N08-70	A63-WH-	N08-70	●	8	63	28	70	45	9	20	M8	HS8X10	LW-4	CL63-1	For Boring Bar
	N10-80		N10-80	●	10		35	80	55	9	22		HS8X12			
	N12-90		N12-90	●	12		42	90	65	9	22					
	N16-100		N16-100	●	16		48	100	75	11	30	M10	HS10X16	LW-5		
	N20-120		N20-120	●	20		52	120	95	13	40					
	N25-140		N25-140	●	25		56	140	115	13	50	M12	HS12X16	LW-6		
	N32-160		N32-160	●	32		56	160	135	13	60		HS12X12			
T63H-	C20-75	A63-WH-	C20-75	●	20	63	52	75	50	13	22	M10	HS10X16	LW-5	CL63-1	*For Drill
	C25-85		C25-85	●	25		56	85	58	15	28	M12	HS12X16	LW-6		
	C32-90		C32-90	●	32		56	90	62	15	30		HS12X12			
	C40-100		C40-100	●	40		68	100	72	18	35	M16	HS16X12	LW-8		
T100H-	N08-80	-		●	8	100	28	80	45	9	20	M8	HS8X10	LW-4	CL100-1	For Boring Bar
	N10-90			●	10		35	90	55	9	22		HS8X12			
	N12-100			●	12		42	100	65	9	22					
	N16-110			●	16		48	110	75	11	30	M10	HS10X16	LW-5		
	N20-130			●	20		52	130	95	13	40					
	N25-150			●	25		62	150	115	13	50	M12	HS12X18	LW-6		
	N32-170			●	32		72	170	135	13	60		HS12X20			
T100H-	C20-85	-		●	20	100	52	85	50	13	22	M10	HS10X16	LW-5	CL100-1	*For Drill
	C25-90			●	25		62	90	58	15	20	M16	HS16X18	LW-8		
	C32-95			●	32		72	95	62	15	20					
	C40-105			●	40		82	105	72	15	25	M16	HS16X20	LW-8		

* Shorter than the toolholder for boring bar.

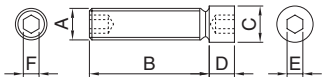
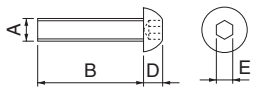
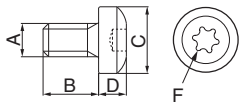
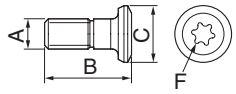
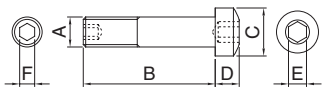
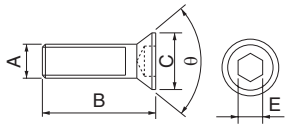
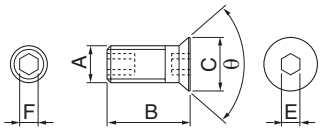
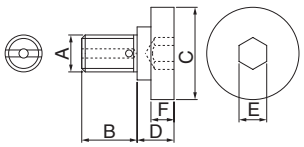
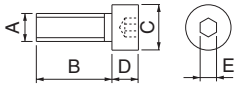
● : Std. Item

Spare Parts

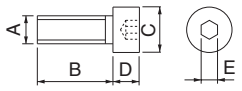
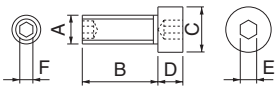
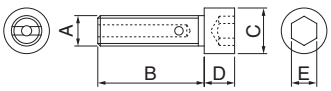
P

P1~P28

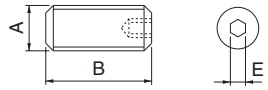
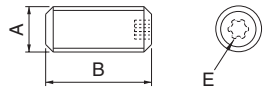
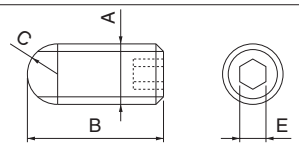
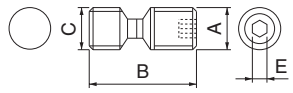
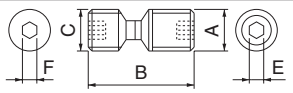
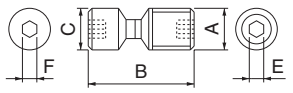
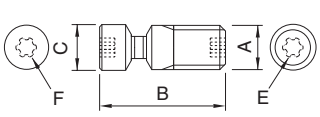
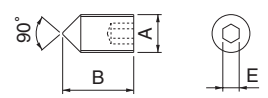
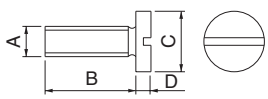
Screws	P2~P6
Pins	P7
Shims	P8~P12
Cartridges	P12
Clamp Sets	P13~P14
Clamps	P15~P16
Chipbreakers	P16
Wrenches	P17~P18
Springs / Nuts / Punches / Others	P18~P19
Former Parts List	P20~P28

Shape	Description		Std.	Dimension (mm)						Angle		Torque (N·m)	Remarks
				A	B	C	D	E	F	α	θ		
	AJ	-6X38	●	M6X1.0	38.0	6.0	10.0	3.0	3.0	-	-	-	
		-8X44-9.5	●	M8X1.25	44.0	9.5	6.0	4.0	4.0	-	-		
		-10X46	●	M10X1.5	46.0	11.5	8.0	5.0	5.0	-	-		
	BH	3X6	●	M3X0.5	6.0	-	1.7	2.0	-	-	-	-	
		3X12	●	M3X0.5	12.0	-	1.7	2.0	-	-	-		
		6X25	●	M6X1.0	25.0	-	3.3	4.0	-	-	-		
		8X30	●	M8X1.25	30.0	-	4.4	5.0	-	-	-		
	BH	6X10TR	●	M6X1.0	10.0	12.0	5.0	-	T25	-	-	6.5	
	CP	8X15TL	●	M8X1.25	15.0	15.0	-	-	T25	-	-	6.0	L…shows Left-hand Thread
		8X23TL	●		23.0								
	CS	-2D	●	M4X0.7	21.5	6.4	3.5	2.5	2.0	-	-	1.7	
		-3D	●	M5X0.8	22.0	8.0	4.0	3.0	2.5	-	-	3.9	
		-5D	●	M5X0.8	28.0	8.0	4.0	3.0	2.5	-	-	3.0	
	GS	-50	●	M5X0.8	13.0	7.5	-	3.0	-	-	82°	-	
		-50S	●	M5X0.8	9.0	7.5	-	3.0	-	-	82°		
	GS	-4090T$^{R}_{L}$W	●	M4X0.7	9.0	5.8	-	2.0	2.0	-	82°	-	R…shows Right-hand Thread L…shows Left-hand Thread
	HF	20X53H	●	M20X2.5	35.0	43.0	18.0	14.0	14.0	-	-	-	With Coolant Hole
		24X60H	●	M24X3.0	40.5	65.0	19.5	17.0					
	HH	3X6	●	M3X0.5	6.0	5.5	3.0	2.5	-	-	-	-	
		3X12	●		12.0								
	HH	4X16	●	M4X0.7	16.0	7.0	4.0	3.0	-	-	-		
	HH	5X15	●	M5X0.8	15.0	8.5	5.0	4.0	-	-	-		
		5X16	●		16.0								
		5X20	●		20.0								
		5X25	●		25.0								
		5X30	●		30.0								
	HH	6X12	●	M6X1.0	12.0	10.0	6.0	5.0	-	-	-		
		6X16	●		16.0								
		6X20	●		20.0								
		6X25	●		25.0								
		6X30	●		30.0								
	HH	8X25	●	M8X1.25	25.0	13.0	8.0	6.0	-	-	-	-	
		8X35	●		35.0								
		8X40	●		40.0								
		8X50	●		50.0								
		8X55	●		55.0								
		8X65	●		65.0								
		8X70	●		70.0								
		8X80	●		80.0								
		8X85	●		85.0								
		8X100	●		100.0								
		8X110	●		110.0								

●:Std. Item

Shape	Description		Std.	Dimension (mm)						Angle		Torque (N·m)	Remarks
				A	B	C	D	E	F	α	θ		
	HH	10X25	●	M10X1.5	25.0	16.0	10.0	8.0	-	-	-	-	
	HH	10X30	●		30.0								
	HH	10X30M	●		30.0								
	HH	10X30S	●		30.0		6.0	7.0					
	HH	10X35	●		35.0		10.0	8.0					
	HH	10X40	●		40.0								
	HH	12X25	●	M12X1.75	25.0	18.0	12.0	10.0	-	-	-		
	HH	12X35	●		35.0								
	HH	12X35M	●		35.0								
	HH	12X40	●		40.0								
	HH	12X55	●		55.0								
	HH	12X65	●		65.0								
	HH	12X80	●		80.0								
	HH	12X85	●		85.0								
	HH	12X100	●		100.0								
	HH	12X110	●		110.0								
	HH	12X120	●		120.0								
	HH	12X130	●		130.0								
	HH	12X140	●		140.0								
	HH	12X150	●		150.0								
	HH	16X35	●	M16X2.0	35.0	24.0	16.0	14.0	-	-	-		
	HH	16X40	●		40.0								
	HH	16X45	●		45.0								
	HH	16X65	●		65.0								
	HH	16X90	●		90.0								
	HH	16X110	●		110.0								
	HH	16X130	●		130.0								
	HH	20X40	●	M20X2.5	40.0	30.0	20.0	17.0	-	-	-		
	HH	20X55	●		55.0								
	HH	20X75	●		75.0								
	HH	20X90	●		90.0								
	HH	20X110	●		110.0								
	HH	20X120	●		120.0								
	HH	20X140	●		140.0								
	HH	20X150	●		150.0								
	HH	20X170	●		170.0								
	HH	24X40	●	M24X3.0	40.0	36.0	24.0	19.0	-	-	-		
	HH	24X60	●		60.0								
	HH	24X75	●		75.0								
	HH	24X90	●		90.0								
	HH	24X110	●		110.0								
	HH	24X120	●		120.0								
	HH	24X140	●		140.0								
	HH	24X150	●		150.0								
	HH	24X170	●		170.0								
	HH	4X12	●	M4X0.7	10.0	7.0	4.0	3.0	2.0	-	-	-	
	HH	8X25H	●	M8X1.25	25.0	13.0	8.0	5.0	-	-	-	-	With Coolant Hole
	HH	10X30H	●	M10X1.5	30.0	16.0	10.0	6.0					
	HH	12X35H	●	M12X1.75	35.0	18.0	12.0	8.0					
	HH	16X52H	●	M16X2.0	36.0	24.0	16.0	12.0					

●:Std. Item

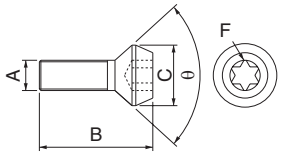
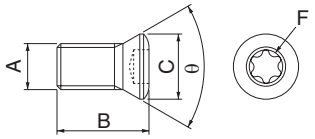
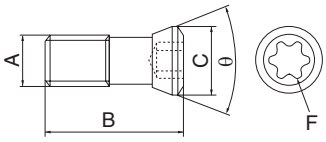
Shape	Description		Std.	Dimension (mm) A	B	C	D	E	F	Angle α	θ	Torque (N·m)	Remarks
	HS	3X4P	●	M3X0.5	3.9	-	-	1.5	-	-	-	1.0	HS4X4P and HS6X4P have a flat edge Clamp screw equivalent to JIS B-1177
		3X4	●		4.0								
		3X8	●		8.0								
		3X12	●		12.0								
		3X16	●		16.0								
	HS	4X4P	●	M4X0.7	3.9	-	-	2.0	-	-	-	2.0	
		4X4	●		4.0								
		5X5	●	M5X0.8	5.0			2.5				3.0	
	HS	6X4P	●	M6X0.75	3.9	-	-	3.0	-	-	-	4.0	
		6X6	●	M6X1.0	6.0								
		6X14	●		14.0								
		6X22	●		22.0								
	HS	8X10	●	M8X1.25	10.0	-	-	4.0	-	-	-	-	
		8X12	●		12.0								
	HS	10X10	●	M10X1.5	10.0	-	-	5.0	-	-	-		
		10X16	●		16.0								
	HS	12X12	●	M12X1.75	12.0	-	-	6.0	-	-	-		
		12X16	●		16.0								
		12X18	●		18.0								
		12X20	●		20.0								
		12X25	●		25.0								
		12X30	●		30.0								
		12X35	●		35.0								
	HS	16X12	●	M16X2.0	12.0	-	-	8.0	-	-	-		
		16X18	●		18.0								
		16X20	●		20.0								
	HS	-2524TRP	●	M2.5X0.35	2.4	-	-	5IP	-	-	-	0.4	○IP shows Torx Plus
		-2534TRP	●		3.4								
		-3048TRP	●	M3X0.5	4.8			6IP				0.5	
		-4067TRP	●	M4X0.7	6.7			7IP				0.8	
	HSB	4X8R/L	●	M4X0.7	8.0	R2.0	-	2.0	-	-	-	2.0	R...shows Right-hand Thread L...shows Left-hand Thread
	LS	-03N	●	M5X0.8	9.7	M5X0.8	-	2.0	-	-	-	2.0	N:Silver coated
		-03SN	●		12.0			2.5				3.0	
	LS	-05	●	M5X0.8	15.5	M5X0.8	-	2.0	2.0	-	-	2.0	
	LS	-1N	●	M6X1.0	17.0	6.0	-	2.5	2.5	-	-	3.0	N:Silver coated
		-1SN	●		14.2								
		-1T	●		21.0								
	LS	-2N	●	M8X1.0	20.0	8.0	-	3.0	3.0	-	-	4.0	
		-3	●		22.0								
		-4N	●		24.0								
	LS	-1P	●	M6X1.0	16.5	6.0	-	10IP	10IP	-	-	2.0	○○IP shows Torx Plus
		-2P	●	M8X1.0	18.2	8.0		15IP	15IP			3.5	
		-3P	●		21.8								
	LS	-11	●	M6X1.0	9.5	-	-	3.0	-	-	-	-	
		-15	●		12.5								
	M	3X8	●	M3X0.5	8.0	5.5	2.0	-	-	-	-	-	Flat fillister head screw equivalent to JIS B-1101
		3X12	●		12.0								
		4X10	●	M4X0.7	10.0	7.0	2.6						

Reference

Torx and Torx Plus have different cross-sections.

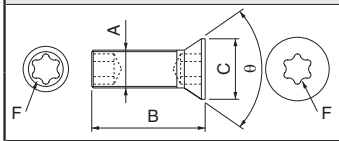
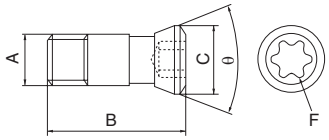
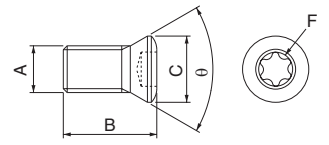
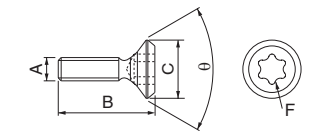
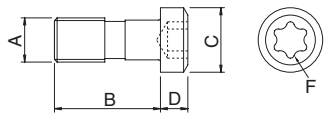
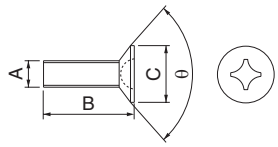
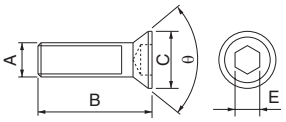
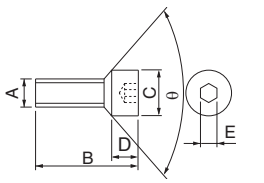
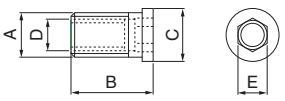
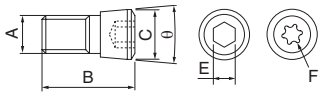
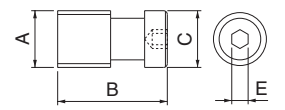
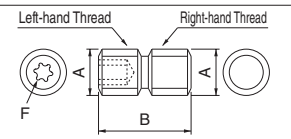
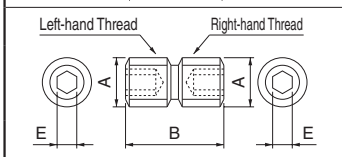
Torx　　Torx Plus

●:Std. Item

Shape	Description	Std.	Dimension (mm)						Angle		Torque (N·m)	Remarks
			A	B	C	D	E	F	α	θ		
	**SB -1TR**	●	M2X0.4	5.3	3.8			T6			0.5	
	-2TR	●	M2.5X0.45	6.2	4.5			T8			1.2	
	-3TR	●	M3X0.5	7.2	4.8			T10		82°	2.0	
	-3STR	●		6.4	5.2							
	-3.5TR	●	M3.5X0.6	9.3	5.6			T15			3.5	
	-4TR	●	M4X0.7	7.7	5.8							
	-5TR	●	M5X0.8	20.0	8.7	-	-	T20	-	90°	4.5	R...shows Right-hand Thread
	-2290TR	●	M2.2X0.45	9.2	2.8			T6		60°	0.5	
	-25100TR	●	M2.5X0.45	10.0	3.5			T7			0.8	
	-40115TR	●	M4X0.7	11.5	5.5			T15			3.5	
	-5070TR	●	M5X0.8	7.0	6.8			T20			4.5	
	-5090TR	●		9.0								
	-50120TR	●		12.0								
	SB -1635TR	●	M1.6X0.35	3.3	2.6			T6		60°	0.5	
	SB -1STR	●	M2X0.4	5.0	3.1							
	-1840TRP	●	M1.8X0.35	4.0	2.5			6IP		55°		
	-2035TR	●	M2X0.4	3.7	3.0			T6		60°		
	-2035TRG	●		3.5	2.7							
	-2040TR	●		3.8	3.0							
	-2040TRG	●		4.0		-	-		-			
	-2042TRG	●		4.1	2.7							
	-2045TR	●		4.3								
	-2045TRN	●			2.8					37°		
	-2050TR	●		4.8	3.0					60°		
	-2060TR	●		5.8	3.5			T8			1.2	
	-2080TR	●		8.3	2.8			T6			0.5	
	SB -2250TR	●	M2.2X0.45	5.1	3.1			T7		60°	0.8	
	-2255TR	●		5.5	3.5	-	-		-			
	-2260TR	●		5.8	3.1							
	SB -2545TR	●	M2.5X0.45	4.6	3.5			T8		60°	1.2	
	-2555TRG	●		5.4								
	-2555TRP	●		5.5		-	-	8IP	-			
	-2560TR	●		5.7				T8				
	-2570TR	●		6.8								
	**SB -3060TR**	●	M3X0.5	5.3	4.2			T10		60°	2.0	R...shows Right-hand Thread
	-3060TRG	●		5.9								
	-3065TRP	●		6.5	4.0	-	-	8IP	-		1.2	
	-3070TRG	●		7.0	4.2			T10			2.0	
	-3070TRP	●						10IP				
	-3080TR	●		8.0				T10				
	**SB -3580TR**	●	M3.5X0.6	8.0	5.3			T15		60°	3.5	○○IP shows Torx Plus
	-3590TRP	●		9.0		-	-	15IP	-		4.0	
	-3592TR	●		9.2	5.1			T10			2.0	
SB-40125TRN	**SB -4050TRN**	●	M4X0.5	4.6	5.1			T10		57°	2.0	
	-4060TR	●	M4X0.7	5.9	5.5			T15		60°	3.5	
	-4065TR	●		6.7								
	-4070TRG	●		7.0								
	-4070TRN	●		7.7	5.4							
	-4070TRS	●		6.7	5.5			T10			2.0	
	-4075TRP	●		7.5				15IP			3.5	
	-4082TPR	●		8.2		-	-		-			
	-4085TR	●		8.5				T15				
	-4085TRP	●						15IP				
	-4090TRP	●		9.0	5.7							
	-4090TRPN	●			5.5							
	-40120TR	●		12.0	5.1			T15				
	-40125TRN	●		12.5	5.2					50°		
	-40140TR	●		14.0	5.5					60°		
	-40140TRN	●			6.7					75°		
	SB -45130TR	●	M4.5X0.75	13.0	6.6	-	-	20IP	-	55°	4.5	
	SB -5085TR	●	M5X0.8	8.5	6.8			T20		50°	4.5	
	-50120TRP	●		12.0				20IP		60°		
	-50120TRS	●			7.2	-	-	15IP	-		3.5	
	-50140TR	●		14.0	7.3			T15		50°	3.5	
	-50140TRP	●						20IP		60°	4.5	
	SB -60120TR	●	M6X1.0	12.0	8.5			T25			6.0	

●:Std. Item

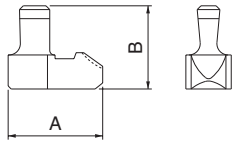
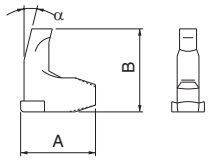
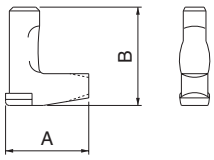
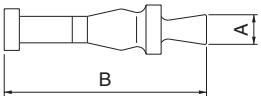
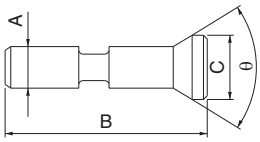
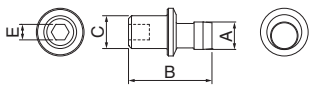
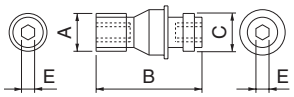
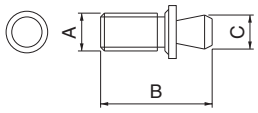
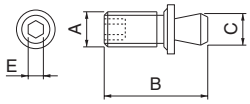
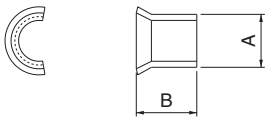
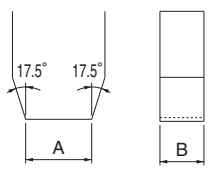
Screws

Shape	Description		Std.	Dimension (mm) A	B	C	D	E	F	Angle α	θ	Torque (N·m)	Remarks
	SB	-4070TRW	●	M4X0.7	6.7	5.5	-	-	T8	-	60°	1.2	R···shows Right-hand Thread
		-4590TRWN	●	M4.5X0.75	9.3	5.6			T10		57°	2.0	
	SC	-30067	●	M3X0.35	6.7	4.4	-	-	T8	-	60°	1.2	
		-35085	●	M3.5X0.35	8.5	5.7			T10			2.0	
		-40100	●	M4X0.5	10.0	6.0			T15			3.5	
		-50130	●	M5X0.5	13.0	6.6			T20		40°	4.5	
		-60160	●	M6X0.75	16.0	8.0			T25			6.0	
		-60210	●		21.0	9.6			T30			8.0	
	SE	-3070TRP	●	M3X0.5	7.0	4.3	-	-	9IP	-	43°	1.7	○○IP shows Torx Plus
		-40050TRN	●	M4X0.7	5.0	5.0			T15		44°	3.5	
		-40055TR	●		5.5								
		-40068TR	●		6.8								
		-40080TR	●		8.0								
		-40090TR	●		9.0								
		-40100TR	●		10.0								
	SE	-40120TR	●	M4X0.7	12.0	5.6	-	-	T15	-	60°	3.5	
		-50125TR	●	M5X0.8	12.5	6.8			T20			4.5	
	SH	-50150TR	●	M5X0.8	15.1	7.3	3.1	-	T20	-	-	4.5	
	SP	3X4	●	M3X0.5	4.0	4.0	-	-	-	-	90°	-	With additional machining below the flat head screw
		3X6	●		6.0	6.0							Cross recessed flat head screw equivalent to JIS...B-1111
		3X8	●		8.0								
		3X10	●		10.0								
	SP	4X9	●	M4X0.7	9.0	5.6	-	2.0	-	-	90°	-	
	SP	8X35	●	M8X1.25	35.0	11.0	4.4	5.0	-	-	90°	-	
	SPW	-6045	●	M6X0.75	9.0	7.5	M4.5X0.75	4.5	-	-	-	-	A shows External, D shows Internal. External and Internal threads are both Right-hand threads.
		-7050	●	M7X0.75	9.0	8.8	M5X0.8	5.0	-	-	-		
	SS	-4N	●	M5.5X0.5	8.5	6.6	M4X0.7	4.0	-	-	-		
	SV	-60136R	●	M6X1.0	13.6	6.3	-	4.0	-	-	6°	-	Hexagon socket
		-60136TR	●					-	T20	-		4.5	Torx
	TH	8X15	●	M8X1.25	20.0	8.5	-	4.0	-	-	-	-	
	W	6X17	●	M6X1.0	17.0	-	-	-	T20	-	-	4.5	
		6X18N	●		18.0				T15			3.5	
		8X16	●	M8X1.25	16.0				T25			6.0	
	W	6X18	●	M6X1.0	17.5	-	-	3.0	-	-	-	-	
		6X20	●	M6X1.0	20.5								
		8X18	●	M8X1.25	18.0			4.0					
		*8X21	●	M8X1.0	21.0								

* No socket on right-hand thread side

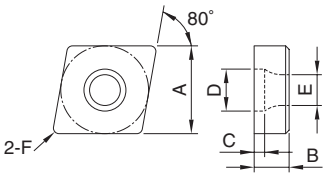
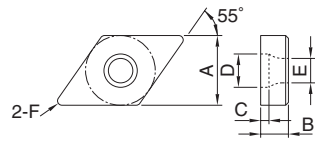
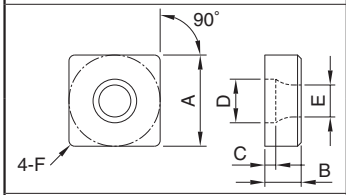
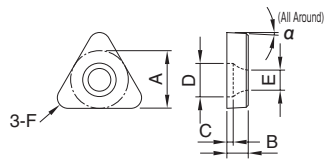
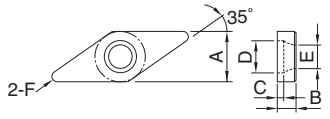
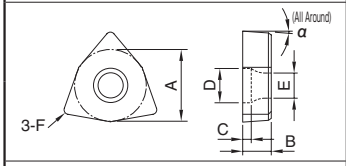
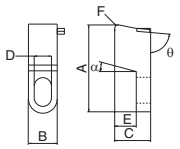
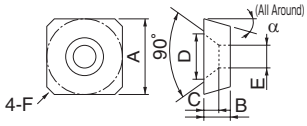
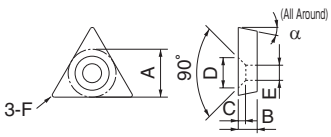
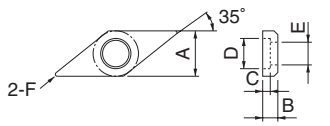
●:Std. Item

Pins

Shape	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	LL	-03N	●	7.8	6.3	-	-	-	-	-	-	
		-03SN	●	11.1	8.9							
		-03TN	●	8.3	8.9							
	LL	-05C	●	10.7	11.7	-	-	-	-	12°	-	
		-1CN	●	13.0	13.3					14°		
		-2C	●	18.8	17.6					14°		
	LL	-1K	●	10.0	12.0	-	-	-	-	-	-	
		-1N	●	10.3	12.0							
		-1DN	●	12.3	12.0							
		-2K	●	13.3	13.2							
		-2N	●	13.5	13.0							
		-3K	●	16.0	14.8							
		-3N	●	16.4	13.0							
		-4	●	16.4	14.7							
		-5N	●	17.1	16.7							
	LP	-2S	●	3.65	20.0	-	-	-	-	-	-	
		-6S	●	3.65	25.0	-	-	-	-	-	-	
	LPA	-11	●	2.8	11.0	4.2	-	-	-	-	60°	
		-13	●		13.0							
		-17	●		17.0							
	LPF	-11	●	2.5	11.0	3.5	-	-	-	-	60°	
		-1113	●		13.0							
		-1117	●		17.0							
		-13	●	3.8	13.0	5.5						
		-17	●		17.0							
	PP	-4	●	4.6	14.0	5.5	-	3.0	-	-	-	
	TS	-3S	●	M5X0.8	15.0	3.6	-	2.0	-	-	-	
	WP	-1S	●	M5X0.8	18.0	3.65	-	-	-	-	-	
		5X15	●		15.0	5.0						
	WP	5X11	●	M5X0.8	10.5	5.0	-	2.0	-	-	-	
	LSP	-1	●	5.0	5.3	-	-	-	-	-	-	
		-2	●	6.5	5.6							
		-3	●	8.25	7.9							
	LSP	-2K	●	5.1	5.2							
		-3K	●	6.7	5.7							
	P	-03	●	2.8	1.95	-	-	-	-	-	-	
		-03S	●	3.5	1.95	-	-	-	-	-	-	

●:Std. Item

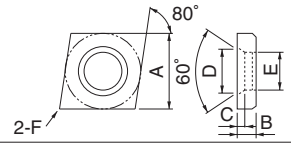
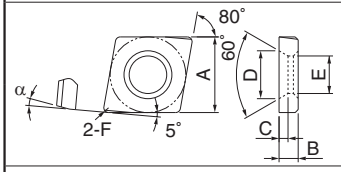
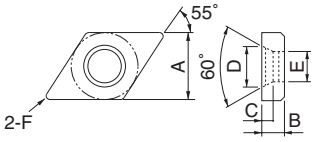
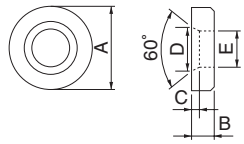
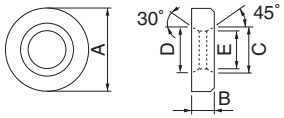
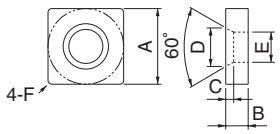
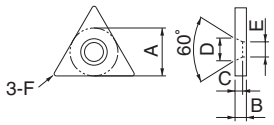
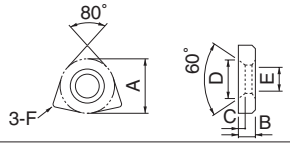
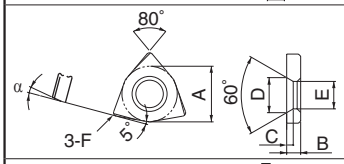
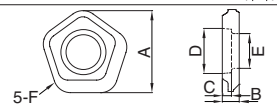
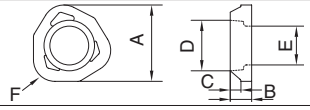
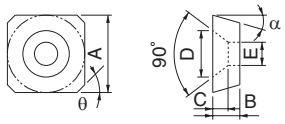
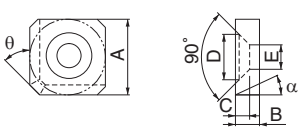
Shims

Shape Handed Spare Parts show Right-hand	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**DC**	**-42**	●	12.0	3.2	1.2	6.0	4.4	R1.2	-	-	Shim Screw:SB-4085TR
		-44	●	12.55	5.0	1.5			R0.8			
	**DD**	**-42**	●	12.55	3.2	1.2	6.0	4.4	R1.2	-	-	Shim Screw:SB-4085TR
		-42-16	●						R1.6			
		-43	●		3.4	1.3			R0.8			
		-44	●		5.0	1.5						
	**DS**	**-42**	●	12.0	3.2	1.2	6.0	4.4	R1.2	-	-	Shim Screw:SB-4085TR
		-44	●	12.55	5.0	1.5			R0.8			
	**DT**	**-32**	●	8.63	3.2	0.95	5.0	3.4	R1.6	3°	-	Shim Screw:SB-3080TR
		-42	●	12.46		1.2	6.0	4.4	R1.2	-		Shim Screw:SB-4085TR
	**DV**	**-33**	●	9.40	3.5	1.2	6.0	4.4	R1.0	-	-	Shim Screw:SB-4085TR
	**DW**	**-42**	●	11.5	3.2	1.2	6.0	4.4	R1.2	4°	-	Shim Screw:SB-4085TR
		-44	●	12.65	5.0	1.5			R0.8	-		
	**556**	**C**R/L	●	34.0	10.0	12.7	5.6	5.0	R1.6	0°	55°	R...shows Right-hand L...shows Left-hand Shim Screw:HH5X16
	**KPS**	**-42**	●	11.5	3.2	2.0	7.2	3.2	C1.0	7°	-	Shim Screw:SP3X8
	**KPT**	**-32**	●	8.0	3.2	1.9	7.0	3.2	R0.4	11°	-	Shim Screw:SP3X8 :SP3X10
		-42	●	10.5	3.2	1.9	7.0	3.2	R0.8	11°	-	
	**KVN**	**-32**	●	9.52	3.2	2.1	7.6	5.5	R0.8	-	-	Lock Pin:LP-2S :LP-6S

●:Std. Item

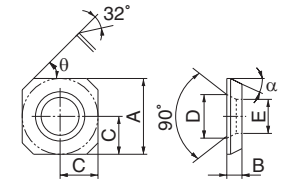
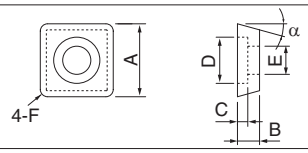
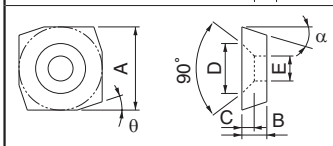
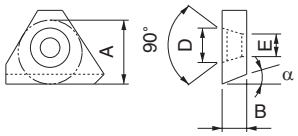
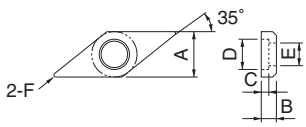
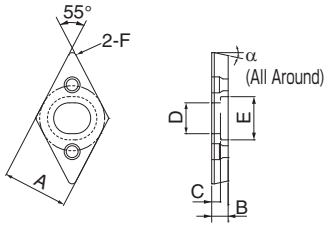
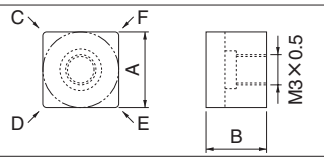
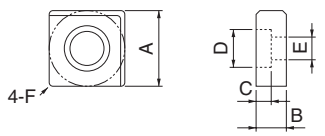
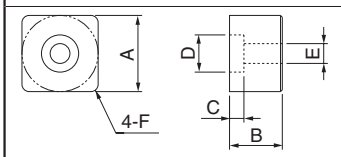
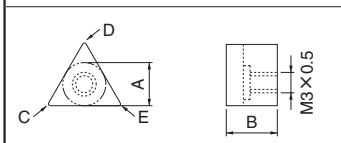
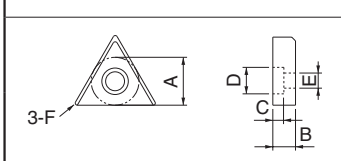
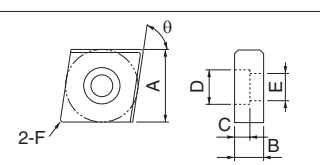
P

Spare Parts

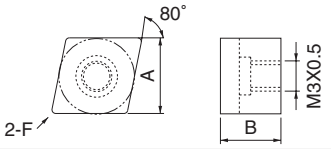
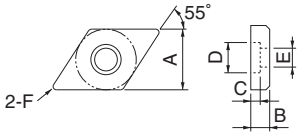
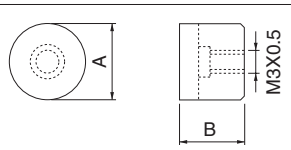
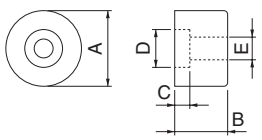
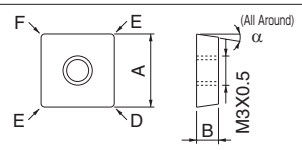
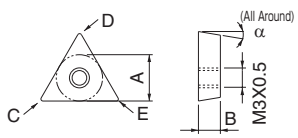
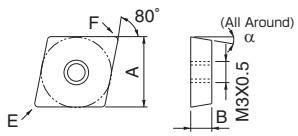
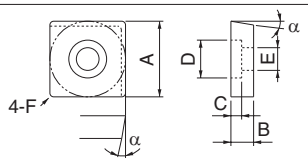
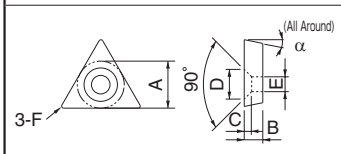
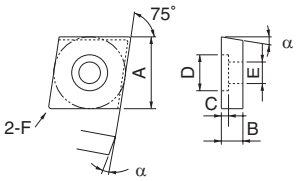
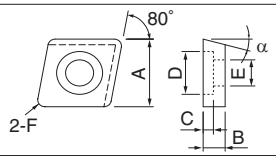
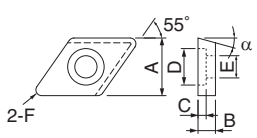
Shape Handed Spare Parts show Right-hand	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	LC	-32N	●	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin:LSP-1
		-4K	●	11.7	3.2	1.4	8.1	6.73	R0.8	-	-	Shim Pin:LSP-3K
		-42N	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin:LSP-2
		-42N-20	●						R2.0			
		-53N	●	15.9	4.8	1.7	10.0	8.0	R1.2	-	-	Shim Pin:LSP-3
	LC	-42N$^{R}_{L}$	●	12.65	3.2	1.5	8.01	6.28	R0.8	10°	-	R...shows Right-hand L...shows Left-hand Shim Pin:LSP-2
		-42N$^{R}_{L}$-20	●						R2.0			
	LD	-32N	●	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin:LSP-1
		-4K	●	11.7	3.2	1.4	8.1	6.73	R0.8	-	-	Shim Pin:LSP-3K
		-4K43	●		4.8	3.0	8.3	6.60	R1.2			
		-42	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin:LSP-2
		-42-20	●						R2.0			
		-43	●	12.65	4.8	3.1	8.5	6.28	R0.8	-	-	
		-43-20	●						R2.0			
	LR	-80	●	9.47	3.2	1.3	6.25	4.75	-	-	-	Shim Pin:LSP-1
		-81	●	12.65	3.2	1.5	8.01	6.28	-	-	-	Shim Pin:LSP-2
	LR	-10C	●	8.5	3.2	6.3	6.3	4.7	-	-	-	Shim Pin:LSP-1
		-12C	●	10.0	3.2	6.3	6.3	4.7	-	-	-	
		-16C	●	13.6	3.2	7.9	8.01	6.28	-	-	-	Shim Pin:LSP-2
	LS	-32	●	9.47	3.2	1.3	6.18	4.68	R0.8	-	-	Shim Pin:LSP-1
		-42	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin:LSP-2
	LT	-3K	●	8.53	2.7	1.0	6.1	5.13	R0.8	-	-	Shim Pin:LSP-2K
		-32N	●	9.47	2.7	1.3	6.18	4.68	R0.8	-	-	Shim Pin:LSP-1
		-32N-20	●						R2.0			
		-42N	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin:LSP-2
		-42N-20	●						R2.0			
	LW	-32N	●	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin:LSP-1
		-42N	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin:LSP-2
	LW	-42N$^{R}_{L}$	●	12.65	3.2	1.5	8.01	6.28	R0.8	10°	-	R...shows Right-hand L...shows Left-hand Shim Pin:LSP-2
	MFPN	-45	●	17.07	3.5	1.95	9.8	7.18	R3.5	-	-	Shim Screw:SPW-7050
	MFWN	-90	●	15.25	4.0	2.5	9.44	7.25	R3.0 R4.0	-	-	Shim Screw:SPW-7050
	MSD	-42	●	10.7	3.2	1.85	7.0	3.3	-	20°	45°	Shim Screw:SP3X8
	MSE	-4245S	●	10.3	3.2	2.0	6.0	5.0	-	20°	45°	Shim Screw:SP4X9
	MSE	-4215	●	10.53	3.2	1.5	6.4	3.4	-	25°	15°	Shim Screw:SP3X8
		-4245	●	10.53	3.2	1.5	6.4	3.4	-	25°	45°	Shim Screw:SP3X8

●:Std. Item

Shims

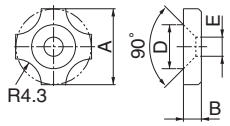
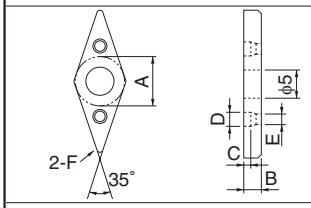
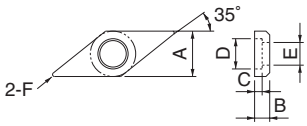
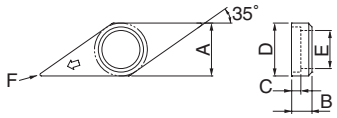
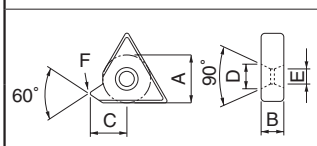
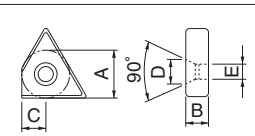
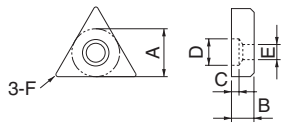
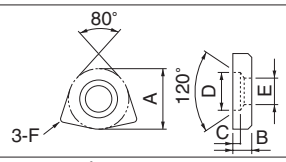
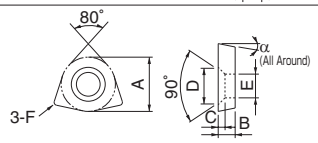
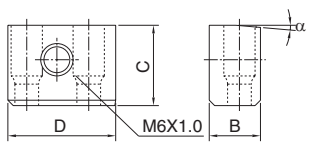
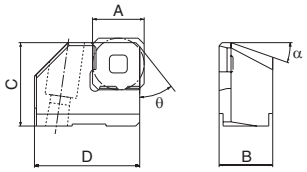
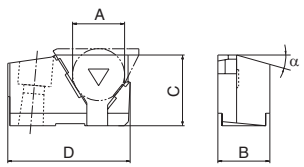
Shape	Description	Std.	Dimension (mm)						Angle		Remarks
			A	B	C	D	E	F	α	θ	
	**MSO -4T245**	●	10.0	2.0	4.7	6.4	4.8	-	27°	45°	Shim Screw:SP3X6
	**MSO -5200**	●	12.6	3.18	1.8	8.27	6.66	R0.8	15°	-	Shim Screw:SPW-6045
	**MSP -42**	●	11.3	3.2	1.85	7.0	3.3	-	15°	15°	Shim Screw:SP3X8
	**MTE -42**	●	9.8	3.2	-	6.4	3.4	-	25°	-	Shim Screw:SP3X8
	**MVN -32**	●	9.52	3.2	2.1	7.4	6.5	R0.8	-	-	Lock Pin:TS-3S
	**PD -42**	●	12.7	3.2	1.7	6.0	8.4	0.8	12°	-	Shim Screw:SB-2050TR
	**SP -129**	●	9.52	9.52	R0.8	R1.6	R1.2	R1.6	-	-	Shim Screw:HH3X12
	**SP -141**	●	12.7	4.0	2.4	6.2	3.3	R1.2	-	-	Shim Screw:M3X8
	-143	●	12.7	7.2	2.4	6.2	3.3	R1.2	-	-	Shim Screw:M3X12
	-162	●	15.8	6.0	3.4	8.0	4.4	R1.5	-	-	Shim Screw:M4X10
	**SP -148**	●	12.7	8.8	2.4	6.2	3.3	R1.2	-	-	Shim Screw:BH3X12
	**SP -219**	●	6.35	9.52	R0.8	R1.2	R1.6	-	-	-	Shim Screw:HH3X12
	**SP -221**	●	9.52	4.0	2.5	6.5	3.5	R1.2	-	-	Shim Screw:M3X8
	-223	●	9.52	7.2	2.5	6.5	3.5	R1.2	-	-	Shim Screw:M3X12
	**SP -342**	●	12.7	6.0	2.5	6.5	3.5	R1.2	-	75°	Shim Screw:M3X8
	-441	●	12.7	4.0	2.5	6.2	3.3	R0.8	-	80°	Shim Screw:M3X8
	-443	●	12.7	7.2	2.5	6.2	3.3	R0.8	-	80°	Shim Screw:M3X12
	-454	●	15.7	8.0	3.4	8.0	4.5	R1.6	-	80°	Shim Screw:M4X10

●:Std. Item

Shape	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	SP	-429	●	9.52	9.52	-	-	-	R1.2	-	-	Shim Screw:HH3X12
	SP	-521	●	10.0	4.0	2.5	6.2	3.3	R1.0	-	-	Shim Screw:M3X8
		-523	●		7.2							Shim Screw:M3X12
		-541	●	12.7	4.0	2.5	6.2	3.3	R1.2	-	-	Shim Screw:M3X8
		-543	●		7.2							Shim Screw:M3X12
	SP	-826	●	9.52	7.9	-	-	-	-	-	-	Shim Screw:HH3X12
		-829	●	9.52	9.52	-	-	-	-	-	-	
	SP	-841	●	12.7	4.0	2.4	6.2	3.3	-	-	-	Shim Screw:M3X8
		-843	●	12.7	7.2	2.4	6.2	3.3	-	-	-	Shim Screw:M3X12
		-849	●	12.7	8.8	2.4	6.2	3.3	-	-	-	Shim Screw:BH3X12
		-861	●	15.8	6.0	3.4	8.0	4.4	-	-	-	Shim Screw:M4X10
	SP	-130A	●	9.52	3.2	-	R0.4	R0.8	R1.2	8°	-	Shim Screw:BH3X12
	SP	-210A	●	6.35	3.2	R0.4	R0.8	R1.2	-	8°	-	Shim Screw:BH3X6
	SP	-420A	●	9.52	3.2	-	-	R0.8	R1.2	8°	-	Shim Screw:BH3X6
	SP	-141P	●	12.7	4.0	2.4	6.2	3.3	R1.2	7°	-	Shim Screw:M3X8
		-143P	●	12.7	7.2	2.4	6.2	3.3	R1.2	7°	-	Shim Screw:M3X12
	SP	-230P	●	8.3	3.2	2.0	7.2	3.2	R0.5	7°	-	Shim Screw:SP3X10
	SP	-341P	●	12.6	4.0	2.5	6.5	3.5	R1.2	7°	-	Shim Screw:M3X8
	SP	-441P	●	12.7	4.0	2.5	6.2	3.3	R1.2	11°	-	Shim Screw:M3X8
		-443P	●		7.2							Shim Screw:M3X12
	SP	-521P	●	10.0	4.0	2.5	6.2	3.3	R1.2	11°	-	Shim Screw:M3X8
		-523P	●		7.2							Shim Screw:M3X12

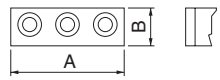
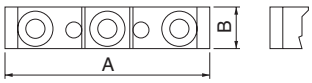
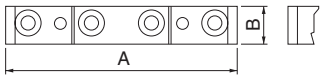
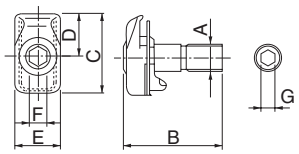
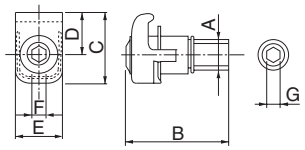
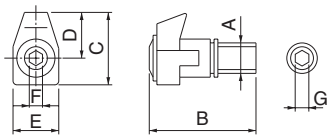
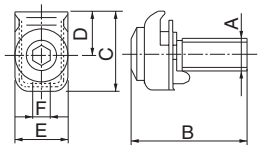
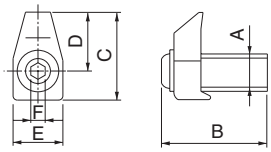
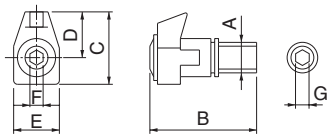
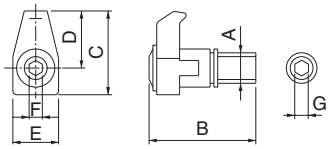
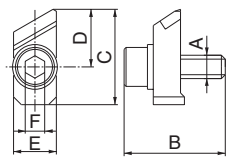
●:Std. Item

Shims / Cartridges

Shape (Handed Spare Parts show Right-hand)	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**SP**	**-RC**	●	12.6	3.0	-	7.35	3.35	-	-	-	Shim Screw:SP3X8
	**SVN**	**-32**	●	8.0	3.2	1.5	3.1	2.3	R0.4	-	-	Shim Screw:SB-2050TR
	**SVN**	**-32N**	●	8.2	3.2	1.5	7.0	5.9	R0.6	-	-	Shim Screw:SS-4N
	**SVN**	**-32S**	●	8.2	3.2	1.5	7.0	5.9	R0.2	-	-	Shim Screw:SS-4N 1-corner use only
	**TN**	**-32**	●	9.52	3.2	6.5	7.0	4.2	R0.4	-	-	Shim Screw:SP3X8
		-43	●	12.70	3.2	8.1	7.0	4.2	R0.5	-	-	
	**TNW**	**-32**	●	9.52	3.2	4.8	7.0	4.2	-	-	-	Shim Screw:SP3X8
	**WTN**	**-33**	●	9.52	4.76	2.5	7.0	5.3	R0.8	-	-	Shim Pin:WP-1S
		-33-20	●						R2.0			
	**WWN**	**-42**	●	12.7	3.0	1.4	7.0	5.3	R1.2	-	-	Shim Pin:WP5X15
	**WWP**	**-42**	●	12.7	3.0	1.5	8.3	5.3	R1.2	11°	-	Shim Pin:WP5X11
		-42-16	●						R1.6			
	**MAP**	**-2506**	●	-	9.5	14.9	20	-	-	5°	-	Clamp Screw: SB-40140TR
	**LSD**	**-445R**	●	12.7	13.0	20.0	26.5	-	-	20°	45°	Dimension A shows Insert I.D.
	LSE	**-445R**	●	12.7	13.0	19.5	26.0	-	-	20°	45°	
	LSO	**-445R**	●	13.494	12.0	21.3	23.5	-	-	27°	45°	
	LSP	**-415R**	●	12.7	13.0	18.0	26.0	-	-	15°	15°	
	**LTE**	**-490R**	●	12.7	12.0	17.0	30.0	-	-	15°	-	Dimension A shows Insert I.D.

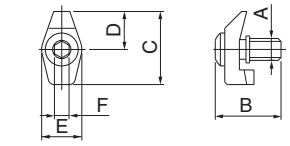
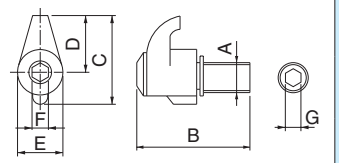
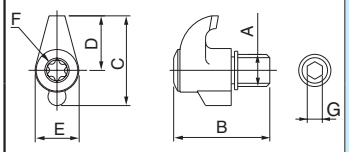
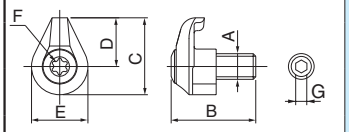
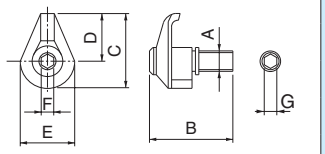
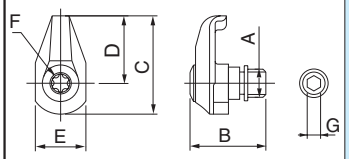
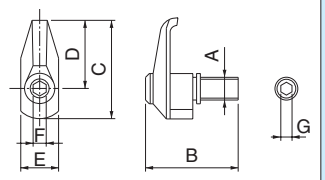
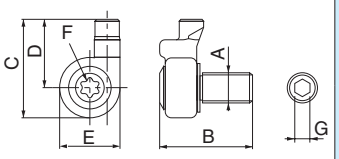
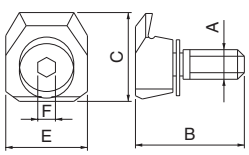
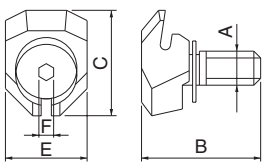
●:Std. Item

Clamp Sets

Shape Handed Spare Parts show Right-hand	Description	Std.	Dimension (mm)							Remarks
			A	B	C	D	E	F	G	
	**BCS -1**	●	64.0	13.0	-	-	-	-	-	
	-5	●	48.0	16.5	-	-	-	-	-	
	**BCS -2**	●	74.0	15.0	-	-	-	-	-	
	-3	●	88.0	16.0	-	-	-	-	-	
	**BCS -4**	●	98.0	16.0	-	-	-	-	-	
	**CE -010**	●	M8X1.25	28.0	24.0	12.8	13.0	4.0	4.0	G:Indicates hexagon hole two side widths of back side of bolts
	-220	●			27.0	15.8	15.0			
	**CE -020**	●	M8X1.25	30.0	17.0	10.5	12.7	4.0	4.0	G:Indicates hexagon hole two side widths of back side of bolts
	**CE -030**	●	M8X1.25	30.0	19.0	12.5	12.7	4.0	4.0	G:Indicates hexagon hole two side widths of back side of bolts
	-040	●			22.5	16.0				
	**CE -320**	●	M6X1.0	24.5	18.2	9.7	12.7	4.0	-	
	**CE -360S**	●	M6X1.0	16.0	18.0	10.55	12.4	4.0	-	
	**CE -030A**	●	M8X1.25	30.0	20.0	13.7	12.7	4.0	-	G:Indicates hexagon hole two side widths of back side of bolts
	**CE -410**	●	M8X1.25	30.0	26.0	19.5	12.7	4.0	4.0	G:Indicates hexagon hole two side widths of back side of bolts
	-430	●			29.0	22.5				
	**CP -RC**$^{R}/_{L}$	●	M6X1.0	20.0	24.5	14.8	11.0	5.0	-	R...shows Right-hand L...shows Left-hand

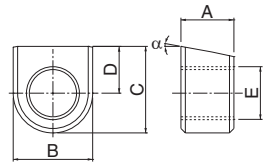
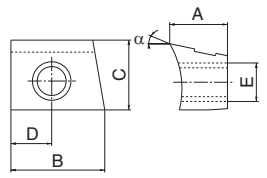
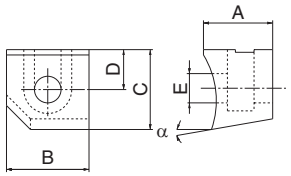
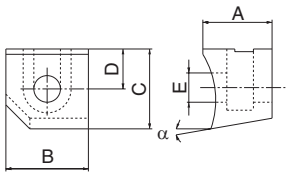
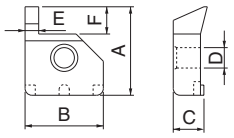
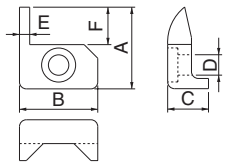
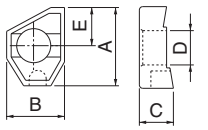
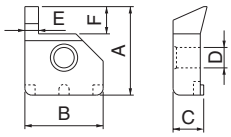
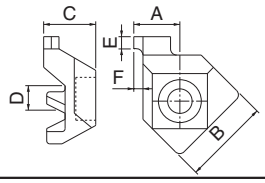
●:Std. Item

Clamp Sets

Shape Handed Spare Parts show Right-hand	Description	Std.	Dimension (mm)							Remarks
			A	B	C	D	E	F	G	
	**CPS -1**	●	M3X0.5	9.0	10.0	5.2	5.5	2.0	-	
	**CPS -2**	●	M5X0.8	14.5	14.0	8.5	6.8	2.5	2.5	G:Indicates hexagon hole two side widths of back side of bolts
	-2P	●		18.0						
	-3	●	M6X1.0	19.0	16.5	10.0	8.8	3.0	3.0	
	**CPS -2S**	●	M5X0.8	13.5	14.0	8.5	6.8	T15	2.0	G:Indicates hexagon hole two side widths of back side of bolts
	-2TR	●		15.0						
	**CPS -4V**	●	M4X0.7	8.9	11.3	7.3	8.0	T10	-	G:Indicates hexagon hole two side widths of back side of bolts
	-5F	●	M5X0.8	11.3	12.7	7.5	10.3	T15	2.5	
	-5S	●		18.0	15.0	9.5	11.0		2.0	
	-5V	●		13.5	12.7	7.5	10.3		2.5	
	**CPS -6F**	●	M6X1.0	16.5	15.6	9.5	12.2	3.0	-	G:Indicates hexagon hole two side widths of back side of bolts
	-6M	●		18.5	17.5	11.0	13.0		3.0	
	-6S	●			18.0	12.0	12.0			
	-6V	●			15.6	9.5	12.2			
	-8V	●	M8X1.25	24.0	20.8	13.0	15.5	4.0	4.0	
	**CPS -5E**	●	M5X0.8	13.5	17.5	12.0	9.0	T15	2.5	G:Indicates hexagon hole two side widths of back side of bolts
	**CPS -5R/L**	●	M5X0.8	18.0	17.5	12.0	9.0	2.5	2.5	G:Indicates hexagon hole two side widths of back side of bolts R...shows Right-hand Thread L...shows Left-hand Thread
	**LGBA -16R/LS**	●	M5X0.8	15.0	16.1	11.2	9.85	T15	2.0	G: Indicates hexagon hole two side widths of back side of bolts R...shows Right-hand L...shows Left-hand
	-22R/LS	●			17.6	12.7				
	**WCS -1N**	●	M6X1.0	21.0	15.7	-	15.0	3.0	-	
	**WCS -8**	●	M6X1.0	21.0	19.4	-	15.0	3.0	-	

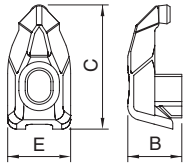
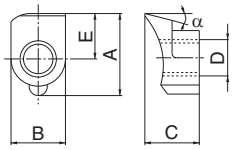
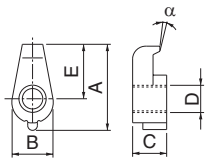
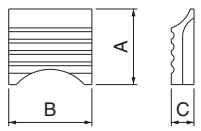
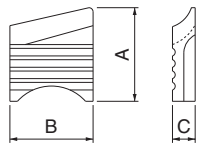
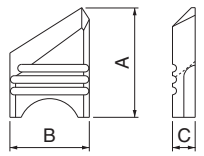
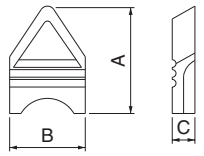
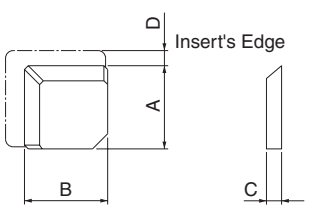
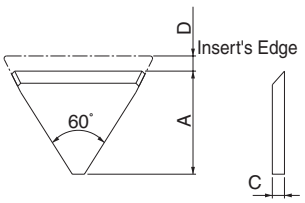
●:Std. Item

Clamps

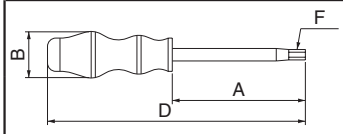
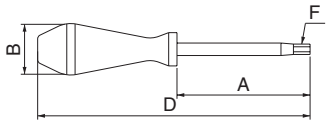
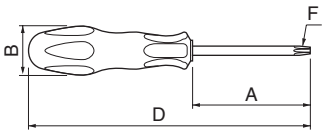
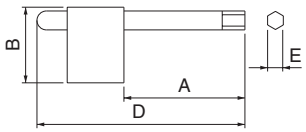
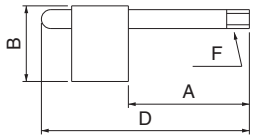
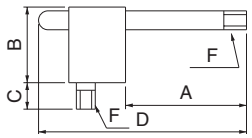
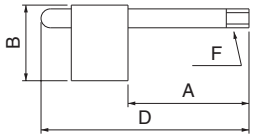
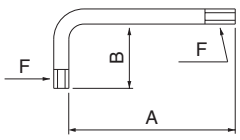
Shape Handed Spare Parts show Right-hand	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**C**	**09N**	●	6.0	9.0	9.8	5.3	M6X1.0 (Left-hand Thread)	-	10°	-	Clamp Screw: W6X18N
	**C**	**17R**	●	12.2	20.0	14.3	8.5	M8X1.25 (Left-hand Thread)	-	12°	-	Clamp Screw: W8X18
	**C**	**20R**	●	15.1	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw: TH8X15
	CH	**-20R**	●	13.1	15.5	14.8	7.5	5.3	-	10°	-	Clamp Screw: TH8X15
	**C**	**25R**	●	13.2	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw: TH8X15
	**CE**	**-111**	●	35.0	25.0	10.0	8.0	3.0	10.0	-	-	Right-hand
		-121	●									Left-hand
		-131	●					4.5		-	-	Right-hand
		-141	●									Left-hand
	**CGA**	**-3R/L**	●	24.0	17.66	12.0	6.2	1.9	11.0	-	-	R...shows Right-hand L...shows Left-hand
		-4R/L	●	24.0	17.66	12.0	6.2	2.9	11.0	-	-	
		-5R/L	●	27.5	18.66	12.0	6.2	3.9	14.5	-	-	
	**CGB**	**R/L**	●	19.0	14.0	8.2	6.35	9.5	-	-	-	R...shows Right-hand L...shows Left-hand
	**CGH**	**-1R/L**	●	25.0	22.0	8.0	6.05	3.0	5.5	-	-	R...shows Right-hand L...shows Left-hand
		-2R/L	●					5.0				
		-3R/L	●	30.0	23.0	8.5		6.0	7.0			
	**CGIA**	**-3R**	●	10.7	17.0	10.5	5.2	1.8	2.0	-	-	
		-4R	●			11.5		2.5				
		-5R	●	15.7		10.5		3.5	7.0			

●:Std. Item

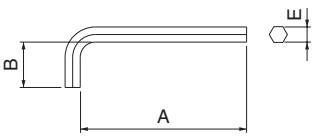
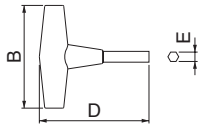
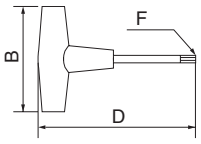
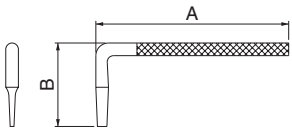
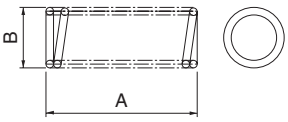
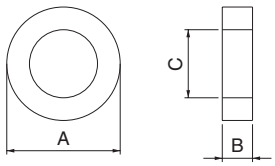
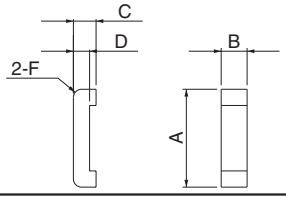
Clamps / Chipbreakers

Shape (Handed Spare Parts show Right-hand)	Description		Std.	Dimension (mm) A	B	C	D	E	F	Angle α	θ	Remarks
	CP	-2D	●	-	10.0	21.6	-	10.4	-	-	-	
		-3D	●		12.0	27.6		14.0				
		-5D	●		13.0	32.0						
	CP	-8TE	●	17.9	12.0	12.0	M8X1.25 (Left-hand Thread)	10.0	-	15°	-	
	CP	-8W	●	20.9	12.0	8.0	M8X1.25 (Left-hand Thread)	13.0	-	3°	-	
	CB	-11	●	11.5	12.7	3.5	-	-	-	-	-	
		-51	●	16.0	15.6	3.5	-	-	-	-	-	
	CB	-12	●	14.0	12.7	3.5	-	-	-	-	-	Right-hand
		-13	●	14.0	12.7	3.5	-	-	-	-	-	Left-hand
	CB	-14	●	18.51	12.7	3.5	-	-	-	-	-	Right-hand
		-15	●	18.51	12.7	3.5	-	-	-	-	-	Left-hand
	CB	-16	●	18.0	12.7	3.5	-	-	-	-	-	
		-17	●	21.0	15.6	3.5	-	-	-	-	-	
	CB	-S3220	●	7.94	7.94	1.0	2.0	-	-	-	-	
		-S4220	●	11.12	11.12	2.0	2.0	-	-	-	-	
	CB	-T2212	●	7.48	-	1.5	1.2	-	-	-	-	
		-T3220	●	10.87	-	2.0	2.0	-	-	-	-	

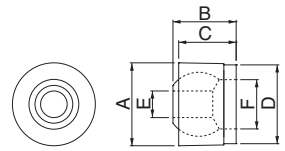
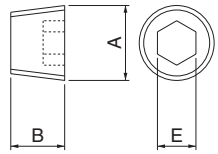
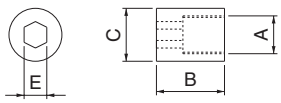
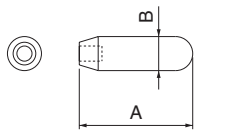
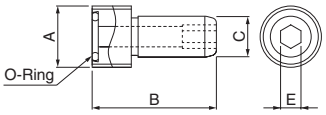
●:Std. Item

Shape	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**DT**	**-7**	●	44	16	-	114	-	T7	-	-	Torx
		-8	●	70	26		150		T8			
	**DT**	**-10**	●	70	29	-	160	-	T10	-	-	Torx
		-15	●	70	32		170		T15			
		-20	●	90	32		190		T20			
		-25	●	82	36		190		T25			
	**DTM**	**-6**	●	40	17	-	115	-	T6	-	-	Torx Top of wrench is magnetized
		-7	●	44	17		119		T7			
		-8	●	70	24		150		T8			
		-10	●	70	28		167		T10			
		-15	●	70	31		174		T15			
	DTP	**-9**	●	61	30	-	174	-	9IP	-	-	○○IP shows Torx Plus
		-15	●	81	33		186		15IP			
		-20	●	100			206		20IP			
	DTPM	**-8**	●	70	24	-	150	-	8IP	-	-	○○IP shows Torx Plus Top of wrench is magnetized
		-10	●	70	28		165		10IP			
		-15	●	70	31		174		15IP			
	**FH**	**-2**	●	40	20	-	71	2.0	-	-	-	Hexagon
		-2.5	●	45	20		76	2.5				
	**FT**	**-6**	●	35	15	-	65	-	T6	-	-	Torx
		-7	●	34	15		62		T7			
		-8	●	40	20		74		T8			
		-10	●	40	20		74		T10			
	**FT**	**-15**	●	45	25	10	80	-	T15	-	-	Torx
	**FTP**	**-5**	●	34	15	-	62	-	5IP	-	-	○IP shows Torx Plus
		-6	●						6IP			
		-7	●						7IP			
	LTP	**-10**	●	51	17	-	-	-	10IP	-	-	○○IP shows Torx Plus
		-15	●	54	18				15IP			
	**LTW**	**-8SS**	●	43	6	-	-	-	T8	-	-	Torx
		-10S	●	62	10				T10			
		-10SS	●	47	7				T10			
		-15S	●	62	10				T15			
		-20	●	58	19				T20			
		-25	●	65	20				T25			

●:Std. Item

Shape	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**LW**	**-1.5**	●	45	14	-	-	1.5	-	-	-	Hexagon
		-2	●	50	16			2.0				
		-2.5	●	56	18			2.5				
		-3	●	63	20			3.0				
		-4	●	70	25			4.0				
		-4.5	●	78	26			4.5				
		-5	●	80	28			5.0				
		-6	●	90	32			6.0				
		-8	●	109	36			8.0				
		-10	●	112	40			10.0				
		-14	●	140	56			14.0				
		-17	●	160	63			17.0				
		-19	●	180	70			19.0				
	**TH**	**-4**	●	-	80	-	83	4.0	-	-	-	Hexagon
	**TT**	**-15**	●	-	70	-	118	-	T15	-	-	Torx
		-25	●		70		69		T25			
		-25L	●		80		145		T25			
		-30	●		80		110		T30			
	TTC	**-20**	●	-	98	-	130	-	T20	-	-	
		-25	●						T25			
	TTP	**-20**	●	-	70	-	138	-	20IP	-	-	○○IP shows Torx Plus
	**LTK**	**-5**	●	70	30	-	-	-	-	-	-	
	**SP**	**-2D**	●	8.5	5.6	-	-	-	-	-	-	Spring
		-3D	●	12.0	7.0							
		-5	●	12.0	6.7							
		-5D	●	12.0	7.2							
		-6	●	12.0	7.7							
		-8	●	11.0	9.7							
	**W**	**-6**	●	11.5	1.6	6.4	-	-	-	-	-	Washer
		6-14	●	11.5	1.4	6.4						
		-8	●	15.5	1.6	8.4						
	WB	**-5**	●	10.0	1.0	5.3	-	-	-	-	-	Washer (Brass)
		-6	●	11.5	1.6	6.4						
		-8	●	15.5	1.6	8.4						
	**WSP**	**-1**	●	15.1	4.0	3.5	2.5	-	R1.25	-	-	Spacer

●:Std. Item

Shape	Description		Std.	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**DN**	**10**	●	6.2	5.1	4.5	5.7	2.6	4.0	-	-	Nozzle
		20	●	10.1	7.7	7.0	9.6	M4X0.7	6.0			
	**GP**	**-1**	●	PT1/8	7.0	-	-	5.0	-	-	-	Plug
		-2	●	PT1/4	9.0	-	-	6.0	-	-	-	
	**WN**	**-1**	●	M5X8	10.0	7.0	-	3.0	-	-	-	Nut
	**PC**	**-1**	●	60.0	8.5	-	-	-	-	-	-	Punch
		-2	●	62.2	10.0	-	-	-	-	-	-	
	**CL**	**63-1**	●	M18X1.0	36.5	12	-	6.0	-	-	-	Coolant Pipe
		100-1	●	M24X1.5	44.0	16.0		8.0				

●:Std. Item

Former Parts List

Toolholders for Ceramic Tools

Description	Spare Parts				
	Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CCLNR 2525M -16	CB-17	CE-220	LW-4	SP-454	M4X10
CS-N$^{R}/_{L}$ ..... -12	CB-11	CE-020	LW-4	SP-141 *(SP-143)	M3x8 *(M3X12)

* Shim & Shim Screw : When using SN□□1204 Insert, purchase spare parts in ( ) separately.

Toolholders for Solid CBN Tools

Description	Spare Parts			
	Clamp Set	Wrench	Shim	Shim Screw
CCLN$^{R}/_{L}$ ..... -09A	CE-030A	LW-4	SP-429	HH3X12
CTUN$^{R}/_{L}$ ..... -11A	CE-030A	LW-4	SP-219	HH3X12

Toolholders for Bearing Machining

Description	Spare Parts					
	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PRGC$^{R}/_{L}$ ..... -12BE	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
..... -16BE	LL-2C	LS-1T	LR-16C	LSP-2	PC-2	FH-2.5
PRGC$^{R}/_{L}$ ..... -12BF	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
..... -16BF	LL-2C	LS-1T	LR-16C	LSP-2	PC-2	FH-2.5

Toolholders for Back Turning

Description	Spare Parts			
	Anchor Pin	Lock Screw	Clamp Screw	Wrench
AABSR 0810K -40F	LPA-11	HSB4X8R	-	FH-2
1010·· -40F				
1212·· -40F	LPA-13			
1616·· -40F	LPA-17			
SABSR ..... -40F	-	-	SB-3080TR	FT-10
AABWR 0810K -40F	LPA-11	HSB4X8R	-	FH-2
1010·· -40F				
1212·· -40F	LPA-13			
1616·· -40F	LPA-17			
SABWR ..... -40F	-	-	SB-3080TR	FT-10
AABWR 0810K -50F	LPA-11	HSB4X8R	-	FH-2
1010·· -50F				
1212·· -50F	LPA-13			
1616·· -50F	LPA-17			
SABWR ..... -50F	-	-	SB-3080TR	FT-10

KTKF

Description	Spare Parts	
	Clamp Screw	Wrench
KTKF$^{R}/_{L}$ ..... -12	SB-4590TRWN	LTW-10S
..... -16		

External Toolholders (Back Clamp)

Description			Spare Parts		
			Anchor Pin	Lock Screw	Wrench
ACLC R/L	0810K	-06F	LPF-11	HSB4X8 R/L	FH-2
	1010K	-06F			
	1010K	-09F	LPF-13		
	1212M	-09F			
	1616M	-09F	LPF-17		
ADJC R/L	0810K	-07F	LPF-11	HSB4X8 R/L	FH-2
	1010K	-07F			
	1010K	-11F	LPF-13		
	1212M	-11F			
	1616M	-11F	LPF-17		
ADNCR	0810K	-07F	LPF-11	HSB4X8R	FH-2
	1010K	-07F			
	1010K	-11F	LPF-13		
	1212M	-11F			
	1616M	-11F	LPF-17		
AVJB R/L	1010K	-11F	LPF-11	HSB4X8 R/L	FH-2
	1212M	-11F	LPF-1113		
	1616M	-11F	LPF-1117		
AVVBR	1010K	-11F	LPF-11	HSB4X8R	FH-2
	1212M	-11F	LPF-1113		
	1616M	-11F	LPF-1117		

* Lock Screw: HSB4X8R for R-hand Toolholder, HSB4X8L for L-hand Toolholder.

External Toolholders (Screw Clamp)

Description			Spare Parts	
			Clamp Screw	Wrench
SCLC R/L	.....	-06	SB-2570TR	FT-8
	.....	-09	SB-4085TR	FT-15
	.....	-12	SB-5090TR	LTW-20
SCAC R/L	.....	-06	SB-2570TR	FT-8
	.....	-09	SB-4085TR	FT-15
	1212F	-09FF		
SDJC R/L	.....	-07F	SB-2570TR	FT-8
	.....	-11F	SB-4085TR	FT-15
SDLC R/L	.....	-07FF	SB-2570TR	FT-8
	.....	-11FF	SB-4085TR	FT-15
SDXC R/L	.....	-07	SB-2570TR	FT-8
	.....	-11	SB-4085TR	FT-15
SDNC R/L	.....	-07F	SB-2570TR	FT-8
	.....	-11F	SB-4085TR	FT-15
SDNCN	.....	-07	SB-2570TR	FT-8
	.....	-11	SB-4085TR	FT-15
SDLP R/L	.....	-07F	SB-2570TR	FT-8
	.....	-11F	SB-4085TR	FT-15
STGP R/L	.....	-08	SB-2050TR	FT-6
	.....	-11	SB-3080TR	FT-10
SVJB R/L	.....	-11F	SB-2570TR	FT-8
SVLP R/L	.....	-08FF	SB-2050TR	FT-6
	.....	-11FF	SB-2570TR	FT-8
	.....	-11F		
SVPP R/L	.....	-08FF	SB-2050TR	FT-6
	.....	-11FF	SB-2570TR	FT-8
	.....	-11		
SYXP R/L	.....	-06F	SB-2050TR	FT-6

Former Parts List

External Toolholders (Screw Clamp)

Description	Spare Parts				
	Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVPBR/L ..... **-11**	SB-2570TR	FT-8	-	-	-
..... **-16N**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
SVVBN ..... **-11**	SB-2570TR	FT-8	-	-	-
..... **-16N**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4

External Toolholders (Top Clamp)

Description	Spare Parts				
	Clamp Set	Wrench	Shim	Shim Screw	Chipbreaker
CSBPR/L **1212F -09N**	CPS-2P	LW-2.5	-	-	CB-S3220
CTTPR/L ..... **-11N**	CPS-2P	LW-2.5	-	-	CB-T2212
..... **-16N**	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220

Twin-Bars

Description	Spare Parts	
	Clamp Screw	Wrench
STWR/L ..... **-15**	SB-3080TR	LTW-10S
STWSR ..... **-15T**	SB-3080TR	LTW-10S

System Tip-Bars

Description	Spare Parts			
	Clamp Screw	Wrench	Screw (Side Stopper)	Wrench
SVNR 1010H -12	SB-3080TR	FT-10	HS3X4	LW-1.5
1212K -12				
1616K -12			HS3X8	
2020K -12			HS3X12	
2525M -12			HS3X16	
SVNSR ..... **-12-..**	SB-3080TR	LTW-10S	HS3X4	LW-1.5
S12F- SVNR 12	SB-3080TR	FT-10	HS3X4	LW-1.5
S14G- SVNR 12				
S16H- SVNR 12			HS3X8	
S19H- SVNR 12				
S19N- SVNR 12				
S20H- SVNR 12				
S25H- SVNR 12			HS3X12	
S25Q- SVNR 12				
S.... **SVNR 12S**	SB-3080TR	FT-10	HS3X4	LW-1.5

System Tip-Bars (S...SVN-XN)

Description	Spare Parts		
	Clamp Screw	Wrench	Clamp Screw
S...- **SVNR 12XN**	SB-3080TR	FT-10	SP3X4

PSH Sleeve

Description	Spare Parts	
	Clamp Screw	Wrench
PSH 02.. -..	HS3×4P	LW-1.5
03.. -..		
PSH 04.. -..	HS4×4P	LW-2
05.. -..		
06.. -..		
07.. -..		

Boring Bars (Screw Clamp)

Description		Spare Parts	
		Clamp Screw	Wrench
S10H-	SCLC[R/L]03--E	SB-1635TR	FT-6
S10J-	SCLC[R/L]04--E	SB-2040TR	
S08X-	SCLC[R/L]06-10E	SB-2545TR	FT-8
S08X-	SCLC[R/L]06-10	SB-2545TR	FT-8
C----	SCLC[R/L]03--	SB-1635TR	FT-6
C----	SCLC[R/L]04--	SB-2040TR	
C08L-	SCLC[R/L]06-10	SB-2545TR	FT-8
A08H-	SCLC[R/L]06-10E	SB-2545TR	FT-8
E08L-	SCLC[R/L]06-10	SB-2545TR	FT-8
S--M-	SCLP[R/L]08--E	SB-3STR	FT-10
S----	SCLP[R/L]09--E	SB-4TR	FT-15
S--M-	SCLP[R/L]08--	SB-3STR	FT-10
S----	SCLP[R/L]09--	SB-4TR	FT-15
C10N-	SCLP[R/L]08--	SB-3STR	FT-10
C----	SCLP[R/L]09--	SB-4TR	FT-15
A--X-	SCLP[R/L]08--E	SB-3STR	FT-10
A----	SCLP[R/L]09--E	SB-4TR	FT-15
E10N-	SCLP[R/L]08-12	SB-3STR	FT-10
E----	SCLP[R/L]09--	SB-4TR	FT-15
S----	SDUC[R/L]07--E	SB-2560TR	FT-8
S----	SDUC[R/L]11--E	SB-4085TR	FT-15
S----	SDUC[R/L]07--	SB-2560TR	FT-8
S----	SDUC[R/L]11--	SB-4085TR	FT-15
C----	SDUC[R/L]07--	SB-2560TR	FT-8
C----	SDUC[R/L]11--	SB-4085TR	FT-15
S----	SDZC[R/L]07--E	SB-2560TR	FT-8
S----	SDZC[R/L]11--E	SB-4085TR	FT-15
S----	SDZC[R/L]07--	SB-2560TR	FT-8
S----	SDZC[R/L]11--	SB-4085TR	FT-15
S06H-	STUB[R/L]06-08E	SB-1STR	FT-6
S08K-	STUP[R/L]08-10E	SB-1TR	
S--M-	STUP[R/L]09--E	SB-2TR	FT-8
S----	STUP[R/L]11--E	SB-3TR	FT-10
S--X-	STUP[R/L]16--E	SB-4TR	FT-15
S06H-	STUB[R/L]06-08	SB-1STR	FT-6
S08K-	STUP[R/L]08-10	SB-1TR	
S--M-	STUP[R/L]09--	SB-2TR	FT-8
S----	STUP[R/L]11--	SB-3TR	FT-10
S25X-	STUP[R/L]16-32	SB-4TR	FT-15
C10L-	STUB[R/L]06-08	SB-1STR	FT-6
C08L-	STUP[R/L]08-10	SB-1TR	
C----	STUP[R/L]09--	SB-2TR	FT-8
C----	STUP[R/L]11--	SB-3TR	FT-10
C20S-	STUP[R/L]16--	SB-4TR	FT-15
A08H-	STUP[R/L]08-10E	SB-1TR	FT-6
A--X-	STUP[R/L]09--E	SB-2TR	FT-8
A----	STUP[R/L]11--E	SB-3TR	FT-10
A----	STUP[R/L]16--E	SB-4TR	FT-15
E08L-	STUP[R/L]08-10	SB-1TR	FT-6
E----	STUP[R/L]09--	SB-2TR	FT-8
E----	STUP[R/L]11--	SB-3TR	FT-10
E20S-	STUP[R/L]16-25	SB-4TR	FT-15

Former Parts List

Boring Bars (Screw Clamp)

Description		Spare Parts	
		Clamp Screw	Wrench
S···-	SWUB$^{R}_{L}$08-··E	SB-2050TR	FT-6
S12M-	SWUP$^{R}_{L}$11-14E	SB-2545TR	FT-8
S···-	SWUP$^{R}_{L}$11-··E	SB-2560TR	
S···-	SWUP$^{R}_{L}$16-··E	SB-4065TR	FT-15
S···-	SWUB$^{R}_{L}$06-··	SB-2040TR	FT-6
S10J-	SWUB$^{R}_{L}$08-··	SB-2035TR	
C···-	SWUB$^{R}_{L}$06-··	SB-2040TR	FT-6
C07K-	SWUB$^{R}_{L}$08-08	SB-2035TR	
C08L-	SWUB$^{R}_{L}$08-10	SB-2050TR	
C10N-	SWUB$^{R}_{L}$08-··		
C12Q-	SWUP$^{R}_{L}$11-14(-·/·)	SB-2545TR	FT-8
C12Q-	SWUP$^{R}_{L}$11-16(-·/·)	SB-2560TR	
C16X-	SWUP$^{R}_{L}$11-18(-·/·)		
C···-	SWUP$^{R}_{L}$16-··	SB-4065TR	FT-15
S16Q-	SSKPR09-20	SB-4TR	FT-15
S20R-	SSKPR09-25		
S25X-	SSKPR12-32	GS-50S	LW-3
S32S-	SSKPR12-40	GS-50	
S12M-	SYXP$^{R}_{L}$06-12E	SB-2040TR	FT-6
S16Q-	SYXP$^{R}_{L}$06-16E	SB-2045TR	

Boring Bars (Screw Clamp)

Description		Spare Parts				
		Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)
S12M-	SVJP$^{R}_{L}$08-16E	SB-2050TR	FT-6	-	-	-
S···-	SVJC$^{R}_{L}$08-··E					
S···-	SVJB$^{R}_{L}$11-··E	SB-2570TR	FT-8			
S···-	SVJB$^{R}_{L}$16-··EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S32S-	SVJB$^{R}_{L}$16-40E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S40T-	SVJB$^{R}_{L}$16-50E					
S10M-	SVPC$^{R}_{L}$08-16E	SB-2050TR	FT-6	-	-	-
S···-	SVPB$^{R}_{L}$11-··E	SB-2570TR	FT-8			
S···-	SVPB$^{R}_{L}$16-··EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S25X-	SVPB$^{R}_{L}$16-34E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S32S-	SVPB$^{R}_{L}$16-40E					
S12M-	SVUC$^{R}_{L}$08-16E	SB-2050TR	FT-6	-	-	-
S···-	SVUB$^{R}_{L}$11-··E	SB-2570TR	FT-8			
S···-	SVUB$^{R}_{L}$16-··EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S25X-	SVUB$^{R}_{L}$16-34E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S32S-	SVUB$^{R}_{L}$16-40E					
S12M-	SVZC$^{R}_{L}$08-16E	SB-2050TR	FT-6	-	-	-
S···-	SVZB$^{R}_{L}$11-··E	SB-2570TR	FT-8			
S···-	SVZB$^{R}_{L}$16-··EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S25X-	SVZB$^{R}_{L}$16-34E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S32S-	SVZB$^{R}_{L}$16-40E					

Boring Bars (Top Clamp)

Description		Spare Parts				
		Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
S12L-	CTUP$^{R}_{L}$09-16	-	CPS-1	FH-2	-	-
S···-	CTUP$^{R}_{L}$11-··	-	CPS-2	FH-2.5	-	-
S25X-	CTUP$^{R}_{L}$16-34	-	CPS-3	LW-3	-	-
S32S-	CTUP$^{R}_{L}$16-43				KPT-32	SP3X10
S40X-	CTUP$^{R}_{L}$16-50					
S32S-	CTUC$^{R}_{L}$16-40	*CB-13/12	CE-320	LW-4	SP-230P	SP3X10
S···-	CCLN$^{R}_{L}$09-··A	-	CE-360S	LW-4	SP-420A	BH3X6
S···-	CSKN$^{R}_{L}$09-··A	-	CE-360S	LW-4	SP-130A	BH3X12

* CB-13 for Right-hand Toolholder, CB-12 for Left-hand Toolholder.

KTGF-F

Description	Spare Parts	
	Clamp Screw	Wrench
KTGF$^{R}_{L}$ ..... -16F	SB-4070TRW	FT-8

KN91

Description	Spare Parts				
	Clamp	Clamp Bolt	Washer	Spring	Wrench
KN91$^{R}_{L}$ 44 -4	*CE-111/121	BH8X30	W-8	SP-8	LW-5
44 -5					
44 -7	*CE-131/141				

*KN91$^{R}_{L}$44-4/5... CE-111 for Right-hand Toolholder, and CE-121 for Left-hand Toolholder.
KN91$^{R}_{L}$44-7.. CE-131 for Right-hand Toolholder, and CE-141 for Left-hand Toolholder.

KGHS

Description	Spare Parts				
	Clamp	Clamp Bolt	Washer	Spring	Wrench
KGHS$^{R}_{L}$ ..... -4	CGH-1$^{L}_{R}$	HH6X25	W-6	SP-6	LW-5
..... -5					
..... -7	CGH-2$^{L}_{R}$				

·Clamp: KGHS$^{R}_{L}$ ... CGH-OL for Right-hand Toolholder, and CGH-OR for Left-hand Toolholder.

KGM (For automatic lathe)

Description	Spare Parts	
	Clamp Screw	Wrench
KGM$^{R}_{L}$ 0810K -···	SE-40120TR	LTW-15S
1010·· -···		
1212·· -1.5-···		
1212·· -2-···		
1212·· -2.5-···		
1616·· -2-···	SE-50125TR	LTW-20
1616·· -2.5-···		
1616·· -3-···		

GFVS-AA / GFVT-AA

Description	Spare Parts	
	Clamp Set	Wrench
GFVS$^{R}_{L}$ ..... -08AA	CPS-5V	FT-15
GFVT$^{R}_{L}$ ..... -08AA	CPS-5V	FT-15

KTKH-S

Description	Spare Parts
	Releasing Wrench
KTKH$^{R}_{L}$ ..... -···S	LTK-5

KTKH-B

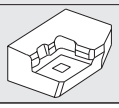
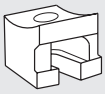
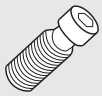
Description	Spare Parts	
	Clamp Screw	Wrench
KTKH$^{R}_{L}$ 0808K -···B	SE-40120TR	FT-15
1010K -···B		
1212M -···B		
1414M -···B		
1616M -···B	SE-50125TR	LTW-20

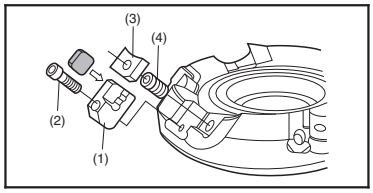
KTTX

Description	Spare Parts	
	Clamp Screw	Wrench
KTTXR ..... -16F	SB-4070TRW	FT-8

Former Parts List

MSD45 (Face Mill)

Description	(1) Cartridge	(2) Clamp Bolt	(3) Clamp	(4) Clamp Screw	Wrench
					
MSD 45···R	LSD-445R	HH4X16	C20R	TH8X15	TH-4

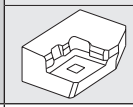
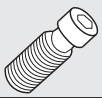


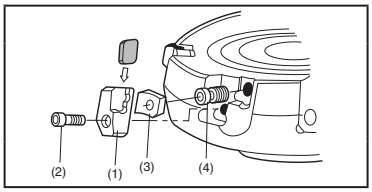
·Mounting bolt (HH12X35) is included for MSD4580R.

MSO45-09 (Face Mill)

Description	Spare Parts	
	Clamp Screw	Wrench
MSO 45···R-09	SB-3060TR	DT-10

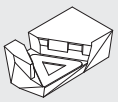
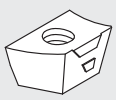
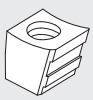
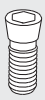
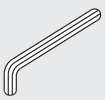
MSP15 (Face Mill)

Description	(1) Cartridge	(2) Clamp Bolt	(3) Clamp	(4) Clamp Screw	Wrench
					
MSP 15···R	LSP-415R	HH4X16	C25R	TH8X15	TH-4

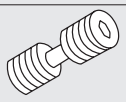


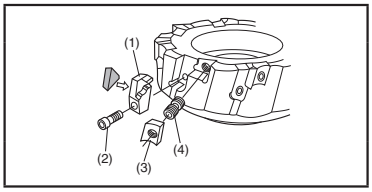
·Mounting bolt (HH12X35) is included in MSP1580R.

MTE90-SF

Description	Spare Parts						
	Cartridge	Clamp	Clamp	Clamp Screw	Adjustment Screw	Wrench	Wrench
							
MTE 90···-SF	LTE-490SR	C91R (for Insert)	C92R (for Cartridge)	W8X16	SV-60136R	TTC-25	LW-4 (for adjustment crew)

MTE90 (Face Mill)

Description	(1) Cartridge	(2) Clamp Bolt	(3) Clamp	(4) Clamp Screw	Wrench
					
MTE 90···R	LTE-490R	HH4X16	C17R	W8X18	TH-4



MSO90-09 (Face Mill)

Description	Spare Parts	
	Clamp Screw	Wrench
MSO 90···R-09	SB-3080TR	DT-10

MEA / MEB

Description	Spare Parts	
	Clamp Screw	Wrench
MEA .. -S..(-···)	SB-2560TR	DT-8
MEB .. -S..	SB-4085TR	DT-15

MRP (Face Mill)

Description		Spare Parts	
		Clamp Screw	Wrench
MRP	···R -10-·T	SB-3080TR	DT-10
MRP	050R -12	SB-40115TR	DT-15
	063R -12		
	080R -12	SB-4085TR	
	080R -12-7T		
MRP	···R -16(··T)	SB-50120TR	DT-20
MRP	···R -20	SB-60120TR	DT-25

MHD (Helical End Mill)

Description		Spare Parts				
		Clamp Screw	Wrench	Clamp Bolt		Wrench
				1 Front Piece	2 Front Pieces	
MHD	32-S32 -SA	SB-2560TR	DT-8	-	HH8X50	LW-6
	40-S32 -SA	SB-3080TR	DT-10		HH8X65	
	40-S42 -SA					
	50-S42 -SA				HH12X65	LW-10
MHD	40-S42 -SB	SB-3080TR	DT-10	HH8X40	-	LW-6
	50-S42 -SB			HH12X40		LW-10
MHD	20S-S20 -C	SB-2560TR	DT-8	-	-	-
	25-S25 -C					
	32-S32 -C					
	40-S42 -C	SB-3080TR	DT-10			
	50-S42 -C					
MHD	32-S32 -A	SB-2560TR	DT-8	HH8X35	HH8X50	LW-6
	40-S32 -A	SB-3080TR	DT-10	HH8X40	HH8X65	
	40-S42 -A					
	50-S42 -A			HH12X40	HH12X65	LW-10
MHD	32-S32 -A-130	SB-2560TR	DT-8	HH8X35	HH8X50	LW-6
	40-S32 -A-150	SB-3080TR	DT-10	HH8X40	HH8X65	
	50-S42 -A-150			HH12X40	HH12X65	LW-10
MHD	40-S42 -B	SB-3080TR	DT-10	HH8X40	-	LW-6
	50-S42 -B			HH12X40		LW-10
MHD	32 -F	SB-2560TR	DT-8	-	-	-
	40 -F	SB-3080TR	DT-10			
	50 -F					

Former Parts List

MHD (Face Mill and Integral Arbor type)

Description			Spare Parts			
			Clamp Screw	Wrench	Clamp Bolt	Wrench
MHD	63-FMA	-SA	SB-3080TR	DT-10	HH16X90	LW-14
	80-FMA	-SA			HH20X110	LW-17
	100-FMA	-SA			HH24X110	LW-19
MHD	63-FMA	-A			HH16X90	LW-14
	80-FMA	-A			HH20X110	LW-17
	100-FMA	-A			HH24X110	LW-19
MHD	63-BT50	-SA			HH16X65	LW-14
	80-BT50	-SA			HH20X90	LW-17
	100-BT50	-SA			HH24X90	LW-19
MHD	63-BT50	-A			HH16X65	LW-14
	80-BT50	-A			HH20X90	LW-17
	100-BT50	-A			HH24X90	LW-19
MHD	63	-F			-	-
	80	-F				
	100	-F				

MHD (Radius)

Description			Spare Parts						
			Clamp Screw		Wrench		Clamp Bolt		Wrench
			For Bottom Insert	For Middle Insert	For Bottom Insert	For Middle Insert	1 Front Piece	2 Front Pieces	
MHD	32-S32	-4RSA	SB-2560TR	SB-2560TR	DT-8	DT-8	-	HH8X50	LW-6
	40-S32	-5RSA	SB-3080TR	SB-3080TR	DT-10	DT-10		HH8X55	
	40-S42	-5RSA							
	50-S42	-6RSA	SB-4085TR		DT-15			HH12X55	LW-10
MHD	32-S32	-A	SB-2560TR		DT-8		-	HH8X50	LW-6
	40-S32	-A	SB-3080TR		DT-10			HH8X65	
	40-S42	-A							
	50-S42	-A						HH12X65	LW-10
MHD	32	-F	SB-2560TR		DT-8		-	-	-
	40	-F	SB-3080TR		DT-10				
	50	-F							
MHD	32	-4RF	SB-2560TR	SB-2560TR	DT-8	DT-8	-	-	-
	40	-5RF	SB-3080TR	SB-3080TR	DT-10	DT-10			
	50	-6RF	SB-4085TR		DT-15				

MVG

Description		Spare Parts	
		Clamp Set	Wrench
MVG	....	CPS-6V	LW-3

Blank Tool

Description		Spare Parts
		Coolant Pipe
T63H-	BL...-...	CL63-1

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R

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SI Derived Units Conversion Chart

(Bold lined units are the ones by SI Derived Unit.)

(Extracted from JIS Handbook "Iron & Steel")

●Force

N	kgf	dyn
1	$1.019\ 72\times10^{-1}$	1×10^{5}
9.806 65	1	$9.806\ 65\times10^{5}$
1×10^{-5}	$1.019\ 72\times10^{-6}$	1

●Stress

$1Pa=1N/m^2$, $1MPa=1N/mm^2$

Pa or **N/m²**	**MPa** or **N/mm²**	kgf/mm²	kgf/cm²	kgf/m²
1	1×10^{-6}	$1.019\ 72\times10^{-7}$	$1.019\ 72\times10^{-5}$	$1.019\ 72\times10^{-1}$
1×10^{6}	1	$1.019\ 72\times10^{-1}$	$1.019\ 72\times10$	$1.019\ 72\times10^{5}$
$9.806\ 65\times10^{6}$	9.806 65	1	1×10^{2}	1×10^{6}
$9.806\ 65\times10^{4}$	$9.806\ 65\times10^{-2}$	1×10^{-2}	1	1×10^{4}
9.806 65	$9.806\ 65\times10^{-6}$	1×10^{-6}	1×10^{-4}	1

●Pressure

$1Pa=1N/m^2$

Pa	**kPa**	**MPa**	bar	kgf/cm²
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	$1.019\ 72\times10^{-5}$
1×10^{3}	1	1×10^{-3}	1×10^{-2}	$1.019\ 72\times10^{-2}$
1×10^{6}	1×10^{3}	1	1×10	$1.019\ 72\times10$
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.019 72
$9.806\ 65\times10^{4}$	$9.806\ 65\times10$	$9.806\ 65\times10^{-2}$	$9.806\ 65\times10^{-1}$	1

Cutting Symbol

● Cutting conditions below are indicated by the new symbols listed in 2nd column.

1) Turning

Cutting Conditions	Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Rate	f	f	mm/rev
Depth of Cut	ap	d	mm
Edge Width	W	W	mm
Workpiece Dia.	Dm	D	mm
Required Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Theoretical Surface Roughness	h	Rz	μm
Corner Radius	rε	R	mm
Revolution	n	N	min^{-1}

Note: 'rε' is read as 'r epsilon'

2) Milling

Cutting Conditions	Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Speed	Vf	F	mm/min
Feed per tooth	fz	f	mm/t
Feed Rate	f	f	mm/rev
No. of Inserts	Z	Z	teeth
Depth of Cut	ap	d	mm
Width of Cut	ae	w	mm
Pick feed	Pf	Pf	mm
Required Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Chip Removal Volume	Q	Q	cm^3/min
Revolution	n	N	min^{-1}

3) Drilling

Cutting Conditions	Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Speed	Vf	F	mm/min
Feed Rate	f	f	mm/rev
Drill Dia.	Dc	D (Ds)	mm
Required Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Drilling Depth	H	d	mm
Revolution	n	N	min^{-1}

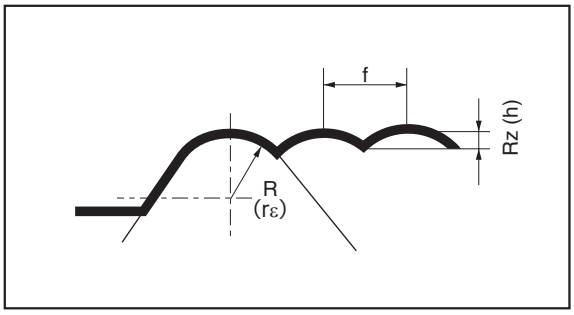
Surface Roughness (JIS B 0601-2001)

Theoretical (Geometrical) Surface Roughness

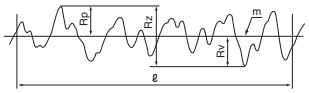
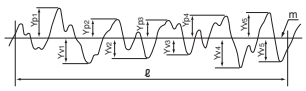
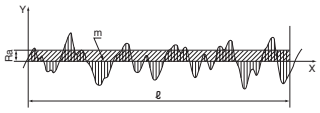
Theoretical surface roughness for turning indicates the minimum roughness value from the cutting conditions and it is shown by the formula as follows.

$$Rz(h)=\frac{f^2}{8R(r\varepsilon)}X10^3$$

Rz(h): Theoretical Surface Roughness [μm]
f: Feed Rate [mm/rev]
R(rε): Corner Radius of Insert [mm]



How to Obtain Surface Roughness Values

Type	Symbol	How to Obtain	Explanation
Max. Height Roughness	Rz	Rz is a mean value in micron meter obtained from the distance of the highest peaks and the lowest valleys within the range of sampled reference length ("ℓ") in the direction of the center line of the roughness curve. Note) When calculating Rz, extraordinarily high or low threads are considered as damages and excluded from the calculation, and only standard lengths are used. Rz=Rp+Rv	
Ten Points Mean Roughness	RzJIS	RzJIS is a mean value in micron meter obtained from the distance of 5 highest peaks (Yp) and the 5 lowest valleys (Yv) measured from the center line of the roughness curve within the range of sampled reference length "ℓ". $RzJIS=\frac{(Yp1+Yp2+Yp3+Yp4+Yp5)+(Yv1+Yv2+Yv3+Yv4+Yv5)}{5}$	 *Yp1, Yp2, Yp3, Yp4, Yp5*: Distance from the mean line to the highest 5 peaks in the range of sampled reference length "ℓ" *Yv1, Yv2, Yv3, Yv4, Yv5*: Distance from the mean line to the lowest 5 valleys in the range of sampled reference length "ℓ"
Arithmetical Mean Roughness	Ra	Ra is obtained from the following formula in micron meter, the roughness curve is expressed by y=f(x), the X-axis is in the direction of the center line and the Y-axis is the vertical magnification of the roughness curve in the range of sampled reference length "ℓ". $Ra=\frac{1}{\ell}\int_0^{\ell}\{f(x)\}dx$	

Relationship with Triangle Symbol

Arithmetical Mean Roughness Ra (μm)	Max. Height Roughness Rz (μm)	Ten Points Mean Roughness RzJIS (μm)	*(Triangle Symbol)
0.025 0.05 0.1 0.2	0.1 0.2 0.4 0.8	0.1 0.2 0.4 0.8	▽▽▽▽
0.4 0.8 1.6	1.6 3.2 6.3	1.6 3.2 6.3	▽▽▽
3.2 6.3	12.5 25	12.5 25	▽▽
12.5 25	50 100	50 100	▽

* Finishing symbol (Triangle ▽ and wave~) was removed from JIS standard in the 1994 Revision.

·How to Indicate
(1) When Ra is 1.6μm → 1.6μmRa
(2) When Rz is 6.3μm → 6.3μmRz
(3) When RzJIS is 6.3μm → 6.3μmRzJIS

Indication in JIS Standard

Example of Ra Indication		Example of Rz Indication	
(1) When indicating the upper limit only (when upper limit is 6.3μmRa)	6.3	(1) When indicating the upper limit only indicate surface roughness following the parameter symbol.	Rz6.3
(2) When indicating both lower and upper limit (when upper limit is 6.3μmRa, lower limit is 1.6μmRa)	6.3 1.6	(2) When indicating both lower and upper limit indicate surface roughness as (upper limit ~ lower limit) following the parameter symbol.	Rz6.3~1.6

Note: The indications of Ra and Rz are different.

Caution-Symbols for Surface Roughness

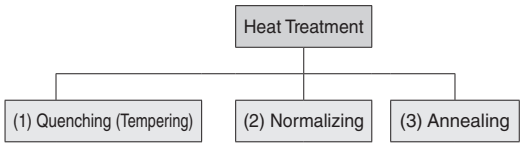
The above information is based on JIS B 0601-2001.
IHowever, some symbols were revised as shown in the right table in accordance with ISO Standard from JIS B 0601-2001 version.
Ten Points Mean Roughness (Rz) was eliminated from 2001 version but it still remains as RzJIS reference, since it was popular in Japan.

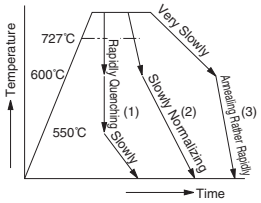
Type	Symbol of JIS B 0601-1994		Symbol of JIS B 0601-2001
Max. Height Roughness	Ry	→	Rz
Ten Points Mean Roughness	Rz	→	(RzJIS)
Arithmetical Mean Roughness	Ra	→	Ra

Heat Treatment and Hardness Expression

Heat Treatment

One of the ways to determine the hardness of steel is the heat treatment and it is classified to 3 types.



Heat Treatment Method		Detail	Effect
	·Quenching (Tempering)	After heating to over 727℃ , cool rapidly down to 550℃ in water or oil.	Quenching makes steel hard because it cools down red-hot steel very rapidly in water or oil, but it may promote internal stress. In order to remove such internal stress, tempering is used. (After cooled down once, reheat it to 200°C~600°C)
	·Normalizing	After heating to over 727℃ , cool down rapidly to 600℃ and then to normal temperature.	It miniaturizes the crystals. (Steel is also composed of small cells.) It is used to improve the mechanical character or machinability.
	·Annealing	After heating to over 727℃ , cool down very slowly to 600℃ , then to normal temperature.	It miniaturizes the crystals like the process of normalizing, but the crystal size is bigger than that of normalizing. It targets machinability improvement and distortion correction.

Hardness Expression

Hardness	Reference Standard	Example	Explanation of Example
Brinell Hardness	JIS Z 2243:1992	250HB	Hardness Value :250, Hardness Symbol : HB
		200~250HB	When the hardness has the range
Vickers Hardness	JIS Z 2244:1998	640HV	Hardness Value :640, Hardness Symbol : HV
Rockwell Hardness	JIS Z 2245:1992	60HRC	Hardness Value :60, Hardness Symbol : HRC
Shore Hardness	JIS Z 2246:1992	50HS	Hardness Value :50, Hardness Symbol : HS

Vickers Hardness Conversion Chart

Vickers Hardness (HV)	Brinell Hardness 10mm Dia. Ball Load: 3,000kgf (HB)		Rockwell Hardness [2]			Shore Hardness (HS)	Tensile Strength MPa[1]
	Standard Ball	Tungsten Carbide Ball	A Scale Load: 60kgf Diamond Point (HRA)	B Scale Load: 100kgf 1.6mm (1/16in) ball (HRB)	C Scale Load: 150kgf Diamond Point (HRC)		
940	–	–	85.6	–	68.0	97	
920	–	–	85.3	–	67.5	96	
900	–	–	85.0	–	67.0	95	
880	–	(767)	84.7	–	66.4	93	
860	–	(757)	84.4	–	65.9	92	
840	–	(745)	84.1	–	65.3	91	
820	–	(733)	83.8	–	64.7	90	
800	–	(722)	83.4	–	64.0	88	
780	–	(710)	83.0	–	63.3	87	
760	–	(698)	82.6	–	62.5	86	
740	–	(684)	82.2	–	61.8	84	
720	–	(670)	81.8	–	61.0	83	
700	–	(656)	81.3	–	60.1	81	
690	–	(647)	81.1	–	59.7	–	
680	–	(638)	80.8	–	59.2	80	
670	–	630	80.6	–	58.8	–	
660	–	620	80.3	–	58.3	79	
650	–	611	80.0	–	57.8	–	
640	–	601	79.8	–	57.3	77	
630	–	591	79.5	–	56.8	–	
620	–	582	79.2	–	56.3	75	
610	–	573	78.9	–	55.7	–	
600	–	564	78.6	–	55.2	74	
590	–	554	78.4	–	54.7	–	2055
580	–	545	78.0	–	54.1	72	2020
570	–	535	77.8	–	53.6	–	1985
560	–	525	77.4	–	53.0	71	1950
550	505	517	77.0	–	52.3	–	1905
540	496	507	76.7	–	51.7	69	1860
530	488	497	76.4	–	51.1	–	1825
520	480	488	76.1	–	50.5	67	1795
510	473	479	75.7	–	49.8	–	1750
500	465	471	75.3	–	49.1	66	1705
490	456	460	74.9	–	48.4	–	1660
480	448	452	74.5	–	47.7	64	1620
470	441	442	74.1	–	46.9	–	1570
460	433	433	73.6	–	46.1	62	1530
450	425	425	73.3	–	45.3	–	1495
440	415	415	72.8	–	44.5	59	1460
430	405	405	72.3	–	43.6	–	1410
420	397	397	71.8	–	42.7	57	1370
410	388	388	71.4	–	41.8	–	1330
400	379	379	70.8	–	40.8	55	1290
390	369	369	70.3	–	39.8	–	1240
380	360	360	69.8	(110.0)	38.8	52	1205
370	350	350	69.2	–	37.7	–	1170
360	341	341	68.7	(109.0)	36.6	50	1130
350	331	331	68.1	–	35.5	–	1095
340	322	322	67.6	(108.0)	34.4	47	1070
330	313	313	67.0	–	33.3	–	1035
320	303	303	66.4	(107.0)	32.2	45	1005
310	294	294	65.8	–	31.0	–	980
300	284	284	65.2	(105.5)	29.8	42	950
295	280	280	64.8	–	29.2	–	935
290	275	275	64.5	(104.5)	28.5	41	915
285	270	270	64.2	–	27.8	–	905
280	265	265	63.8	(103.5)	27.1	40	890
275	261	261	63.5	–	26.4	–	875
270	256	256	63.1	(102.0)	25.6	38	855
265	252	252	62.7	–	24.8	–	840
260	247	247	62.4	(101.0)	24.0	37	825
255	243	243	62.0	–	23.1	–	805
250	238	238	61.6	99.5	22.2	36	795
245	233	233	61.2	–	21.3	–	780
240	228	228	60.7	98.1	20.3	34	765
230	219	219	–	96.7	(18.0)	33	730
220	209	209	–	95.0	(15.7)	32	695
210	200	200	–	93.4	(13.4)	30	670
200	190	190	–	91.5	(11.0)	29	635
190	181	181	–	89.5	(8.5)	28	605
180	171	171	–	87.1	(6.0)	26	580
170	162	162	–	85.0	(3.0)	25	545
160	152	152	–	81.7	(0.0)	24	515
150	143	143	–	78.7	–	22	490
140	133	133	–	75.0	–	21	455
130	124	124	–	71.2	–	20	425
120	114	114	–	66.7	–	–	390
110	105	105	–	62.3	–	–	–
100	95	95	–	56.2	–	–	–
95	90	90	–	52.0	–	–	–
90	86	86	–	48.0	–	–	–
85	81	81	–	41.0	–	–	–

·Extracted from JIS Handbook Iron & Steel (SAE J 417)

Note 1) 1MPa = 1N/mm^2

2) Value in ( ) is not in practical use, but reference only.

Material List (JIS)

Ferrous Materials

Classification		Name of JIS Standard	Symbol
Structural Steel		Rolled Steel for Welded Structure	SM
		Re-Rolled Steel	SRB
		Rolled Steel for General Structure	SS
		Light Gauge Steel for General Structure	SSC
		Hot-Rolled Steel Plate, Sheet and Strip for Automobile Structural Use	SAPH
Steel Sheet		Cold-Rolled Steel Plate, Sheet and Strip	SPC
		Hot-Rolled Soft Steel Plate, Sheet and Strip	SPH
Steel Pipe		Carbon Steel Pipe for Ordinary Piping	SGP
		Carbon Steel Pipe for Boiler / Heat Exchanger	STB
		Seamless Steel Pipe for High Pressure Gas Cylinder	STH
		Carbon Steel Pipe for General Structural Use	STK
		Carbon Steel Pipe for Machine Structural Use	STKM
		Alloy Steel Pipe for Structural Use	STKS
		Stainless Steel Pipe for Machine Structural Use	SUS-TK
		Steel Square Pipe for General Structural Use	STKR
		Alloy Steel Pipe for Ordinary Piping	STPA
		Carbon Steel Pipe for Pressure Service	STPG
		Carbon Steel Pipe for High-Temperature Service	STPT
		Carbon Steel Pipe for High-Pressure Service	STS
		Stainless Steel Pipe for Ordinary Piping	SUS-TP
Machine Structural Steel		Carbon Steel for Machine Structural Use	SxxC,SxxCK
		Aluminium Chromium Molybdenum Steel	SACM
		Chromium Molybdenum Steel	SCM
		Chromium Steel	SCr
		Nickel Chromium Steel	SNC
		Nickel Chromium Molybdenum Steel	SNCM
		Manganese Steel and Manganese Chromium Steel for Machine Structural Use	SMn,SMnC
Special Steel	Tool Steel	Carbon Tool Steel	SK
		Hollow Drill Steel	SKC
		Alloy Tool Steel	SKS,SKD,SKT
		High Speed Tool Steel	SKH
	Special Steel	Free Cutting Carbon Steel	SUM
		High Carbon Chromium Bearing Steel	SUJ
		Spring Steel	SUP
	Stainless Steel	Stainless Steel Bar	SUS-B
		Hot-Rolled Stainless Steel Plate, Sheet and Strip	SUS-HP,SUS-HS
		Cold-Rolled Stainless Steel Plate, Sheet and Strip	SUS-CP,SUS-CS
	Heat-Resisting Steel	Heat-Resisting Steel Bar	SUH-B,SUH-CB
		Heat-Resisting Steel Plate and Sheet	SUH-HP,SUH-CP
	Superalloy	Corrosion-Resisting and Heat-Resisting Superalloy Bar	NCF-B
		Corrosion-Resisting and Heat-Resisting Superalloy Plate and Sheet	NCF-P
Forged Steel		Carbon Steel Forging	SF
		Chromium Molybdenum Steel Forging	SFCM
		Nickel Chromium Molybdenum Steel Forging	SFNCM
Cast Iron		Gray Cast Iron	FC
		Spheroidal Graphite Cast Iron	FCD
		Blackheart Malleable Cast Iron	FCMB
		Whiteheart Malleable Cast Iron	FCMW
		Pearlitic Malleable Cast Iron	FCMP
Cast Steel		Carbon Cast Steel	SC
		High Tensile Strength Carbon Cast Steel & Low Alloy Cast Steel	SCC
		Stainless Cast Steel	SCS
		Heat-Resisting Cast Steel	SCH
		High Manganese Cast Steel	SCMnH
		Cast Steel for High Temperature and High Pressure Service	SCPH

Non-ferrous Metals

Classification	Name of JIS Standard	Symbol
Copper	Copper and Copper Alloy Sheet / Strip	CxxxxP CxxxxPP CxxxxR
	Copper and Copper Alloy Rod and Bar	CxxxxBD CxxxxBDS CxxxxBE
Aluminum Alloys and Aluminum Alloys Expanded Material	Aluminum and Al. Alloy Sheet / Strip	AxxxxP AxxxxPC
	Aluminum and Al. Alloy Rod, Bar, and Wire	AxxxxBE AxxxxBES AxxxxBD AxxxxBDS AxxxxW AxxxxWS
	Aluminum and Al. Alloy Extruded Shape	AxxxxS
	Aluminum and Al. Alloy Forging	AxxxxFD AxxxxFH
Magnesium Alloy Expanded Material	Magnesium Alloy Sheet and Plate	MP
	Magnesium Alloy Rod and Bar	MB
Nickel Alloy	Nickel Copper Alloy Sheet and Plate	NCuP
	Nickel Copper Alloy Rod and Bar	NCuB
Titanium Expanded Material	Titanium Rod and Bar	TB
Casting	Brass Casting	CAC20x
	High Strength Brass Casting	CAC30x
	Bronze Casting	CAC40x
	Phosphoric Bronze Casting	CAC50x
	Aluminum Bronze Casting	CAC70x
	Aluminum Alloy Casting	AC
	Magnesium Alloy Casting	MC
	Zinc Alloy Die Casting	ZDCx
	Aluminum Alloy Die Casting	ADC
	Magnesium Alloy Die Casting	MD
	White Metal	WJ

Material Cross Reference Table

● Steel

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI / SAE	BS	DIN	NF	ГОСТ
Carbon Steel for Machine Structural Use	S10C	08 10	1010	040A10 045A10 045M10	C10E C10R	XC10	
	S12C		1012	040A12		XC12	
	S15C	15	1015	055M15	C15E C15R		
	S17C		1017			XC18	
	S20C	20	1020	070M20 C22 C22E C22R	C22 C22E C22R	C22 C22E C22R	
	S22C		1023				
	S25C	25	1025	C25 C25E C22R	C25 C25E C25R	C25 C25E C25R	
	S28C		1029				25Г
	S30C	30	1030	080A30 080M30 C30 C30E C30R	C30 C30E C30R	C30 C30E C30R	30Г
	S33C						30Г
	S35C	35	1035	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35Г
	S38C		1038				35Г
	S40C	40	1039 1040	080M40 C40 C40E C40R	C40 C40E C40R	C40 C40E C40R	40Г
	S43C		1042 1043	080A42			40Г
	S45C	45	1045 1046	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45Г
	S48C			080A47			45Г
	S50C	50	1049	080M50 C50 C50E C50R	C50 C50E C50R	C50 C50E C50R	50Г
	S53C		1050 1053				50Г
	S55C	55	1055	070M55 C55 C55E C55R	C55 C55E C55R	C55 C55E C55R	
	S58C	60	1059 1060	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60Г
	S09CK			045A10 045M10	C10E	XC10	
	S15CK	15F			C15E	XC12	
	S20CK					XC18	

Material Cross Reference Table

● **Steel**

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI / SAE	BS	DIN	NF	ГОСТ
Nickel Chromium Steel	SNC236				36NiCr6		40ХН
	SNC415	12CrNi2			14NiCr10		
	SNC631	30CrNi3			36NiCr10		30ХН3А
	SNC815	12Cr2Ni4		655M13	15NiCr13		
	SNC836	37CrNi3			31NiCr14		
Nickel Chromium Molybdenum Steel	SNCM220	20CrNiMo	8615 8617 8620 8622	805A20 805M20 805A22 805M22	20NiCrMo2 20NiCrMoS2	20NCD 2	
	SNCM240		8637 8640		40NiCrMo2-2		
	SNCM415						
	SNCM420	18CrNiMnMoA	4320		17NiCrMo6-4		20ХН2М (20ХНМ)
	SNCM431				30CrNiMo8		
	SNCM439	40CrNiMoA	4340		40NiCrMo6		
	SNCM447				34CrNiMo6		
	SNCM616						
	SNCM625						
	SNCM630						
	SNCM815						
Chromium Steel	SCr415	15Cr 15CrA			17Cr3 17CrS3		15Х 15ХА
	SCr420	20Cr	5120				20Х
	SCr430	30Cr	5130 5132	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30Х
	SCr435	35Cr	5132	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35Х
	SCr440	40Cr	5140	530M40 41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40Х
	SCr445	45Cr 50Cr					45Х
Chromium Molybdenum Steel	SCM415	15CrMo			15CrMo4		
	SCM418	20CrMo			18CrMo4 18CrMoS4		20ХМ
	SCM420			708M20	20CrMo5		20ХМ
	SCM421						
	SCM430	30CrMo 30CrMoA	4130				30ХМ 30ХМА
	SCM432						
	SCM435	35CrMo	4137	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	35ХМ
	SCM440	42CrMo	4140 4142	708M40 709M40 42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	
	SCM445		4145 4147				
	SCM822						

● **Steel**

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI / SAE	BS	DIN	NF	ГОСТ
Manganese Steel Manganese Chromium Steel	SMn420	20Mn2	1522	150M19	20Mn5		
	SMn433	30Mn2 35Mn2	1536	150M36	34Mn5		30Г2 35Г2
	SMn438	40Mn2	1541	150M36	36Mn5		35Г2 40Г2
	SMn443	45Mn2	1541				40Г2 45Г2
	SMnC420	15CrMn	5115		16MnCr5		
	SMnC443	40CrMn	5140				
Structural Steel with Specified Hardenability Band	SMn420H		1522H				
	SMn433H						
	SMn438H		1541H				
	SMn443H		1541H				
	SMnC420H						
	SMnC443H						
	SCr415H	15CrH			17Cr3 17CrS3		15Х
	SCr420H	20Cr1H	5120H		17Cr3		20Х
	SCr430H		5130H 5132H	34Cr4 34CrS4	34Cr4 34CrS3	34Cr4 34CrS4	30Х
	SCr435H		5135H	37Cr4 37CrS4	37Cr4 34CrS4	37Cr4 37CrS4	35Х
	SCr440H	40CrH	5140H	41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40Х
	SCM415H	15CrMoH	4118H		15CrMo5		
	SCM418H				18CrMo4 18CrMoS4		
	SCM420H	20CrMoH	4118H	708H20	18CrMo4		
	SCM435H		4135H 4137H	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	
	SCM440H	42CrMoH	4140H 4142H	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	
	SCM445H		4145H 4147H				
	SCM822H						
	SNC415H						
	SNC631H						
	SNC815H	12Cr2Ni4H		655H13	15NiCr13		
	SNCM220H	20CrNiMoH	8617H 8620H 8622H	805H17 805H20 805H22	21NiCrMo2	20N CD 2	
	SNCM420H	20CrNi2MoH	4320H		20NiCrMoS6-4		

Material Cross Reference Table

● Steel

Classification	Japan	China	USA		UK	Germany	France	Russia
	JIS	GB	UNS	AISI	BS	DIN	NF	ГОСТ
Stainless Steel	SUS 201	1Cr17Mn6Ni5N	S20100	201			Z12CMN17-07Az	
	SUS 202	1Cr18Mn8Ni5N	S20200	202	284S16			12Х17Г9АН4
	SUS 301	1Cr18Mn10Ni5Mo3N 1Cr17Ni7	S30100	301	301S21	X12CrNi17 7	Z11CN17-08	07Х16Н6
	SUS 301L		S30153			X2CrNiN18-7		
	SUS 301J1					X12CrNi17 7		
	SUS 302	1Cr18Ni9	S30200	302	302S25		Z12CN18-09	12Х18Н9
	SUS 302B		S30215	302B				
	SUS 303	Y1Cr18Ni9	S30300	303	303S21	X10CrNiS18 9	Z8CNF18-09	
	SUS 303Se	Y1Cr18Ni9Se	S30323	303Se	303S41			12Х18Н10Е
	SUS 304	0Cr18Ni9	S30400	304	304S31	X5CrNi18 10	Z7CN18-09	08Х18Н10
	SUS 304L	00Cr18Ni10	S30403	304L	304S11	X2CrNi19 11	Z3CN19-11	03Х18Н11
	SUS 304N1	0Cr18Ni9N	S30451	304N			Z6CN19-09Az	
	SUS 304N2	0Cr19Ni10NbN	S30452					
	SUS 304LN	00Cr18Ni10N	S30453	304LN		X2CrNiN18 10	Z3CN18-10Az	
	SUS 304J1							
	SUS 304J2							
	SUS 304J3		S30431	S30431				
	SUS 305	1Cr18Ni12	S30500	305	305S19	X5CrNi18 12	Z8CN18-12	06Х18Н11
	SUS 305J1							
	SUS 309S	0Cr23Ni13	S30908	309S			Z10CN24-13	
	SUS 310S	0Cr25Ni20	S31008	310S	310S31		Z8CN25-20	10Х23Н18
	SUS 316	0Cr17Ni12Mo2	S31600	316	316S31	X5CrNiMo17 12 2	Z7CND17-12-02	
	SUS 316F					X5CrNiMo17 13 3	Z6CND18-12-03	
	SUS 316L	00Cr17Ni14Mo2	S31603	316L	316S11	X2CrNiMo17 13 2	Z3CND17-12-02	
						X2CrNiMo17 14 3	Z3CND17-13-03	03Х17Н14М3
	SUS 316N	0Cr17Ni12Mo2N	S31651	316N				
	SUS 316LN	00Cr17Ni13Mo2N	S31653	316LN		X2CrNiMoN17 12 2	Z3CND17-11Az	
						X2CrNiMoN17 13 3	Z3CND17-12Az	
	SUS 316Ti		S31635			X6CrNiMoTi17 12 2	Z6CNDT17-12	08Х17Н13М2Т
	SUS 316J1	0Cr18Ni12Mo2Cu2						
	SUS 316J1L	00Cr18Ni14Mo2Cu2						
	SUS 317	0Cr19Ni13Mo3	S31700	317	317S16			
	SUS 317L	00Cr19Ni13Mo3	S31703	317L	317S12	X2CrNiMo18 16 4	Z3CND19-15-04	
	SUS 317LN		S31753				Z3CND19-14Az	
	SUS 317J1	0Cr18Ni16Mo5						
	SUS 317J2							
	SUS 317J3L							
	SUS 836L		N08367					
	SUS 890L		N08904	N08904	904S14		Z2NCDU25-20	
	SUS 321	1Cr18Ni9Ti 0Cr18Ni10Ti	S32100	321	321S31	X6CrNiTi18 10	Z6CNT18-10	08Х18Н10Т
	SUS 347	0Cr18Ni11Nb	S34700	347	347S31	X6CrNiNb18 10	Z6CNNb18-10	08Х18Н12Б
	SUS 384		S38400	384			Z6CN18-16	
	SUS XM7	0Cr18Ni9Cu3	S30430	304Cu	394S17		Z2CNU18-10	
	SUS XM15J1	0Cr18Ni13Si4	S38100				Z15CNS20-12	
	SUS 329J1	0Cr26Ni5Mo2	S32900	329				
	SUS 329J3L		S39240	S31803			Z3CNDU22-05Az	08Х21Н6М2Т
	SUS 329J4L		S39275	S31260			Z3CNDU25-07Az	

● Steel

Classification	Japan	China	USA		UK	Germany	France	Russia
	JIS	GB	UNS	AISI	BS	DIN	NF	ГОСТ
Stainless Steel	SUS 405	0Cr13Al 0Cr13	S40500	405	405S17	X6CrAl13	Z8CA12	
	SUS 410L	00Cr12					Z3C14	
	SUS 429		S42900	429				
	SUS 430	1Cr17	S43000	430	430S17	X6Cr17	Z8C17	12Х17
	SUS 430F	Y1Cr17	S43020	430F		X7CrMoS18	Z8CF17	
	SUS 430LX		S43035			X6CrTi17	Z4CT17	
	SUS 430J1L					X6CrNb17	Z4CNb17	
	SUS 434	1Cr17Mo	S43400	434	434S17	X6CrMo17 1	Z8CD17-01	
	SUS 436L		S43600	436				
	SUS 436J1L							
	SUS 444		S44400	444			Z3CDT18-02	
	SUS 447J1	00Cr30Mo2	S44700					
	SUS XM27	00Cr27Mo	S44627				Z1CD26-01	
	SUS 403	1Cr12	S40300	403				
	SUS 410	1Cr13	S41000	410	410S21	X10Cr13	Z13C13	
	SUS 410S		S41008	410S	403S17	X6Cr13	Z8C12	08Х13
	SUS 410F2							
	SUS 410J1	1Cr13Mo 1Cr12Mo	S41025			X12CrS13		
	SUS 416	Y1Cr13	S41600	416	416S21		Z11CF13	
	SUS 420J1	2Cr13	S42000	420	420S29	X20Cr13	Z20C13	20Х13
	SUS 420J2	3Cr13	S42000	420	420S37	X30Cr13	Z33C13	30Х13
	SUS 420F	Y3Cr13	S42020	420F			Z30CF13	
	SUS 420F2							
	SUS 429J1							
	SUS 431	1Cr17Ni2	S43100	431	431S29	X20CrNi17 2	Z15CN16-02	20Х17Н2
	SUS 440A	7Cr17	S44002	440A			Z70C15	
	SUS 440B	8Cr17	S44003	440B				
	SUS 440C	9Cr18 11Cr17 9Cr18Mo	S44004	440C			Z100CD17	95Х18
	SUS 440F	Y11Cr17	S44020	S44020				
	SUS 630	0Cr17Ni4CuNb	S17400	S17700		X5CrNiCuNb16-4	Z6CNU17-04	
	SUS 631	0Cr17Ni7Al	S17700	S17700		X7CrNiAl17 7	Z9CNA17-07	09Х17Н7 Ю
	SUS 632J1							

● Representative Classification of Stainless Steel

• Stainless Steel (Austenitic related)

JIS	
SUS201	SUS309S
SUS202	SUS310S
SUS301	SUS316
SUS302	SUS316L
SUS302B	SUS316N
SUS303	SUS317
SUS303Se	SUS317L
SUS304	SUS321
SUS304L	SUS347
SUS304N1	SUS384
SUS304N2	SUSXM7
SUS305	SUSXM15J1
SUS308	

• Stainless Steel (Ferritic related)

JIS
SUS405
SUS429
SUS430
SUS430F
SUS434
SUSXM27

• Stainless Steel (Martensitic related)

JIS
SUS403
SUS410
SUS410S
SUS416
SUS420J1
SUS420F
SUS431
SUS440A
SUS440B
SUS440C
SUS440F

• Stainless Steel (Precipitation Hardening)

JIS
SUS630
SUS631

Material Cross Reference Table

● Steel

Classification	Japan	China	USA		UK	Germany	France	Russia
	JIS	GB	UNS	AISI	BS	DIN	NF	ГОСТ
Heat-Resisting Steel	SUH 31				331S42		Z35CNWS14-14	45Х14Н14В2М
	SUH 35				349S52		Z52CMN21-09Az	
	SUH 36	5Cr21Mn9Ni4N	S63008		349S54	X53CrMnNi21 9	Z55CMN21-09Az	55Х20 Г 9АН4
	SUH 37	2Cr21Ni12N	S63017		381S34			
	SUH 38							
	SUH 309	2Cr23Ni13	S30900	309	309S24		Z15CN24-13	
	SUH 310	2Cr25Ni20	S31000	310	310S24	CrNi2520	Z15CN25-20	20Х25Н20С2
	SUH 330	1Cr16Ni35	N08330	N08330			Z12NCS35-16	
	SUH 660	0Cr15Ni25Ti2MoAlVB	S66286				Z6NCTV25-20	
	SUH 661		R30155					
	SUH 21					CrAl1205		
	SUH 409		S40900	409	409S19	X6CrTi12	Z6CT12	
	SUH 409L						Z3CT12	
	SUH 446	2Cr25N	S44600	446			Z12C25	15Х28
	SUH 1	4Cr9Si2	S65007		401S45	X45CrSi9 3	Z45CS9	
	SUH 3	4Cr10Si2Mo					Z40CSD10	40Х10С2М
	SUH 4	8Cr20Si2Ni			443S65		Z80CSN20-02	
	SUH 11							40Х 9С2
	SUH 600	2Cr12MoVNbN						20Х12ВНМБФР
	SUH 616	2Cr12NiMoWV	S42200					

● Representative Classification of Heat-Resisting Steel

• Heat-Resisting Steel (Austenitic related)

JIS
SUH31
SUH35
SUH36
SUH37
SUH38
SUH309
SUH310
SUH330
SUH660
SUH661

• Heat-Resisting Steel (Ferritic related)

JIS
SUH21
SUH409
SUH446

• Heat-Resisting Steel (Martensitic related)

JIS
SUH1
SUH3
SUH4
SUH11
SUH600
SUH616

● Steel

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/ASTM	BS	DIN	NF	ГОСТ
Carbon Tool Steel	SK140 (SK1)	T13				C140E3U	У13
	SK120 (SK2)	T12	W1-11 1/2			C120E3U	У12
	SK105 (SK3)	T11	W1-10		C105W1	C105E2U	У11
	SK95 (SK4)	T10	W1-9			C90E2U	У10
	SK85 (SK5)	T8Mn T9	W1-8		C80W1	C90E2U C80E2U	У8Г У9
	SK75 (SK6)	T8			C80W1	C80E2U C70E2U	У8
	SK65 (SK7)	T7			C70W2	C70E2U	У7
High Speed Tool Steel	SKH2	W18Cr4V	T1	BT1		HS18-0-1	Р18
	SKH3	W18Cr4VCo5	T4	BT4	S18-1-2-5	HS18-1-1-5	Р18К5Ф2
	SKH4	W18Cr4V2Co8	T5	BT5		HS18-0-2-9	Р18К5Ф
	SKH10	W12Cr4V5Co5	T15	BT15	S12-1-4-5	HS12-1-5-5	
	SKH51	W6Mo5Cr4V2	M2	BM2	S6-5-2	HS6-5-2	Р6М5
	SKH52	CW6Mo5Cr4V2 W6Mo5Cr4V3	M3-1				Р6М5Ф3
	SKH53	CW6Mo5Cr4V3	M3-2		S6-5-3	HS6-5-3	Р6М5Ф3
	SKH54		M4	BM4		HS6-5-4	
	SKH55	W6Mo5Cr4V2Co5 W7Mo5Cr4V2Co5	M35 M41	BM35	S6-5-2-5	HS6-5-2-5HC	Р6М5К5
	SKH56		M36				
	SKH57			BT42	S10-4-3-10	HS10-4-3-10	
	SKH58	W2Mo9Cr4V2	M7			HS2-9-2	
	SKH59	W2Mo9Cr4VCo8	M42	BM42	S2-10-1-8	HS2-9-1-8	
Alloy Tool Steel	SKS11		F2				ХВ4
	SKS2				105WCr6	105WCr5	ХВГ
	SKS21	W					
	SKS5						
	SKS51		L6				
	SKS7						
	SKS8	Cr06				C140E3UCr4	13Х
	SKS4	5CrW2Si 6CrW2Si	S1				6ХВ2С 5ХВ2СФ
	SKS41	4CrW2Si	S1				4ХВ2С
	SKS43		W2-9 1/2	BW2		100V2	
	SKS44		W2-8				
	SKS3	9CrWMn					9ХВГ
	SKS31	CrWMn			105WCr6	105WCr5	ХВГ
	SKS93						
	SKS94						
	SKS95	8MnSi					
	SKD1	Cr12	D3	BD3	X210Cr12	X200Cr12	Х12
	SKD10	Cr12Mo1V1	D2		X153CrMoV12		Х12МФ
	SKD11	Cr12MoV	D2	BD2	X153CrMoV12	X160CrMoV12	
	SKD12	Cr5Mo1V	A2	BA2		X100CrMoV5	
	SKD4					X32WCrV3	
	SKD5	3Cr2W8V	H21	BH21	X30WCrV9-3	X30WCrV9	
	SKD6	4Cr5MoSiV	H11	BH11	X38CrMoV51	X38CrMoV5	4Х5МФС
	SKD61	4Cr5MoSiV1	H13	BH13	X40CrMoV51	X40CrMoV5	4Х5МФ1С
	SKD62		H12	BH12		X35CrWMoV5	3Х3М3Ф
	SKD7	4Cr3Mo3SiV	H10	BH10	X32CrMoV33	32CrMoV12-18	
	SKD8		H19	BH19			
	SKT3					55CrNiMoV4	
	SKT4	5CrNiMo		BH224/5	55NiCrMoV6	55NiCrMoV7	5ХНМ

Material Cross Reference Table

● **Steel**

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/ASTM	BS	DIN	NF	ГОСТ
Spring Steel	SUP3		1075 1078				75 80 85
	SUP6	55Si2Mn			56SiCr7	60Si7	60С2
	SUP7	60Si2Mn 60Si2MnA	9260		61SiCr7	60Si7	60С2Г
	SUP9	55CrMnA	5155		55Cr3	55Cr3	
	SUP9A	60CrMnA	5160		55Cr3	60Cr3	
	SUP10	50CrVA	6150	735A51, 735H51	50CrV4	51CrV4	ХФА50ХГФА
	SUP11A	60CrMnBA	51B60		51CrV4		50ХГР
	SUP12		9254	685A57, 685H57	54SiCr6	54SiCr6	
	SUP13	60CrMnMoA	4161	705A60, 705H60	60CrMn3-2	60CrMo4	
Free Cutting Carbon Steel	SUM11		1110				
	SUM12	Y12	1108				
	SUM21		1212				
	SUM22	Y15	1213	(230M07)	9SMn28	S250	
	SUM22L	Y12Pb	12L13		9SMnPb28	S250Pb	
	SUM23		1215				
	SUM23L						
	SUM24L	Y15Pb	12L14		9SMnPb28	S250Pb	
	SUM25				9SMn36	S300	
	SUM31		1117		15S10		
	SUM31L						
	SUM32	Y20		210M15, 210A15		(13MF4)	
	SUM41	Y30 Y35	1137			(35MF6)	
	SUM42	Y40Mn	1141			(45MF6.1)	
	SUM43		1144	(226M44)		(45MF6.3)	
High Carbon Chromium Bearing Steel	SUJ1	GCr4	51100				
	SUJ2	GCr15	52100		100Cr6	100Cr6	ШХ15
	SUJ3	GCr15SiMn	ASTM A 485 Grade 1				
	SUJ4	GCr15SiMo					
	SUJ5	GCr18Mo					

● Cast Iron

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/SAE	BS	DIN	NF	ГОСТ
Gray Cast Iron	FC100	HT100	NO.20	100	GG10		СУ10
	FC150	HT150	NO.30	150	GG15	FGL150	СУ15
	FC200	HT200	NO.35	200	GG20	FGL200	СУ20
	FC250	HT250	NO.45	250	GG25	FGL250	СУ25
	FC300	HT300	NO.50	300	GG30	FGL300	СУ30
	FC350	HT350	NO.60	350	GG35	FGL350	СУ35
					GG40	FGL400	СУ40
Nodular Cast Iron	FCD400	QT400-18	60-40-18	400/17	GGG40	FGS370-17	ВУ40
	FCD450	QT450-10	65-45-12	420/12		FGS400-12	ВУ45
	FCD500	QT500-7	70-50-05	500/7	GGG50	FGS500-7	ВУ50
	FCD600	QT600-3	80-60-03	600/7	GGG60	FGS600-2	ВУ60
	FCD700	QT700-2	100-70-03	700/2	GGG70	FGS700-2	ВУ70
	FCD800	QT800-2	120-90-02	800/2	GGG80	FGS800-2	ВУ80
		QT900-2		900/2			ВУ100

● Non-ferrous Metals

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	ASTM	BS	DIN	NF	ГОСТ
Aluminum Alloys		1A99	1199		A199.99R		A99
		1A97			A199.98R		A97
		1A95					A95
	A1080	1A80		1080(1A)	A199.90	1080A	A8
	A1050	1A50	1050	1050(1B)	A199.50	1050A	A5
	A5052	5A02	5052	NS4	AlMg2.5	5052	Amg
		5A03		NS5			AMg3
	A5056	5A05	5056	NB6	AlMg5		AMg5V
	A5556	5A30	5456	NG61		5957	
	A2117	2A01	2036		AlCu2.5Mg0.5	2117	D18
	A2017	2A11		HF15	AlCuMg1	2017S	D1
	A2024	2A12	2124		AlCuMg2	2024	D16AVTV
		2B16	2319				
	A2N01	2A80					AK4
	A2018	2A90	2218				AK2
	A2014	2A14	2014		AlCuSiMn	2014	AK8
	A7075	7A09	7175		AlZnMgCu1.5	7075	V95P
Aluminum Alloy Casting	AC4C	ZAlSi7Mn	356.2	LM25	G-AlSi7Mg		
	AC3A	ZAlSi12	413.2	LM6	G-Al12	A-S12-Y4	AL2
		ZAlSi5Cu1Mg	355.2				AL5
	AC8A	ZAlSi2Cu2Mg1	413.0		G-Al12(Cu)		
		ZAlCu5Mn					AL19
		ZAlCu5MnCdVA	201.0				
		ZAlMg10	520.2	LM10	G-AlMg10	AG11	AL8
		ZAlMg5Si			G-AlMg5Si		AL13

Insert Grades Cross Reference Table

CVD Coated Carbide (Turning)

·This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P01	CA510 CA5505	JC110V	HG8010 HC5000 HG3305	UE6105 UE6005 UE6015		GC4305 GC4005 GC4205	TP0501 TP0500 TP1000	AC700G AC810P	T9005 T9105	KCP05B KCP05 KC9105	IC8150 IC9150
	P10	CA510 CA515 CA5505 CA5515	JC110V JC215V	GM10 GM20 GM8015 HG8010	MC6015 UE6105 UE6110 UE6005 UE6010 UE6020	CP2 CP5 CP7	GC4205 GC4015 GC3115 GC4215 GC4315	TP1501 TP1000 TP1500 TP100	AC700G AC2000 AC810P AC820P	T9005 T9105 T9015 T9115	KCP10B KCP10 KC9010 KC9110	IC8150 IC9150 IC9250
	P20	CA525 CA5515 CA5525 CR9025	JC110V JC215V	GM20 GM8020 HG8025	MC6025 UC6010 UE6110 UE6020	CP2 CP5 CP7	GC4025 GC4215 GC4220 GC4225 GC4325	TP2501 TP2000 TP2500 TP200	AC2000 AC3000 AC820P AC830P	T9015 T9115 T9025 T9125	KCP25B KCP25 KC9125 KC9225 KC9325	IC8250 IC9125 IC9250 IC9350
	P30	CA525 CA5525 CA530 CA5535 CR9025	JC215V JC325V	GM25 GM8035 HG8025	MC6025 UE6020 UE6035 UH6400		GC4225 GC4230 GC4235 GC2135	TP2501 TP2500 TP2000 TP3500 TP200	AC3000 AC630M AC830P ACP100	T9125 T9035 T9135 T3130	KCP30B KCP30 KC9040 KC9140	IC635 IC8350 IC9350
	P40	CA530 CA5535	JC325V JC450V JC540V	GX30	UE6035 UH6400		GC4035 GC4235 GC4240	TP40	AC630M AC830P ACP100	T9035 T3130	KCP40B KCP40 KC9140 KC9240	IC635
M (Stainless Steel)	M10	CA6515	JC110V	GM10	MC7015 US7020	CP2 CP5	GC2015	TP1500 TP100	AC610M	T9015 T9115	KCM15B KCM15 KC9010 KC9110 KC9210	IC8250 IC9250 IC9350
	M20	CA6525	JC110V JC215V	GM8020 HG8025	US7020 MC7025	CP2 CP5	GC1515 GC2015 GC2025	TM2000 TP200	AC6030M AC610M AC630M AC830P	T6020 T6120 T9115 T9125	KCM25B KCM25 KC9025 KC9125 KC9225	IC6015 IC8350 IC9250 IC9350
	M30		JC215V JC325V JC525X	GM25 GM8035	MC7025 US735		GC2040 GC235	TM4000 TP300	AC6030M AC630M AC830P	T6030 T6130 T9125	KCM35B KCM35 KC9240	IC6025 IC8350 IC9350 IC4050
	M40		JC525X	GX30	US735			TP40			KC9045 KC9245	IC635
K (Cast Iron)	K01	CA4010 CA4505 CA5505	JC105V JC605X JC605W JC050W	HG3305 HG3315 HX3505 HX3515	MC5005 UC5105 UC5015	CP1	GC3205 GC3210	TK1000 TH1000 TK1001	AC405K AC410K AC300G	T5105 T5010	KC9105 KC9315 KCK05B KCK05	IC5005 IC428 IC9007 IC9150
	K10	CA4010 CA4115 CA4505 CA4515 CA5505	JC050W JC110V JC605X JC605W JC108W	GM8015 HX3515 HG8010 HG3315	UC5015 UC5105 UC5115 UE6010 MC5015	CP1 CP2 CP5	GC3205 GC3210 GC3215 GC3115	TK1000 TK2000 TK2001 MK1500	AC410K AC415K AC700G	T515 T5105 T5115 T5010	KC9110 KC9120 KC9315 KCK15B KCK15	IC5010 IC418 IC428 IC9015 IC9007
	K20	CA4115 CA4120 CA4515	JC110V JC215V JC605X JC605W	GM8020 HG8025	MC5015 MY5015 UE6010 UC5115 UE6110	CP2 CP5	GC4225 GC3215 GC3220 GC3225	TK2000 TX150 TP200	AC420K AC700G AC820P	T5115 T5125 T5020	KC9125 KC9320 KC9325 KCK20B KCK20	IC418 IC9015
	K30		JC215V	GM25	UE6110		GC3040	TP2500 TP200		T5125 T9125	KCP25B KC9320	

PVD Coated Carbide (Turning)

·This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P01	PR1005	JC5003						ACZ150		KC5510	
	P10	PR930 PR1005 PR1025 PR1115 PR1215 PR1425 PR1225	JC5003 JC5030	CY15 CY150 IP2000	VP10MF	VM1 TM1 TA1 TAS DT4 DM4	GC1025	CP200	ACZ150 ACZ310 AC520U	AH710	KC5010 KC5510 KU10T	IC507 IC807 IC907
	P20	PR930 PR1025 PR1115 PR1215 PR1425 PR1225	JC5015 JC5030 JC5040	CY150 IP2000	VP10RT VP15TF VP20MF UP20M VP20RT	QM1 VM1 TA1 TAS	GC1020 GC1025 GC4125 GC1125	CP250	ACZ310 ACZ330 AC520U	AH710 AH725 AH730 SH725 SH730	KC5025 KC5525 KC7215 KC7315 KU25T	IC507 IC907 IC908
	P30	PR1025 PR1225	JC5015 JC5040	CY250 CY9020 HC844 IP3000	VP10RT VP15TF VP20MF UP20M	ZM3 QM3 TAS	GC1125 GC1145 GC1115 GC1105	CP500	ACZ330 ACZ350 AC530U	GH330 AH120 AH740	KC7015 KC7020 KC7235 KU25T	IC328 IC928 IC3028
	P40		JC5040	CY250 HC844		ZM3 QM3 TAS	GC1145 GC2145	CP500	ACZ350	AH140 AH740 J740	KC7030 KC7040 KC7140	IC328 IC3028
M (Stainless Steel)	M10	PR1025 PR1215 PR1225	JC5003	IP050S	VP10MF VP10RT	VM1 TM1 TA1	GC1005 GC1025 GC1105 GC15	TS2000 CP200 CP250	EH510Z ACZ150 AC510U	AH710	KC5010 KC5510 KC6005 KCU10	IC507 IC520 IC807 IC907
	M20	PR930 PR1025 PR1125 PR1215 PR1425 PR1225	JC5015 JC5030 JC5040 JC8015	IP100S GX30	VP10RT VP15TF VP20MF UP20M VP20RT	QM1 VM1 TA1 TAS DT4 DM4	GC1025 GC1115 GC4125 GC1125 GC30	TS2500 CP200 CP250 CP500	EH520Z ACZ150 ACZ310 AC520U	AH630 AH725 AH730 GH330 GH730 SH725 SH730	KC5025 KC5525 KC7020 KC7025 KCU25	IC308 IC507 IC907 IC908 IC3028
	M30	PR1125 PR1535	JC5015 JC5030 JC5040	CY250 CY9020	VP15TF VP20MF UP20M MP7035	ZM3 QM3 TAS	GC1020 GC2035 GC2030	CP500	ACZ330 ACZ350 AC530U AC6040M	AH120 AH725	KC7030 KC7225	IC908 IC1008 IC1028 IC3028
	M40				MP7035	ZM3 QM3 TAS	GC2145 GC1145		AC6040M ACZ350	J740 AH140 AH645		IC228 IC928 IC328
K (Cast Iron)	K01		JC5003						EH10Z	AH110	KC5515	IC910
	K10	PR905 PR1215	JC5003 JC5015	CY100H CY10H	VP05RT	TA1 TM1	GC1010	TS2000 CP200	EH10Z EH510Z AC510U	GH110 AH110	KC5010 KC7210	IC807 IC910 IC507 IC908
	K20	PR905 PR1215	JC5015	IP2000 CY9020	VP10RT VP15TF VP20RT	QM1 TA1	GC1020 GC1120	TS2500 CP200 CP250	EH20Z ACZ310 AC520U AC530U	AH120 AH725	KC5025 KC5525 KC7015 KC7215 KC7315	IC508 IC908
	K30				VP15TF VP20RT	QM3 TA3	GC1030	CP500	ACZ310		KC7225	IC508 IC908
S (Difficult-to-Cut Material)	S01	PR1305	JC5003		MP9005 VP05RT					AH8005 AH905		
	S10	PR1305 PR1310	JC5015 JC8015	JP9105	MP9005 MP9015 VP10RT		GC1105 GC1005 GC1025	CP200 TS2000	AC510U	AH8015 AH905 SH730 AH110	KC5010 KC5510	IC807 IC808 IC907 IC908
	S20	PR1310 PR1325 PR1535	JC5015 JC8015	JP9115	MP9015 MT9015 VP20RT		GC1025 GC1125	CP250 TS2500	AC510U AC520U	AH8015 AH120 AH725	KC5025 KC5525	IC806 IC808 IC908
	S30	PR1535			VP15TF		GC1125		AC520U	AH725		IC328

Insert Grades Cross Reference Table

Cermet (Turning)

·This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification	Symbol	Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
P (Steel)	P01	TN610 TN6010 **PV710** **PV7010**	LN10 CX50	CH350	**AP25N** **VP25N** NX1010	T3N T15 **Q15**			T110A T1000A	NS520 **GT530** **GT720** **J530**	KT1120 KT125 HTX	IC20N **IC520N**
	P10	TN610 TN6010 TN620 TN6020 TN60 **PV710** **PV7010** **PV720** **PV7025**	LN10 CX50 CX75 NIT **PX75**	CH350 **CZ25**	NX2525 **AP25N** **VP25N**	T15 **C7Z** **Z15**	CT5015 CT525	TP1020 CM CMP	**T1500Z** **T2000Z** T1200A T1500A	NS9530 NS520 **GT9530** **GT530** **GT730**	**KT315** KT175 HT2	IC20N **IC520N** **IC530N** IC75T
	P20	TN620 TN90 TN6020 **PV720** **PV7025**	CX50 CX75 CX90 NAT **PX90**	CH550 CH7030 **CZ1025** **CZ25**	**MP3025** NX2525 NX3035 **AP25N** **VP45N**	T15 C7X **C7Z**	CT525 CT530 **GC1525**	TP1020 C15M TP1030	T1200A T1500A **T1500Z** **T2000Z** **T3000Z**	NS9530 NS530/730 **GT9530** **GT530/730**	PS5 **KT5020**	IC20N **IC520N** **IC530N** IC75T IC30N
	P30		CX90 CX99 SUZ		NX4545 **VP45N**	N40 C7X	CT530 **GC1525**	TP1030	**T3000Z** T250A	NS740		IC75T IC30N
M (Stainless Steel)	M10	TN620 TN60 TN6020 **PV720** **PV7020** **PV7025**	LN10	CH350	NX2525 **AP25N** **VP25N**	T15 C7X **C7Z** **Z15**	CT5015 CT525	CM CMP	T110A T1000A **T2000Z**	NS520 **J530**	KT1120 **KT315** KT125	IC20N **IC520N**
	M20	TN620 TN90 TN6020 **PV720** **PV7020** **PV7025**	CX50 CX75 **PX75** NIT NAT	CH550 CH7030 **CZ1025**	NX2525 NX3025 **AP25N** **VP25N**	C7X **C7Z** **Q15**	CT530 **GC1525**	TP1020 C15M	T1500A **T2000Z**	NS530 NS730 **GT530** **GT730**	KT175 HT2 PS5 **KT5020**	IC30N **IC530N**
	M30		CX75 CX90 **PX90** CX99 SUZ	**CZ25**	NX4545	C7X		TP1030	**T3000Z** T250A	NS740		
K (Cast Iron)	K01	**PV7005**	LN10		**AP25N** **VP25N**	T3N T15 **Q15**			T110A T1000A	NS520	KT1120	
	K10	TN610 TN6010 **PV710** **PV7010** **PV7005**	LN10	CH350	NX2525 **AP25N** **VP25N**	T15 C7X **C7Z** **Z15**	CT5015		T1200A T1500A **T2000Z**	NS530 NS730 **GT530** **GT730**	**KT315** HTX	
	K20		NIT	**CZ25**	NX2525 **AP25N** **VP25N**				**T3000Z**		**KT5020**	

·**Boldface grade** shows PVD Coated Cermet.

Carbide

Classification	Symbol	Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
P (Steel)	P10		SRT	WS10	STi10T		S1P		ST10P	TX10S	K2885	IC70
	P20		SRT DX30	EX35	STi20 UTi20T		SMA	S10M	ST20E	TX20 TX25	K125M	IC70 IC50M
	P30		SR30 DX30 DX35	EX35 EX40	UTi20T		SM30	S25M	A30N A30 ST30E	TX30 UX30	KMF	IC50M IC54
	P40		SR30 DX35	EX45			S6	S60M	ST40E	TX40	PVA	IC54
K (Cast Iron)	K01		KG03	WH02 WH05	HTi05T		H1P		H1 H2	TH03 KS05F	K68 K10	IC04
	K10	KW10 GW15	KG10 KT9	WH10	HTi10	KM1	H1P H10 HM	890	EH10 EH510	G1F TH10 H10T	KMI K8735 K313	IC20
	K20	GW25	CR1 KG20	WH20	HTi20T UTi20T	KM3	H13A	883 890 HX	G10E EH20 EH520	G2F KS15F KS20	KMF	IC20 IC10
	K30		KG30					883	G3 G10E	G3 UX30	THR	IC10 IC28
V (Wear and Shock Resistant Tool)	V40		G5 GD195	WH50	GTi30				G5	D40		
	V50	VW50	MH3 MH4 GD174 GD201	WH60	GTi35 GTi40 GTi30S				G6	D50		
	V60		MH5 MH7 MH8 GD206	WB60	GTi40S GTi50S				G7 G8	D60		

Coated Carbide (Milling)

·This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P10	PR830 PR1025 PR1225	JC5003 JC5030 JC8003	JP4105 JX1020 JP4005	F7010		GC1025 GC1010		ACP100		KC715M	
	P20	PR1525 PR830 PR1025 PR1225 PR1230	JC730U JC5015 JC5030 JC8015	JP4120 JS4045 JP4020 TB6020 JX1015 GX2140	MP6120 F7030 UP20M	TM1 DT4 DM4	GC1130 GC1030 GC4220 GC4020 GC4030	MP1500 T250M T25M T20M	ACP200	T313W AH725	KC522M KC525M KCPM20	IC330 IC250 IC520M IC950 IC5400
	P30	PR1230	JC5015 JC5040	CY250 CY9020 TB6045 JX1045 JM4060 GX2160	MP6130 F7030 VP15TF VP30RT	ZM3	GC1130 GC4040 GC4230	MP2500 T250M T25M F25M F30M	AC230 ACP300	T3130 GH330 AH120 AH330 AH730	KC994M KC725M KC792M KC530M KCPK30	IC330 IC328 IC635 IC830 IC908 IC928
	P40		JC5040	CY250 HC844 TB6060 JX1060	VP30RT		GC4040 GC4240	MP3000 T350M T60M T25M	AC230 ACZ330 ACZ350	AH140	KC735M	IC635 IC928 IC4050
M (Stainless Steel)	M10	PR1025 PR1225		CY9020 JX1020 JP4020	F7010		GC1025 GC1030		ACM100 ACM200 EH10Z		KC522M	
	M20	PR1525 PR1025 PR1225	JC730U JC1341 JC5015 JC5030 JC5040 JC7560	CY150 TB6020 JX1015 CY250	F7030 UP20M VP15TF VP20RT MP7030 MP7130	DT4 DM4	GC2030	MP2500 T250M T25M F20M F25M F30M	ACM200 ACP200 EH20Z	GH330 AH330 AH120 AH130 AH725	KC730M KC525M	IC380 IC908 IC928
	M30	CA6535 PR1535	JC5015 JC5030 JC5040	JM4160 JM4060 TB6045 JX1045 GX2160	F7030 VP30RT MP7140	ZM3	GC1040 GC2040	T350M T250M F40M	ACM300 ACP300 ACZ350	T3130 AH130	KC994M KC725M KCPK30	IC380 IC328 IC330
	M40		JC8050		VP30RT			MM4500	ACZ350	AH140		IC830
K (Cast Iron)	K01		JC8003	TB6005				MH1000		AH110		IC5100 IC4100
	K10	PR1510 PR905 PR1210	JC600 JC610 JC605W	JP4005 CY10H CY100H CY9020	MP8010 MC5020 VP10RT		GC1010 GC3220 K15W	MK1500 T150M F15M	ACK200 AC211	T1015 T1115 AH110	KCK15 KC915M	IC5100 IC4010 IC910 DT7150 IC810
	K20	CA420M PR905 PR1210	JC605X JC610 JC5015 JC8015	CY150 TB6020 JX1015	VP15TF VP20RT		GC1020 GC3020 K20W/K20D GC3330	MP1500 T150M T250M MK2000 MK2050	EH20Z ACZ310 ACK300	AH120 AH725	KC520M KC920M KC925M KC992M	IC810 IC910 IC928
	K30		JC5080				GC3040 GC4040	MK3000 T250M		GH130	KC930M	IC928
S (Difficult-to-Cut Material)	S10	CA6535 PR1535 PR1210	IC8015 IC5015	PCS08M PTH13S JS1025	MP9120 VP15TF		GC1030 GC1025	MS2050	ACM100 ACM200 ACK300		KC510M	IC903 IC807 IC808 IC908
	S20	CA6535 PR1535 PR1210	IC8015 IC5015 JC8050 JC7560	CY100H CY10H	MP9120 VP15TF MP9130 MP9030		GC1030 GC2030 S30T		ACM200		KC525M	IC903 IC807 IC808 IC908 IC830 IC928
	S30	PR1535	JC8050 JC7560				GC2040 S40T	F40M	ACM300		KC725M	IC328 IC330

Cermet (Milling)

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Classification		Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P10	TN60	NIT CX75	CH550	NX2525			C15M		NS530 NS730	KT530M KT195M	
	P20	TN60 TN100M	NAT CX75 CX90	CH570 CH7030 MZ1000	NX2525	C7X C7Z	CT530	C15M MP1020	T250A T1500A	NS530 NS730 NS740	HT7 KT530M KT605M	IC30N
	P30		CX90 CX99 SC30	CH7035	NX4545				T4500A	NS540		IC30N
M (Stainless Steel)	M10	TN60			NX2525			C15M				
	M20	TN60 TN100M	NIT CX75 NAT	CH550 CH570 CH7030	NX2525		CT530	C15M	T250A	NS530	KT7 KT530M KT605M	IC30N
	M30		CX75 CX90 CX99 SC30		NX4545				T4500A	NS740 N308		
K (Cast Iron)	K01		LN10									
	K10		LN10 CX75	CH550	NX2525							IC30N
	K20		NIT	CH7030 CH7035	NX2525							

Ceramic

Classification		Kyocera	Dijet	Nippon Tungsten	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
K (Cast Iron)	K01	KA30 A65 KT66 **PT600M** **CS7050**		NPC-H2 NPC-A2		SE1 HC1 HC2 HC5 HC6 HW2	CC620 CC650		NB90S NB90M WX120		KW80 KY1615 AC5	
	K10	A65 KT66 **A66N** **PT600M** **CS7050** KS6050		NX **NXA** Whiskal WIN		WA1 HC2 HC6 HC7	CC6090 CC6190 **GC1690**		WX120 **NS260C**	LX11 LX21	KYK10 **KYK25** KB90 KY1320 KY3000 **KY3400**	
	K20	KS6050				SX6 SX9 **SP9**	CC6090 CC6190 **GC1690**		WX120	WG300 FX105 CX710	KYK35 **KY3400** KY3500	
S (Difficult-to-Cut Material)	S01						CC650				KY2100	
	S10	CF1 KS6030 KS6040	CA200	Whiskal WIN		WA1 WA5 SX7 SX9	CC670 CC6060 CC6065		WX120	WG300	**KYS25** KY4300 KY1525 KY1540	
	S20								WX120		KYS30	
H (Hard Materials)	H01	A65 KT66 **A66N** **PT600M**		NPC-A2		HC4 HC7 **ZC7**	CC650 CC670 CC6050		**NB100C**	LX11 LX21	**KY4400**	
	H10	A65 KT66 **A66N** **PT600M**		NPC-A2 Whiskal WIN		**ZC7** WA1 WA5	CC670			WG300	KY4300	

·**Boldface grade** shows PVD Coated Ceramic.

CBN

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Classification		Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
K (Cast Iron)	K01	KBN475	JBN795		MB710	B20 B22 B30	CB7525 CB50 CB7050	**CBN050C** **CBN300P**	BN500 **BNC500**	BX910 BX930 BX950		IB50 IB85
	K10	**KBN60M** **KBN900**	JBN330	BH200	MB710 MB5015 MB4020	B22 B23	CB50 CB7050	CBN20 CBN200 CBN300	BN600 BN700 BN7000	BX950 **BXC90** BX470	KB1630 **KB9610**	IB55 IB90
	K20	**KBN900**		BH250	MB730 MBS140 **BC5030**	B16 B40		CBN350 CBN500 CBN600	BN7000 BNS800	BX950 **BXC90** BX90S	**KB9640**	
H (Hard Materials)	H01	KBN510 **KBN05M** **KBN10M**	DH102		**BC8110** **MBC010** MB810	B24 B52	CB20	**CBN050C** CBN010 CBN10 CBN100	BN1000 BNX10 **BNC100** **BNC160** **BNC2010**	BXA30 BX310 **BXC30** **BXM10**	KB1610	IB20H **IB25HC** IB50
	H10	KBN525 **KBN05M** **KBN25M**	JC6102 JC8003 JBN500	BH200	**BC8120** **MBC020** **BC8020** MB8025 MB825	B24 B36 B54 B52	CB7015 CB7050 CB50	CBN150 CBN060K CBN200 **CBN160C**	**BNC160** BNX20 BN2000 **BNC200** **BNC2020**	**BXM10** BXA40 BX330 BX360 **BXC50**	KB1615 KB1625 KB5610 **KB9610**	IB50
	H20	**KBN30M** **KBN35M** **KBN900**	JC8003 JC5015 JBN245	BH250	**BC8120** **MBC020** **BC8020** MB8025	B22 B36	CB7025 CB7525	CBN350 **CBN300P** **CBN400C** CBN500	BNX25 BN350 **BNC300**	BX380 **BXC50** **BXM20**	KB1340 **KB5625** **KB9640**	IB55 **IB25HA**
Sintered Steel	-	KBN65B KBN570 **KBN65M** **KBN70M**	JBN795 JBN500		MB4020			CBN200	BN350 BN7000 BN7500	BX450 BX470 BX480		

·**Boldface grade** shows PVD Coated CBN.

PCD

Classification		Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
N (Non-ferrous Metals)	N01	KPD001	JDA30 JDA735		MD205	PD1	CD05 CD10	PCD05 PCD10	DA90 DA1000 DA2200	DX180 DX160	PD100 KD1400 KD1405	
	N10	KPD001 KPD010 KPD230 KPD250	JDA40 JDA745		MD220	PD2	CD10	PCD10 PCD20	DA150 DA1000 DA2200	DX140	KD100 KD1400 KD1415	ID5
	N20	KPD001 KPD010 KPD230 KPD250	JDA10 JDA715		MD230			PCD30 PCD30M	DA1000 DA2200	DX110 DX120	KD1425	

Molded Chipbreaker Cross Reference Table

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Negative Inserts

Cutting Range		Kyocera		Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
		General Chipbreaker	Chipbreaker for Sticky Material / Soft Steel										
Carbon Steel / Alloy Steel	Finishing (With Wiper Edge)	WP	-	-	-	SW	-	WL WF	W-MF2	SEW LUW	AFW FW	FW	-
	Finishing~Medium (With Wiper Edge)	WQ	-	-	-	MW	-	WM WMX	W-M3 W-M5	GUW	ASW SW	MW	WG
	Finishing	DP GP PP	XF XP	F1 FA FT PF	BE BH FE	F FH FS FY PK	UL WM ZF1	XF QF	FF1	FP SP FA FL LU	TF 01 AS TSF	FF UF FS	F3P SF
	Finishing - Medium	HQ PQ CQ CJ VC VF	XQ	UA UT	AB B CE CT	SH C SA LP SY	WV WR	LC PF	FF2 MF2	SU EX SJ SX UJ SE	TS NS CB 11 17 27 ZF	RP FN	NF
	Medium - Roughing	PG GS PS	XS	UR UB	AE DE AH	MV MP MA MH	Z5 ZW1	XM QM SM SMC PM	M3 MF3	UA UG GE GU	AM DM NM TM ZM	MN	M3P TF
	Medium - Roughing High Feed Rate	PT GT	-	GC PQ	AR AY	GH RP	GS	MR XMR	M5 MR5 MR6	MU UX ME	TH 32Y 32 37	RP RN	R3P NR
	Roughing	Standard PH	-	GG LG GQ	RE	MT Standard	G	Standard 23	MR7	MC MU MX UZ	31 33 F-K THS	PR MG	GN
	Roughing Single Sided High Feed Rate	PX	-	GS RM UC UP	H HX HE TE UE	HV HR HX HZ HL HM	-	QR PR HR	R4 R5 R6 R7 RR6 RP	HG HP MP HF	TU 57 65 TUS	RH RM	TNM
Stainless Steel	Finishing	GU MQ	-	SF	BH MP	FS SH FJ LM	ZF1	MF	-	SU EF	SF SS	FP	F3M
	Medium - Roughing	MS MU TK	-	GP SZ	DE SE PV	MS MA GM MJ MM ES MH GH GJ RM	ZP WS	MM MMC MR XMR SMR	MF1 MF3 A3 A5 M5 56 R8 RR9	EG EX MU UP EM	HMM SM SA S SH	P MP MS	TF PP M3M R3M
Cast Iron	Medium	C Standard	-	-	AH VA VY	LK MF Standard	-	KF KM	-	UZ UX UJ	Standard 33 CF	FN	-
	Roughing	GC ZS	-	-	-	GH RK	-	KR KRR	-	GZ	CM CH	RP UN	-
Non-ferrous Metals	Medium - Roughing	AH	-	-	-	-	-	AL	95	AG	P	GP MS	PP

Positive Inserts

Cutting Range		Kyocera		Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
		General Chipbreaker	Chipbreaker for Sticky Material / Soft Steel										
Carbon Steel / Alloy Steel	Minute ap	CF	-	-	-	-	-	-	-	-	01	-	-
	Finishing (With Wiper Edge)	WP	-	-	-	SW	-	WF WK	W-F1	LUW SDW	-	FW	WF
	Finishing	DP GP PP VF	XP	ASF	-	FV SQ FP SMG	AZ3 AMX AZ7	PF UF XF	FF1	FB FC FK FP LU	PF PSF 23	11 GF UF FP	PF SM
	Finishing - Medium (1)	HQ	XQ	ACB FT	JE	MQ MV LP	AF1	PM UM SMC	F1	LB SF SU	PS PSS 24	LF	14
	Finishing - Medium (2)	GK	-	BM	JQ	Without Indication	QD CL	PF PM XM	MF2	-	-	-	-
	Medium	Standard	-	-	J	MP Standard	AM3	PR UR KM XR	F2	MU SC	PM	GM MP MR	Standard
Stainless Steel	Finishing	MQ	-	-	MP	FM FV SV LM	-	MF MMC	-	LU	JS PF PSF	FW FP MW	WF
Non-ferrous Metals	Finishing - Medium	AH	-	ALU	-	AZ	-	AL	AL	AG AW	AL	HP	AF AS

Positive Inserts (for Automatic Lathe)

Cutting Range		Kyocera	Dijet	Mitsubishi Hitachi Tool	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Carbon Steel / Alloy Steel	Minute ap	CF	-	-	-	-	-	-	-	01	-	-
	Finishing	CK GF	ASF	JQ	FP FV SMG	AZ7 AMX ZR	PF XF	FF1	SI FC	PF	11 UF FP	PF SM
	Finishing - Medium	GQ SK	ACB FT	JE	LP AM MV	AM3 YL	PM XM	F1 MF2	SU	PS	LF	14
	Medium	GK	-	J	MP Standard	QD CL	PR	F2	SC	PM	MF MP	Standard
Stainless Steel	Finishing	MQ	-	MP	FM FV SV LM	-	MF	-	LU	JS PF PSF	FW FP MW	WF
Non-ferrous Metals	Finishing - Medium	AH	ALU	-	AZ	-	AL	AL	AG AW	AL	HP	AF AS

Milling Insert Description Cross Reference Table

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Kyocera	Class	Applications	Mitsubishi Hitachi Tool	Mitsubishi	Sandvik	Sumitomo	Tungaloy	Iscar
SDMR1203AUER-H SDKR1203AUEN-S	M K	Steel	SDKR42TN	(SDNR1203AEEN-JS)		SDMR1203AEEN SDMR1203AETN	SDMR1203AETN-MJ SDKR1203AESR-MJ SDKR1203AETN-MJ SDKR1203AEPN-MS SDKR42ZSR-MJ SDKR42ZPN-MS	SDKR1203AUTR-HS SDKR1203AUN-76
SDCN1203AUTN	C		(SDE42TN-C9)				SDCN1203AETN-12 SDCN42ZTN (SDEN1203AETNCR) (SDEN42ZTNCR)	
SDKN1203AUTN	K		SDK42TN-C9	SDKN1203AEN SDKN1203AETN (SDNN1203AETN1)		SDKN42MT (SDNN1203AETN)	SDKN1203AETN-12 SDKN42ZTN	SDKN1203AETN
SDKN1203AUFN	K	Cast Iron	SDK42FN-C9			SDKN42M (SDNN1203AEEN)	SDKN1203AEFN-12 SDKN42ZFN	
		Non-ferrous Metals				SDKN42M	(SDCN1203AEFN-D) (SDCN42ZFN-DIA)	
SDCN1504AUTN	C	Steel	SDC53TN-C9				SDCN1504AETN SDCN53ZTN	
SDKN1504AUTN	K		SDK53TN-C9	SDKN1504AEN SDKN1504AETN		SDKN53MT	SDKN1504AETN SDKN53ZTN	SDKN1504AETN
SEMR1203AFER-H SEKR1203AFEN-S	M K	Steel	SEKR42TN	(SEER1203AFEN-JS)	SEKR1203AZ-WM (SEER1203AZ-WL)	SEMR1203AFEN (SEER1203AFEN)	SEMR1203AFTN-MJ SEKR1203AFSR-MJ SEKR1203AFTN-MJ SEKR1203AFPN-MS	SEKR1203AFTR-HS SEKR1203AFR-HS SEKR1203AFN-76 SEKR1203AF-N-42
SEMR1204AFER-H	M				(SEKR1204AZ-WM) (SEER1204AZ-WL)	SEMR1204AFEN (SEER1204AFEN)		(SEKR1204AFTR-HS) (SEKN1204AFTN)
SEEN1203AFTN	E		SEE42TN-C9	SEEN1203AFTN1		SEEN42MT	SEEN1203AFTNCR-14	
SEKN1203AFTN	K		SEK42TN-C9	SEKN1203AFTN1 (SENN1203AFTN1)	SEKN1203AZ (SEMN1203AZ)	SEKN42MT (SENN1203AFTN)	SEKN1203AFTN SEKN1203AFTN-16 SEKN42AFTN SEKN42AFTN16	
SEKN1203AFFN	K	Cast Iron	SEK42FN-C9	(SEEN1203AFFN1)	SEKN1203AZ (SEMN1203AZ)	SEKN42M (SENN1203AFEN)	SEKN1203AFFN SEKN42AFFN	
SEEN1203AFFN	E	Non-ferrous Metals	SEE42FN-C9	(SECN1203AFFR1)				
SEKN1203EFTR	K	Steel	SEK42TR-G3	SEKN1203EFTR1	(SECN1203EER)		SEKN1203EFTR (SECN1203EFTR) (SEEN1203EFTR) (SECN42EFTRCR) (SEEN42EFTRCR)	
SEKN1504AFTN	K	Steel	SEK53TN-C9		SEKN1504AZ	SEKN53MT		SEKN1504AFTN
SPEN1203EESR	E	Cast Iron	(SPK42FR-A3E)	SPEN42EFSR1 SPEN1203EESR1 SPEN1203EEER1 (SPNN1203EEER1)				
SPMR1203EDER-H SPKR1203EDER-S	M K	Steel		(SPER1203EDER-JS)	SPKN1203EDR-WH		SPKR1203EDSR-MJ SPKR42SSR-MJ	SPKR1203EDR-76 SPKR1203EDTR-HS
SPCN1203EDTR	C			(SPEN1203EDR)	(SPAN1203EDR)	SPCH42TR-R	SPCN1203EDTR SPCN42STR	
SPKN1203EDTR	K		SPK42TR-A3	SPKN1203EDR	SPKN1203EDR	(SPCH42TR) (SPCH42TR-R)	SPKN1203EDTR SPKN42STR (SPEN1203EDTR) (SPEN42STR)	SPKN1203EDTR SPKN1203EDTR-42
SPKN1203EDFR	K	Cast Iron	SPK42FR-A3		SPKN1203EDR	(SPCH42R)	SPKN1203EDFR SPKN42SFR	SPKN1203EDFR
SPKN1504EDTR	K	Steel	SPK53TR-A3	SPKN1504EDR	SPKN1504EDR	(SPCH53TR-R)	SPKN1504EDTR SPKN53STR (SPCN1504EDTR) (SPCN53STR)	SPKN1504EDTR
SPKN1504EDFR	K	Cast Iron	SPK53FR-A3			(SPCH53R-R) (SPCH53TR-R)	SPKN1504EDFR SPKN53SFR	SPKN1504EDFR

Note 1. Tolerance class is different for description in ( ).

2. Since edge shape of Milling insert is slightly different by each maker, please adjust edges (Z axis direction) during operation.

Milling Insert Description Cross Reference Table

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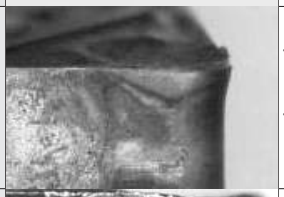
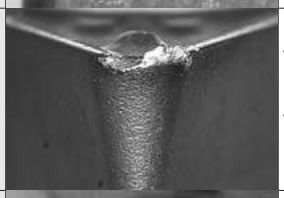
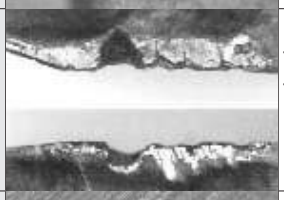
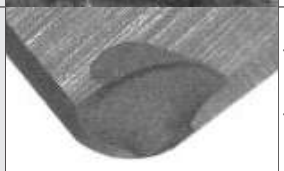
Kyocera	Class	Applications	Mitsubishi Hitachi Tool	Mitsubishi	Sandvik	Sumitomo	Tungaloy	Iscar
SPCN1203XPTR	C	Steel	SPC42TR-A5				SPCN1203ZPTR SPCN42ZTR	
SPKN1203XPTR	K		SPK42TR-A5				SPKN1203ZPTR SPKN42ZTR (SPEN1203ZPTR) (SPEN42ZTR)	
SPKN1203XPFR	K	Cast Iron	SPK42FR-A5				SPKN1203ZPFR SPKN42ZFR	
SPKN1504XETR	K	Steel		SPK53C2SR				
TPMR1603PDER-H	M	Steel		(TPER1603PPER-JS)	(TPKN1603PPR-WH)			(TPKR1603PPTR-HS)
TPKN1603PDTR	K		TPK32TR-E0 TPK32TR-G0	TPKN1603PPR (TPEN1603PPR)	TPKN1603PPR	TPKN32TR		TPKN1603PPTR
TPKN1603PDFR	K	Cast Iron	TPK32FR-E0		TPKN1603PPR	TPKN32R		TPKN1603PPFR
TPMR2204PDER-H **TPKR2204PDER-S**	M K	Steel		(TPER2204PDER-JS)	TPKN2204PDR-WH		TPMR2204PDSR-MJ TPKR2204PDSR-MJ TPKR43ZSR-MJ	TPKR2204PDTR-HS TPKR2204PD-R-76
TPKN2204PDTR	K		TPK43TR-E0 TPK43TR-G0	TPKN2204PDR (TPEN2204PDR)	TPKN2204PDR	(TPCH43TR)	TPKN2204PPTR TPKN43ZTR (TPCN2204PPTR) (TPCN43ZTR)	TPKN2204PDTR TPKN2204PDTR-42
TPKN2204PDFR	K	Cast Iron	TPK43FR-E0			(TPCH43R)	TPKN2204PPFR TPKN43ZFR (TPCN2204PPFR) (TPCN43ZFR) (TPEN2204PPTR-16) (TPEN43ZTR)	TPKN2204PDFR
TEMR1603PTER-H	M	Steel		(TEER1603PEER-JS)			(TEKR1603PEPR-MS)	
TEKN1603PTTR	K		TEK32TR-G0 (TEE32TR-G0)	(TEEN1603PETR1)		TEKN32TR	(TECN1603PETR) (TEEN1603PETR) (TECN32ZTR) (TEEN32ZTR)	
TEKN1603PTFR	K	Cast Iron	TEK32FR-G0 (TEE32FR-G0)	(TEEN1603PEFR1)		TEKN32R	(TEEN1603PEFR) (TEEN32ZFR)	
TEEN1603PTFR	E	Non-ferrous Metals		(TECN1603PEFR1)		TEEN32R	(TECN1603PEFR-D) (TECN32ZFR-DIA)	
TEMR2204PTER-H **TEKR2204PTER-S**	M K	Steel		(TEER2204PEER-JS)			TEKR2204PEPR-MS	
TEEN2204PTTR	E		TEE43TR-G0E (TEK43TR-G0E)	TEEN2204PETR1		TEEN43TR	TEEN2204PETR (TECN2204PETR) TEEN43ZTR (TECN43ZTR)	
TEKN2204PTTR	K		TEK43TR-G0E	TEKN2204PETR1		TEKN43TR	(TEEN2204PETR) (TECN2204PETR) (TEEN43ZTR) (TECN43ZTR)	
TEKN2204PTFR	K	Cast Iron	TEK43FR-G0E	(TEEN2204PEFR1)		TEKN43R	(TEEN2204PEFR) (TEEN43ZFR)	
		Non-ferrous Metals		(TECN2204PEFR1)		(TEEN43R)	(TECN2204PEFR-D) (TECN43ZFR-DIA)	
SNCN1204XNTN	C	Steel	SNC43TN-D5	SNC43B2S		(CSN43MT)	SNCN1204ZNTN SNCN43ZTN	
SNKN1204XNTN	K		SNK43TN-D5	SNK43B2S		(CSN43MT)	SNKN1204ZNTN SNKN43ZTN	
SNCN1204ENTN	C	Steel		(SNKN1204EN)	(SNKN1204ENN)			
SNMF1204XNTN	M	Steel	(SNKF43TN-D5)	(SNKF43B2S)		(CSNB43MT)	(SNKF1204ZNTN) (SNKF43ZFN)	

Note 1. Tolerance class is different for description in ( ).

2. Since edge shape of Milling insert is slightly different by each maker, please adjust edges (Z axis direction) during operation.

Cutting Edges Figuration and Countermeasures

Typical Cutting Edge Figuration		Observation	Causes	Countermeasures
Nose wear		· Deterioration of surface roughness and dimensional accuracy	· Too high Vc · End of tool life	· Reduce Vc · Change to higher wear resistant grade
Notching		· Burr formation · Cutting force increase	· Too high f and Vc	· Sharper cutting performance · Reduce Vc · Change to higher heat resistant grade
Crater wear		· Chip control deterioration · Surface finish deterioration (peeled surface)	· Too high Vc	· Reduce Vc · Change to high speed type like Cermet or Al_2O_3 coated insert grade
Plastic Deformation		· Workpiece dimension changes · Crack at nose	· Too high cutting load · Inappropriate insert grade	· Change to harder grade · Reduce f and ap
Crack from Wear		· Surface finish's sudden deterioration · Workpiece dimension changes	· Too high Vc	· Change the tool earlier · Change to higher wear resistant grade
Chipping		· Cutting force increase · Surface roughness deterioration	· Too high f · Chattering · Lack of insert toughness	· Reduce f and ap · Change to more rigid toolholder · Change to tougher grade
Crack from Welding or Built-up Edge		· Surface finish deterioration · Cutting force increase	· Too low Vc	· Increase Vc · Improve sharp cutting performance (rake angle, chamfer)
Mechanical Fracture		· Sudden cracking · Unstable tool life	· Too high f and ap · Chattering	· Change to tougher grade · Enlarge chamfer · Enlarge Corner-R(rε) · Change to more rigid toolholder
Fracture from Thermal Crack		· Cracking by heat cycle · Possible in interrupted machining and milling	· Too high Vc and f	· Reduce f · Reduce Vc · Change to dry cutting
Flaking		· Possible in hard materials machining · Possible in machining with chattering	· Lack of insert toughness · Poor rigidity of toolholder	· Change to tougher grade (TiC-base ceramic to CBN.) · Change to more rigid toolholder · Change edge preparation

Turning

Trouble	Trouble Item	Check Item / Countermeasures	Change to Harder Grade	Change to Tougher Grade	Change to More Thermal Shock Resistant Grade	Change to More Welding Resistant Grade	Vc	f	ap	Tool Path Review	Coolant: Wet	Coolant: Dry	Chipbreaker Review	Rake Angle	Corner-R(rε)	Approach Angle	Edge Strength / Honing	Change to Higher Tolerance (M→G)	Toolholder Rigidity	Workpiece / Tool Installation	Overhang Length	Power, Rigidity
		Insert Grades / Cutting Conditions / Tool Geometry / Setting / Machine					Higher (Larger) ↑ Lower (Smaller) ↓						Larger ↑ Smaller ↓									
Unstable Dimension	Unstable Workpiece Dimension	Unsuitable Insert Tolerance																●				
		Tool and Workpiece Evacuation											●	●↑	●↓	●↓			●	●	●	●
	Frequent Offset during Machining	Flank Wear Increase	●												●↑							
		Unsuitable Cutting Conditions					●↓	●↑														
		Built-up Edge				●	●↑															
Surface roughness deterioration	Poor Surface Roughness	Poor Cutting by Tool Wear	●			●	●↓				●		●	●↑	●↑		●↓	●				
		Chipping		●				●↓	●↓				●		●↑		●↑			●	●	●
		Welding, Built-up Edge				●	●↑				●		●	●↑			●↓	●				
		Unsuitable Cutting Conditions					●↑	●↓	●↓		●											
		Unsuitable Tool Geometry											●		●↑		●↓	●				
		Vibration, Chattering		●			●↓	*1 ●↓	●↓				●	●↑	●↓	●↓	●↓		●	●	●	●
Heat	Deterioration of Accuracy or Tool Life by Cutting Heat	Unsuitable Cutting Conditions					●↓	●↓	●↓		●											
		Unsuitable Insert Grades and Tool Geometry	●										●	●↑			●↓					
Burr, Workpiece Chip Off and Scuffing	Burr	Unsuitable Cutting Conditions					●↓	●↑		●	●											
		Unsuitable Insert Grades and Tool Geometry	●										●	●↑	●↓	●↓	●↓					
	Workpiece Chip Off	Unsuitable Cutting Conditions						●↓	●↓	●												
		Unsuitable Insert Grades and Tool Geometry	●										●	●↑	●↑	●↑	●↓		●	●	●	●
	Scuffing	Unsuitable Cutting Conditions					●↑	*2 ●↓			●											
		Unsuitable Insert Grades and Tool Geometry	●			●							●	●↑			●↓					
Edge Damage	Wear Increase at Relief Face, Rake Face	Flank Wear	●				●↓				●		●	●↑	●↑		●↓					
		Rake Face Wear	●				●↓	●↓	●↓		●		●	●↑		●↑						
	Notching	Notching				●	●↓				●											
	Chipping	Vibration, Chattering		●				●↓	●↓				●			●↑	●↑		●	●	●	●
	Crack	Unsuitable Insert Grades and Cutting Conditions		●	●			●↓	●↓				●		●↑	●↑	●↑		●	●	●	●
	Thermal Crack	Work Hardness, Unsuitable Insert Grades and Cutting Conditions			●		●↓	●↓	●↓			●	●	●↑			●↓					
	Edge Nose Deformation	Edge Nose Deformation during Interrupted machining	●				●↓	●↓	●↓				●	●↓	●↑	●↑	●↑					
	Built-up Edge	Work Hardness, Unsuitable Insert Grades and Cutting Conditions				●	●↑	●↑			●		●	●↑			●↓	●				
Chip Control	Long, Tangling Chips	Unsuitable Cutting Conditions					*3 ●↓	●↑	●↑	●		●										
		Unsuitable Tool Geometry											●		●↓	●↓						
	Chips scattering	Unsuitable Cutting Conditions						●↓	●↓			●										
		Unsuitable Tool Geometry											●		●↑	●↑						

*1) To prevent chattering, the higher f may be suitable.

*2) To prevent scuffing, the higher f may be suitable.

*3) When using X-chipbreaker insert for soft steel and low carbon steel, the higher Vc cuts chips short.

Milling

Trouble	Trouble Item	Check Item / Countermeasures	Change to Harder Grade	Change to Tougher Grade	Change to More Thermal Shock Resistant Grade	Change to More Welding Resistant Grade	Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	fz (Higher (Larger) ↑ Lower (Smaller) ↓)	ap (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutter Dia. Cutting Width Review	Tool Path Review	Coolant: Usage of Mist	Coolant: Dry	Insert with Chipbreaker	Relief Angle (Larger ↑ Smaller ↓)	Corner Angle (Larger ↑ Smaller ↓)	Edge Strength / Honing (Larger ↑ Smaller ↓)	No. of Inserts (More ↑ Less ↓)	Chip pocket (Larger ↑ Smaller ↓)	Wiper Edge (Relief Angle) Review	Insert Runout Check	Cutter Rigidity	Setting: Workpiece / Tool Installation	Setting: Overhang Length	Machine: Power, Rigidity
Edge Damage	Flank Wear Increase	Unsuitable Cutting Conditions					●↓					●													
		Unsuitable Tool Geometry	●												●↑		●↓			●					
	Rake Face Wear Increase	Unsuitable Cutting Conditions					●↓	●↓	●↓			●													
		Unsuitable Tool Geometry	●												●↑	●↑	●↓								
	Chipping, Cracking	Unsuitable Cutting Conditions						●↓	●↓	●	●														
		Unsuitable Tool Geometry		●											●↓	●↑	●↑			●	●	●	●	●	●
	Edge Breakage by Thermal Shock	Unsuitable Cutting Conditions					●↓	●↓	●↓				●												
		Unsuitable Tool Geometry			●										●↑		●↓								
	Built-up Edge	Unsuitable Cutting Conditions					●↑	●↑				●													
		Unsuitable Tool Geometry				●									●↑		●↓								
Cutting Accuracy	Poor Surface Finish	Unsuitable Cutting Conditions					●↑	●↓	●↓			●													
		Unsuitable Tool Geometry	●			●											●↓	●↓		●	●		●	●	●
	Burr formation	Unsuitable Cutting Conditions					●↓	●↓	●↓	●	●														
		Unsuitable Tool Geometry													●↑	●↓	●↓			●					
	Workpiece Chip Off	Unsuitable Cutting Conditions						●↓	●↓		●														
		Unsuitable Tool Geometry													●↑	●↑	●↓	●↑		●					
	Poor Planeness / Parallelness	Tool and Workpiece Evacuation						●↓	●↓			*5●		●	●↑	●↓	●↓	●↓		●	●	●	●	●	●
Others	Heavy Chattering, Vibration	Unsuitable Cutting Conditions, Installation					●↓	*1●↓	*2●↓	●	*4●			●	●↑	●↓	●↓	●↓				●	●	●	●
	Damaging Chips	Unsuitable Cutting Conditions					●↑	*3●↓		●		*6●	●												
		Unsuitable Tool Geometry												●	●↑			●↓	●↑						

*1) To prevent chattering, the higher fz may be suitable.
*2) To prevent chattering, the larger ap may be suitable.
*3) Higher fz may be suitable.
*4) Down-cut method is recommended for helical end milling.
*5) If the surface is warped by cutting heat.
*6) Compressed air is recommended.

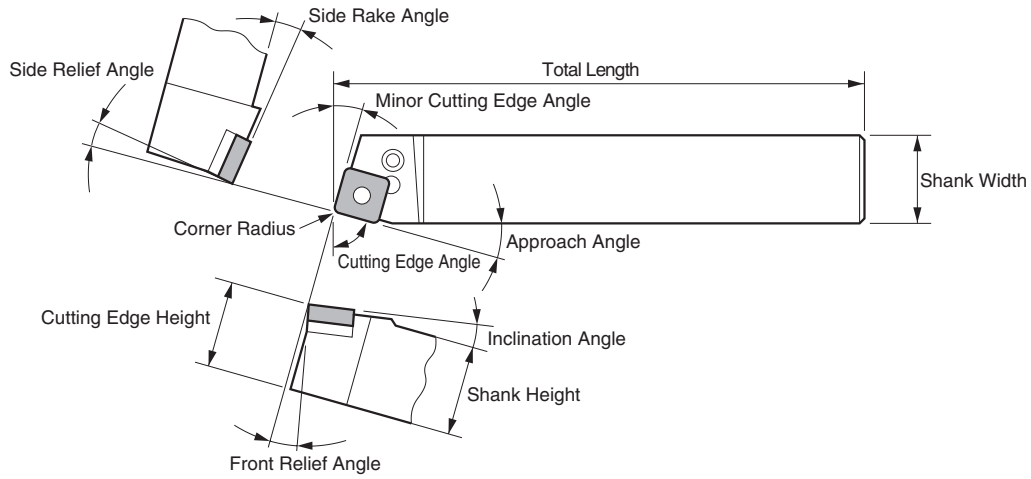
Drilling

Trouble	Trouble Item	Check Item / Countermeasures	Change to Harder Grade (Insert Grades)	Change to Tougher Grade (Insert Grades)	Vc (Cutting Conditions)	f (Cutting Conditions)	Coolant Discharge Condition (Cutting Conditions)	Chipbreaker Review (Tool Geometry)	Inner Edge's Center Height Check (Core Dia. Check) (Tool Geometry)	Toolholder Rigidity Improvement (Short Type) (Tool Geometry)	Workpiece / Tool Installation (Setting)	Insert Installation (Setting)	Offset Check (Setting)	Adjustable Sleeve Usage (Setting)	Power, Rigidity (Machine)
					Higher (Larger) ↑ Lower (Smaller) ↓				Larger ↑ Smaller ↓						
Edge Damage	Unusual Wear	Unsuitable Cutting Speed (too high)	●		●↓										
		Unsuitable Cutting Speed (too low)		●	●↑										
		Unsuitable Coolant Discharge					●								
		Poor Rigidity of Machine / Workpiece									●				●
		Small Hole Dia.											*1 ●	●	
		Unsuitable Insert Grade	●												
	Inner Edge Cracking	No core, Too Small Core							●↑						
		Poor Rigidity of Machine / Workpiece								●	●				●
		Unstable Drilling Start				●↓									
		High Hardness Workpiece	●		●↓	●↓									
		Clogged Chips			●↑				●↓						
		Unstable Insert Installation										●			
	Outer Edge Cracking	Poor Rigidity of Machine / Workpiece									●				●
		Unstable Drilling Start				●↓									
		High Hardness Workpiece	●		●↓	●↓									
		Poor Chip Control		●	●↑										
		Unstable Insert Installation										●			
Toolholder, Others	Scratches on Tool Body	Poor Rigidity of Machine / Workpiece									●				●
		Inaccurate Tool Installment											*1 ●	●	
		Clogged Chips			●↑	●↓									
		Unstable Drilling Start				●↓									
	Poor Hole Dia. Accuracy / Surface Finish	Poor Rigidity of Machine / Workpiece									●				●
		Poor Rigidity of Toolholder								●		●			
		Inaccurate Tool Installment											*1 ●	●	
		Clogged Chips			●↑	●↓			●↓						
		Large Core Dia.							●↓						
		Unstable Drilling Start				●↓									
		Unsuitable Coolant Discharge					●								
	Large Vibration / Chattering	Unsuitable Cutting Conditions, Installation			●↑	●↓				●	●				●
	Long Chips	Unsuitable Cutting Conditions			●↑										
		Unsuitable Chipbreaker						●							
	Machine Failure	Lack of Machine Power			●↓	●↓		●							●

*1) For lathe operation

Terms and Angles of Toolholder

Terms and Angles of Turning Toolholder



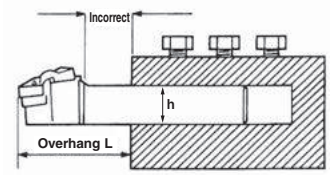
Function of Tool Angle

Tool Angle	Name	Function	Effect
Rake Angle	Side Rake Angle	·Affects cutting force, cutting heat, chip evacuation and tool life.	·If it is positive (+) angle, sharper cutting performance is obtained. (less cutting force, less edge strength) ·Positive (+) angle is recommended for easy to machine workpieces or thin workpieces. ·Smaller rake angle or negative (-) angle is recommended when a stronger edge is required like scale machining or interrupted machining.
	Inclination Angle		
Relief Angle	Front Relief Angle Side Relief Angle	·Prevents the tool's contact to the workpiece surface, except the cutting edge.	·When it is small, the cutting edge becomes strong, but the wear at relief faces may shorten the tool life.
Cutting Edge Angle	Cutting Edge Angle	·Affects chip control and the direction of cutting force.	·When it is large, chip thickness becomes thick and chip control improves.
	Approach Angle	·Affects chip control and the direction of cutting force.	·When it is large, chip thickness becomes thin and chip control worsens, but cutting force is dispersed and edge strength improves. ·When it is small, chip control ability improves.
	Minor Cutting Edge Angle	·Prevents friction between cutting edge and workpiece surface.	·When it is large, edge strength deteriorates.

Toolholder Rigidity

1. Flexure of Toolholder

$$\delta = \frac{4 \times F \times L^3}{E \times b \times h^3} = \frac{4 \times k \times ap \times f \times L^3}{E \times b \times h^3}$$



Symbol	Name	Unit
δ(Delta)	Deflection	mm
b	Shank Width	mm
h	Shank Height	mm
E	Young ratio	N/mm^2
ap	Depth of Cut	mm
f	Feed Rate	mm/rev
k	Specific Cutting Force	N/mm^2
L	Overhang	mm
F	Cutting force	N

(F=k×ap×f)

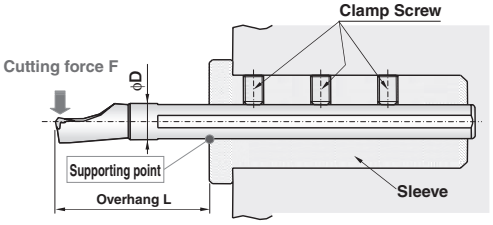
The flexural strength of toolholder will decrease by increasing of shank height by third root and will decrease of reducing overhang by third root.
Minimizing toolholder shank overhang as much as possible is important as well as shank's sectional square measure.

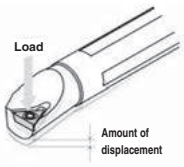
2. Flexure of Boring Bar

$$\delta = \frac{64 \times F \times L^3}{3 \times E \times \pi \times D^4} = \frac{64 \times k \times ap \times f \times L^3}{3 \times E \times \pi \times D^4}$$

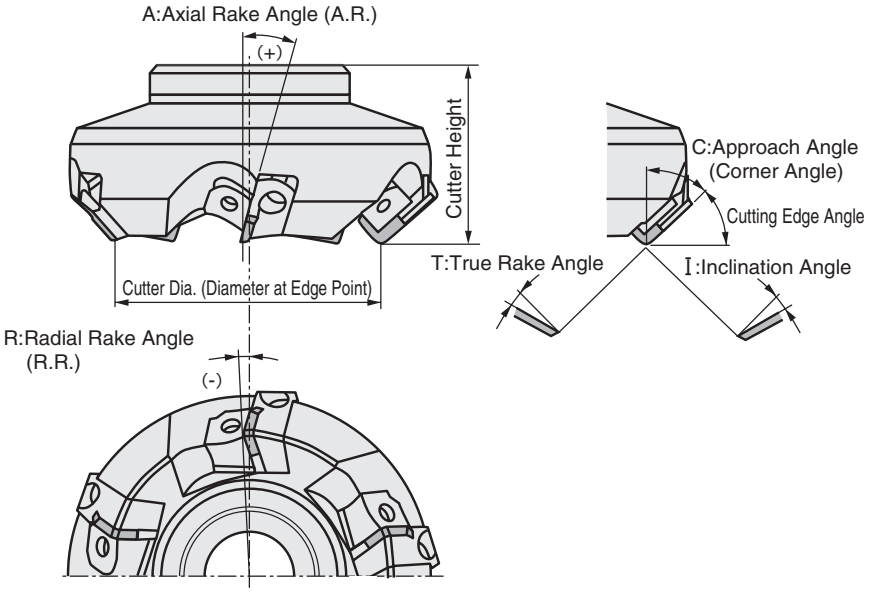
Symbol	Name	Unit
δ(Delta)	Deflection	mm
D	Shank Dia.	mm
E	Young ratio	N/mm^2
ap	Depth of Cut	mm
f	Feed Rate	mm/rev
k	Specific Cutting Force	N/mm^2
L	Overhang	mm
F	Cutting force	N

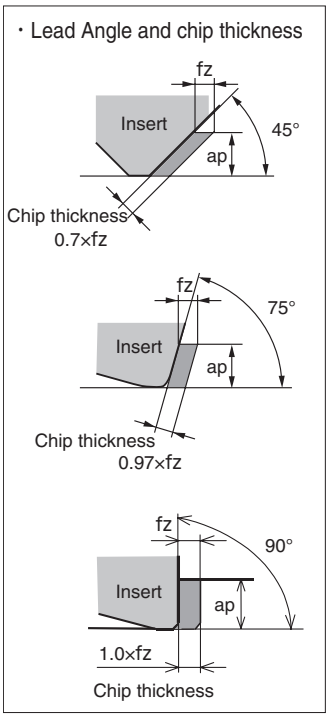
(F=k×ap×f)





Terms and Angles of Milling Cutter





Function of Tool Angle

Symbol	Name	Function	Effect
A	Axial Rake Angle (A.R.)	Controls chip flow direction and cutting force	When it is positive ··· Good cutting performance and less chip welding
R	Radial Rake Angle (R.R.)	Controls chip flow direction and cutting force	When it is negative ··· Good chip evacuation
C	Approach Angle	Controls chip thickness and chip flow direction	When it is large ··· Thinner chip thickness Lower cutting load
T	True Rake Angle	Actual rake angle	When it is positive ··· Good cutting performance and less chip welding, but lower edge strength When it is negative ··· Higher edge strength but easier to weld
I	Inclination Angle	Controls chip flow direction	When it is positive ··· Good chip evacuation Less cutting force Lower edge stability of the corner part

The Formula for True Rake Angle : $\tan T = \tan R \times \cos C + \tan A \times \sin C$

The Formula for Inclination Angle : $\tan I = \tan A \times \cos C + \tan R \times \sin C$

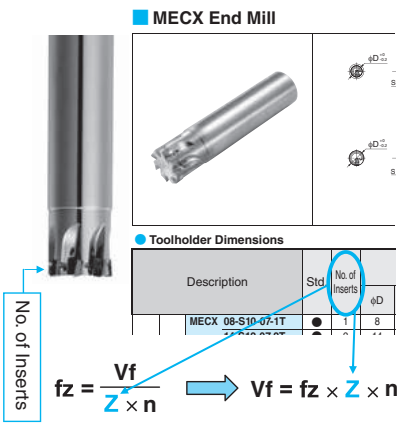
No. of Inserts (Z)

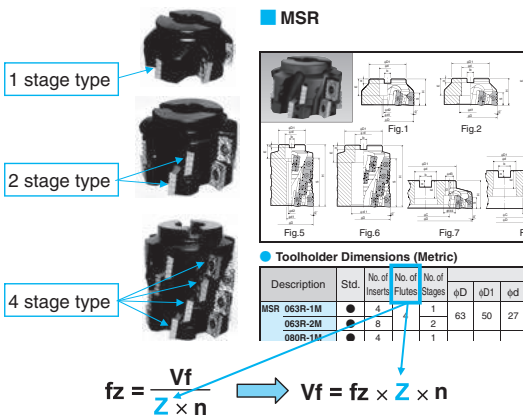
1) If the number of stage is one

If the number of stage is one, it is not indicated on the catalogue.
Please use "No. of inserts" of the catalogue for "Z" of the formula to calculate cutting conditions.

2) If the number of stages is more than two

If the number of stages is more than two, it is indicated on the catalogue.
Please use "No. of flutes" of the catalogue for "Z" of the formula to calculate cutting conditions.





Basic Formulas

Turning

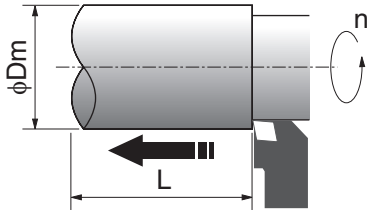
Cutting Speed

$$Vc = \frac{\pi \times Dm \times n}{1{,}000}$$

Vc : Cutting speed [m/min]

Dm : Workpiece Dia. [mm]

n : Spindle Revolution [min^{-1}]



Power Requirement

$$Pc = \frac{Ks \times Vc \times ap \times f}{6{,}120 \times \eta}$$

$$P_{HP} = \frac{Ks \times Vc \times ap \times f}{4{,}500 \times \eta}$$

Pc : Power Requirement [kW]

P_{HP} : Power Requirement (Horse Power) [HP]

Vc : Cutting speed [m/min]

ap : Depth of Cut [mm]

f : Feed Rate [mm/rev]

K_S : Specific Cutting Force [kgf/mm^2]

η : Mechanical Efficiency (0.7~0.8)

Ks Figure (kgf/mm^2)	
Low Carbon Steel	190
Medium Carbon Steel	210
High Carbon Steel	240
Low Alloy Steel	190
High Alloy Steel	245
Cast Iron	93
Malleable Cast Iron	120
Bronze, Brass	70

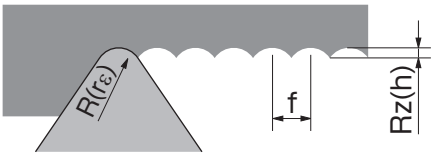
Theoretical Surface Roughness

$$Rz(h) = \frac{f^2}{8 \times R(r\varepsilon)} \times 1{,}000$$

Rz(h): Theoretical Surface Roughness [μm]

f : Feed Rate [mm/rev]

R(rε) : Corner Radius of Insert [mm]



Chip Removal Volume

$$Q = Vc \times ap \times f$$

Q : Chip Removal Volume [cm^3/min=cc/min]

Vc : Cutting speed [m/min]

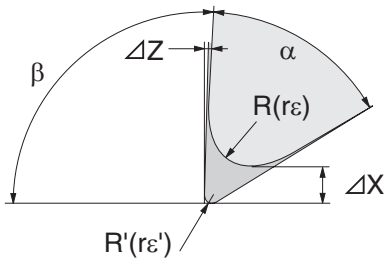
ap : Depth of Cut [mm]

f : Feed Rate [mm/rev]

Edge Position Compensation

$$\Delta X = (R-R') \times \left\{ \frac{\cos\left(\frac{\alpha}{2} + (\beta - 90°)\right)}{\sin\frac{\alpha}{2}} - 1 \right\}$$

$$\Delta Z = (R-R') \times \left\{ \frac{\sin\left(\frac{\alpha}{2} + (\beta - 90°)\right)}{\sin\frac{\alpha}{2}} - 1 \right\}$$



ΔX : X-axis Direction Edge Position Compensation [mm]

ΔZ : Z-axis Direction Edge Position Compensation [mm]

R : Corner-R before Change [mm]

R' : Corner-R after Change [mm]

α : Insert Corner Angle [°]

β : Toolholder's Cutting Edge Angle [°]

Toolholder Type	Insert Corner Angle α	Cutting Edge Angle β	ΔX	ΔZ
DCLN/PCLN	80°	95°	0.100×(R-R')	0.100×(R-R')
DTGN/PTGN	60°	91°	0.714×(R-R')	0.030×(R-R')
DDJN/PDJN	55°	93°	0.866×(R-R')	0.099×(R-R')
DDHN/PDHN	55°	107.5°	0.531×(R-R')	0.531×(R-R')
DVLN/PVLN	35°	95°	2.072×(R-R')	0.273×(R-R')
DVPN/PVPN	35°	117.5°	1.351×(R-R')	1.351×(R-R')
DSBN/PSBN	90°	75°	0.225×(R-R')	-0.293×(R-R')

Example: Compensation when changing corner-R from 0.8 to 0.4, using PCLN type toolholder,

ΔX=0.100×(0.8-0.4)=0.04(mm)

ΔZ=0.100×(0.8-0.4)=0.04(mm)

Turning (Cutting Time)

Cutting Time (External Turning Case 1: 1 Pass machining)

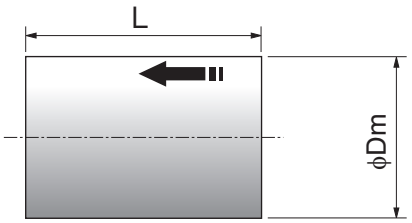
• At Constant Revolution

$$T = \frac{60 \times L}{f \times n}$$

• At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times Dm}{1{,}000 \times f \times Vc}$$

T : Cutting Time [second]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
Dm : Workpiece Dia. [mm]
Vc : Cutting speed [m/min]



Cutting Time (External Turning Case 2: Multi-Pass machining)

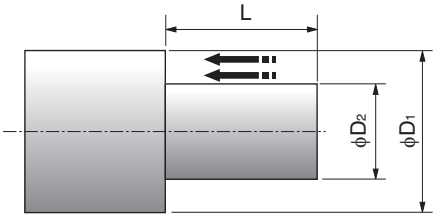
• At Constant Revolution

$$T = \frac{60 \times L}{f \times n} \times N$$

• At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times (D_1 + D_2)}{2 \times 1{,}000 \times f \times Vc} \times N$$

T : Cutting Time [second]
L : Cutting Length per Pass [mm]
ap : Depth of Cut per Pass [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_2 : Min. Dia. of Workpiece [mm]
Vc : Cutting speed [m/min]
N : Number of Passes = (D1 - D2) / ap / 2
(if it is indivisible, obtain integer by rounding up one place of decimals.)



Cutting Time (Facing)

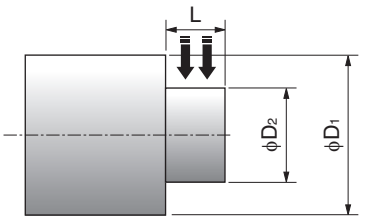
• At Constant Revolution

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n} \times N$$

• At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2) \times (D_1 - D_2)}{4{,}000 \times f \times Vc} \times N$$

T : Cutting Time [second]
T_1 : Cutting Time before reaching Max. Spindle Revolution [second]
L : Cutting Length [mm]
ap : Depth of Cut per Pass [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_2 : Min. Dia. of Workpiece [mm]
Vc : Cutting speed [m/min]
N : Number of Passes = L / ap
(if it is indivisible, obtain integer by rounding up one place of decimals.)



Cutting Time (Grooving)

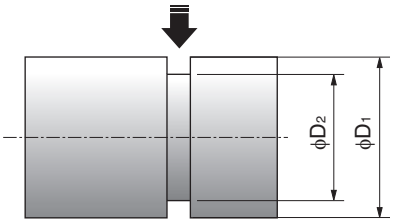
• At Constant Revolution

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n}$$

• At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2) \times (D_1 - D_2)}{4{,}000 \times f \times Vc}$$

T : Cutting Time [second]
T_1 : Cutting Time before reaching Max. Spindle Revolution [second]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_2 : Min. Dia. of Workpiece [mm]
Vc : Cutting speed [m/min]



Cutting Time (Cut-Off)

• At Constant Revolution

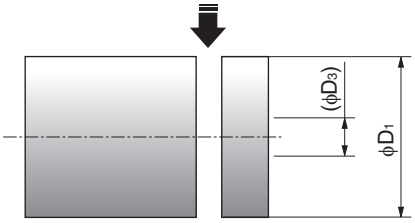
$$T = \frac{60 \times D_1}{2 \times f \times n}$$

• At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_3) \times (D_1 - D_3)}{4{,}000 \times f \times Vc}$$

$$T_3 = T_1 + \frac{60 \times D_3}{2 \times f \times n_{max}}$$

T : Cutting Time [second]
T_1 : Cutting Time before reaching Max. Spindle Revolution [second]
T_3 : Cutting Time when reaching Max. Spindle Revolution [second]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
n_{max} : Max. Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_3 : Diameter when reaching Max. Spindle Revolution [mm]
Vc : Cutting speed [m/min]



Milling

Cutting Speed

$$Vc = \frac{\pi \times Dc \times n}{1{,}000}$$

Vc : Cutting speed [m/min]
Dc : Cutter Dia. [mm]
n : Spindle Revolution [min^{-1}]

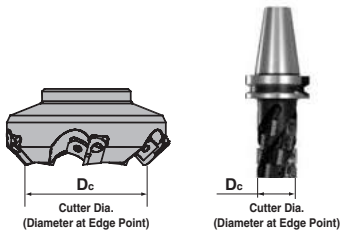
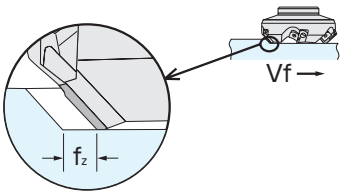


Table Feed & Feed per Tooth

$$f_z = \frac{Vf}{Z \times n}$$

fz : Feed per Tooth [mm/t]
Vf : Table Feed [mm/min]
Z : No. of Inserts
n : Spindle Revolution [min^{-1}]



Power Requirement

$$Pc = \frac{Ks \times Q}{6{,}120 \times \eta} = \frac{Ks \times ae \times Vf \times ap}{6{,}120{,}000 \times \eta}$$

$$= \frac{Ks \times ae \times fz \times Z \times n \times ap}{6{,}120{,}000 \times \eta}$$

$$P_{HP} = \frac{6{,}120}{4{,}500} \times Pc$$

Pc : Power Requirement [kW]
PHP : Power Requirement (Horse Power) [HP]
ae : Width of Cut [mm]
Vf : Table Feed [mm/min]
fz : Feed per Tooth [mm/t]
Z : No. of Inserts
n : Spindle Revolution [min^{-1}]
ap : Depth of Cut [mm]
Ks : Specific Cutting Force [kgf/mm^2]
η : Mechanical Efficiency (0.7~0.8)
Q : Chip Removal Volume [cm^3/min=cc/min]

Ks Figure (kgf/mm^2)	
Low Carbon Steel	190
Medium Carbon Steel	210
High Carbon Steel	240
Low Alloy Steel	190
High Alloy Steel	245
Cast Iron	93
Malleable Cast Iron	120
Bronze, Brass	70

Chip Removal Volume

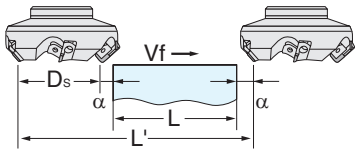
$$Q = \frac{ae \times Vf \times ap}{1{,}000} = \frac{ae \times fz \times Z \times n \times ap}{1{,}000}$$

Q : Chip Removal Volume [cm^3/min=cc/min]
ae : Width of Cut [mm]
Vf : Table Feed [mm/min]
fz : Feed per Tooth [mm/t]
Z : No. of Inserts
n : Spindle Revolution [min^{-1}]
ap : Depth of Cut [mm]

Cutting Time

$$T = \frac{60 \times L'}{Vf} = \frac{60 \times L'}{fz \times Z \times n}$$

T : Cutting Time [second]
L' : Total Table Transfer Length [mm]
(=L+Ds+2α)
L : Workpiece Length [mm]
Ds : Cutter Dia. [mm]
α : Idling Distance [mm]
Vf : Table Feed [mm/min]
fz : Feed per Tooth [mm/t]
Z : No. of Inserts
n : Spindle Revolution [min^{-1}]



True Rake Angle

$$\tan T = \tan R \times \cos C + \tan A \times \sin C$$

Inclination Angle

$$\tan I = \tan A \times \cos C - \tan R \times \sin C$$

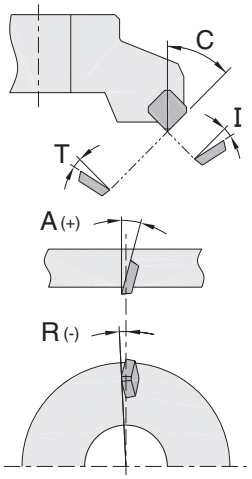
A : Axial Rake Angle (A.R.) [°] (-90°<A<90°)

R : Radial Rake Angle (R.R.) [°] (-90°<R<90°)

C : Approach Angle [°] (0°<C<90°)

T : True Rake Angle [°] (-90°<T<90°)

I : Inclination Angle [°] (-90°<I<90°)



Ball-Nose End Mill Cutting Speed & Revolution

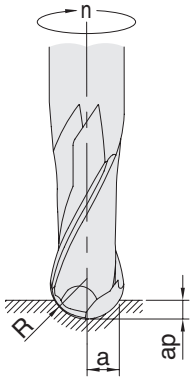
$$n = \frac{1{,}000 \times V_a}{2 \times \pi \times \sqrt{a(2R-ap)}}$$

n : Revolution [min^{-1}]

R : Radius of Ball-Nose End Mill (Ball Part's radius [mm])

ap : Depth of Cut [mm]

V_a : Cutting Speed at Point "a" [m/min]



Drilling

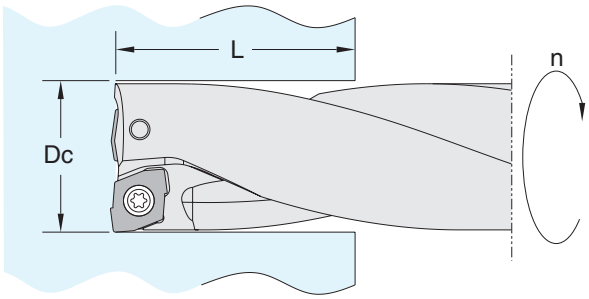
Cutting Speed

$$Vc = \frac{\pi \times Dc \times n}{1{,}000}$$

Vc : Cutting speed [m/min]

Dc : Drill Dia. [mm]

n : Spindle Revolution [min^{-1}]



Feed Rate (Milling)

$$Vf = fz \times Z \times n$$

Vf : Table Feed [mm/min]

fz : Feed per Tooth [mm/t]

Z : No. of Inserts (No. of Insert = 1)

n : Spindle Revolution [min^{-1}]

Cutting Time

$$T = \frac{60 \times L}{f \times n} = \frac{60 \times \pi \times Dc \times L}{1{,}000 \times Vc \times f}$$

T : Cutting Time [second]

L : Drilling Depth [mm]

f : Feed Rate [mm/rev]

n : Spindle Revolution [min^{-1}]

Dc : Drill Dia. [mm]

Vc : Cutting speed [m/min]

Power Requirement (Reference Value)

$$Pc = \frac{Dc}{20} \times \frac{Vc}{100} \times \left(1 + \left(\frac{2.5 \times f}{0.1}\right)\right)$$

Pc : Power Requirement [kW]

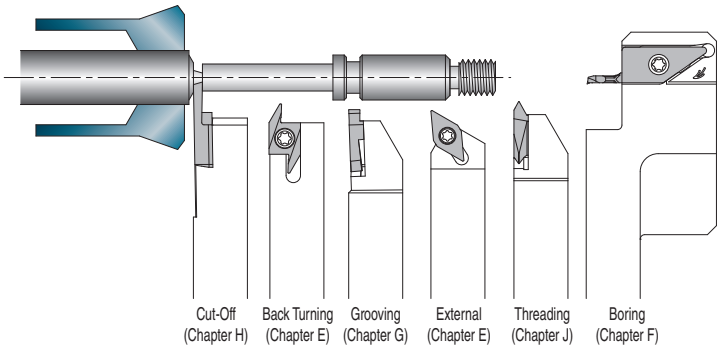
Dc : Drill Dia. [mm]

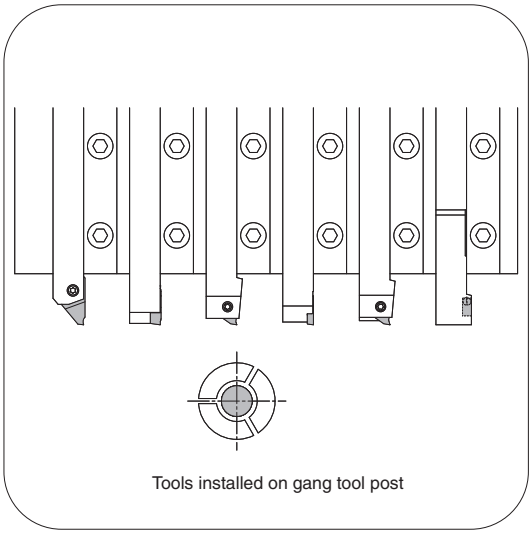
Vc : Cutting speed [m/min]

f : Feed Rate [mm/rev]

Tooling Examples of Small Tools

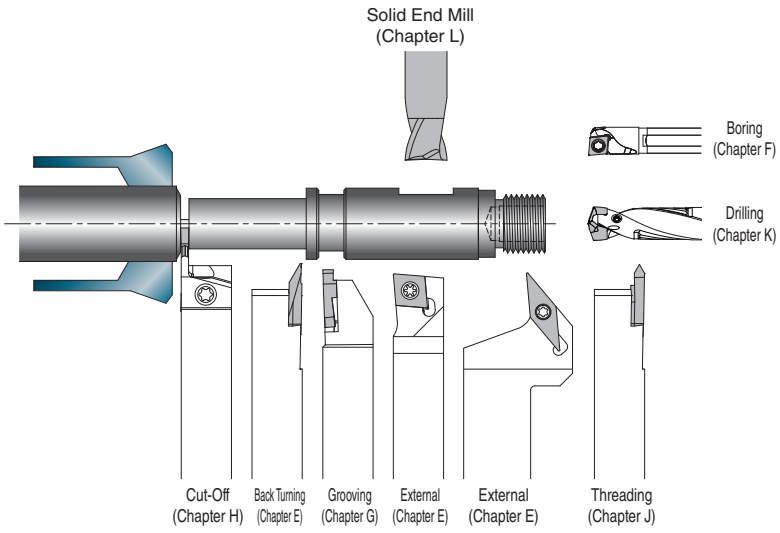
Tooling Example (1) CNC Automatic lathe (Gang Type)

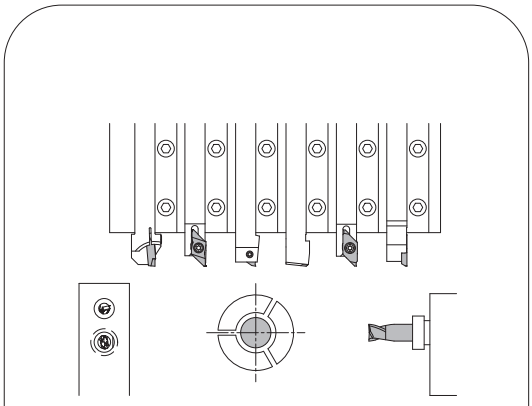




Tools installed on gang tool post

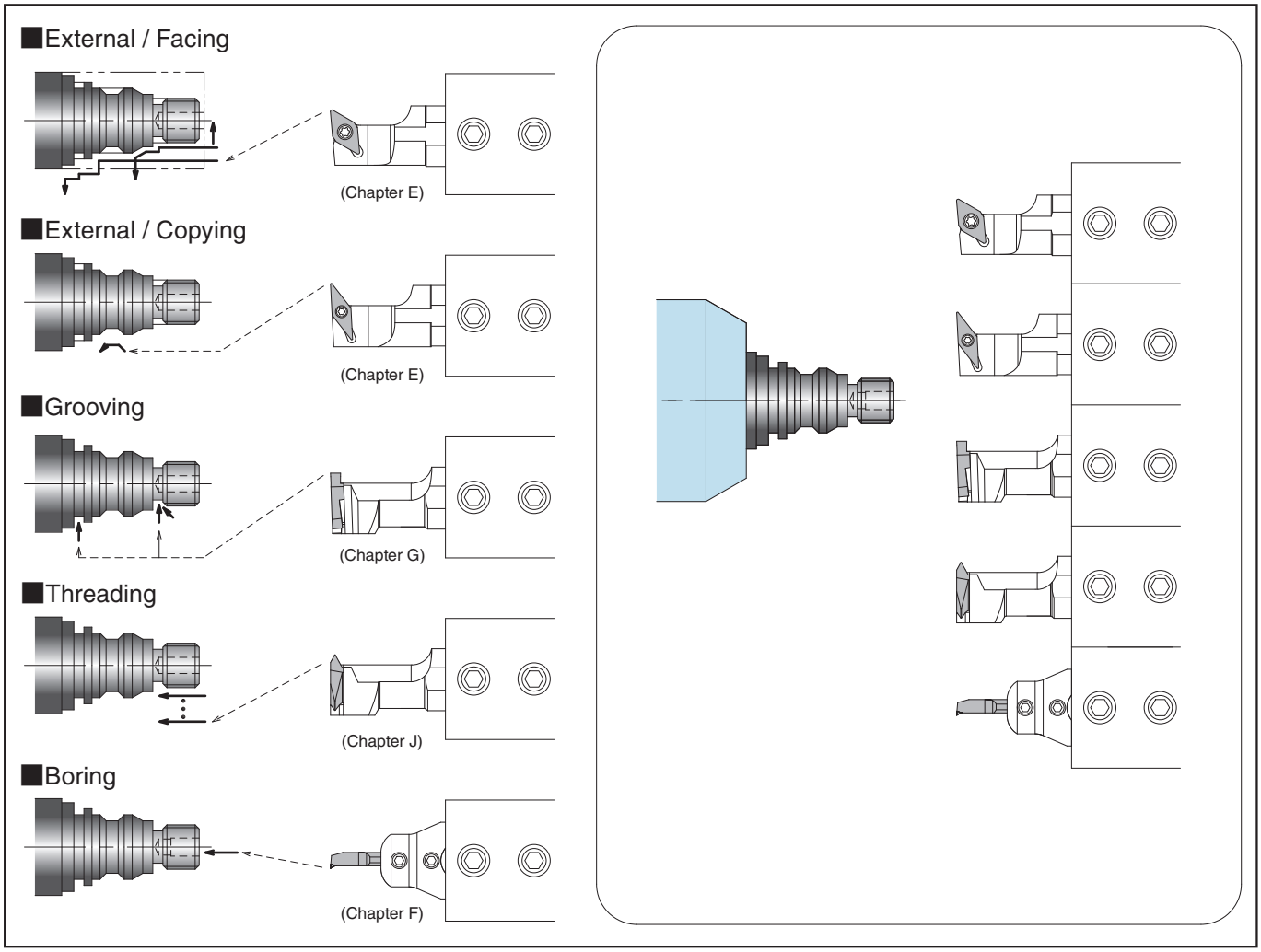
Tooling Example (2) CNC Automatic lathe (Gang Type)



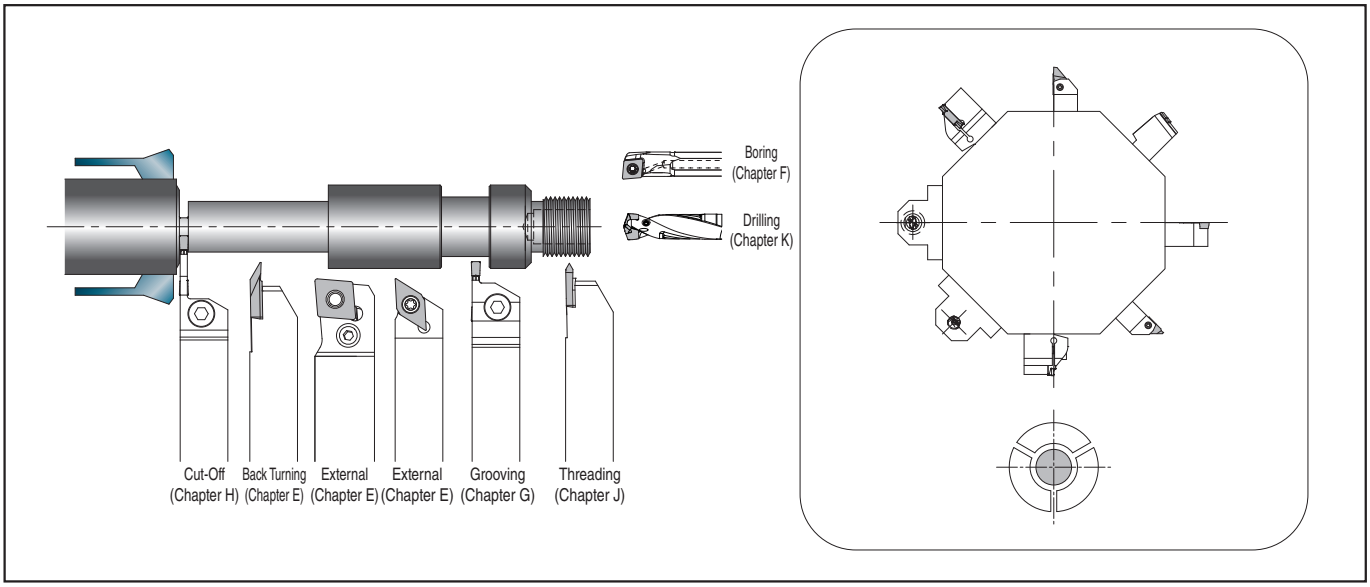


Tools installed on gang tool post + milling toolholder

Tooling Example (3) CNC Automatic Lathe (Opposed Gang Type)



Tooling Example (4) CNC Automatic lathe (Turret Type)



Ref. to Page ➡ **R36~R43** for Tooling Layout and Automatic Lathe List by Manufacturer.

Citizen Machinery (Cincom Products)

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/ Opposed)	Number of tools	Max. Cutting Dia.	Remarks
A12/16	10×10×100	5			ϕ19.05/ϕ20		ϕ12/ϕ16	
A20	12(13)×12(13)×120 * Cut-off toolholder :□16㎜	6			ϕ25.4		ϕ20	
A20Ⅶ	12(13)×12(13)×120 * Cut-off toolholder :□16㎜	6			ϕ25.4		ϕ20	
A32	16×16×150	6			ϕ25.4		ϕ32	
B12	10×10×100	5			ϕ19.05/ϕ20		ϕ12	
B12E/B16E	10×10×120(60)	5			ϕ19.05(ϕ20^{OP})		ϕ12/ϕ16	
B20	12(13)×12(13)×120	6			ϕ19.05/ϕ20		ϕ20	
BL12	10×10×60~120	5			ϕ20(ϕ19.05)		ϕ12	
BL20/25	12(13)×12(13)×120	4~7			ϕ20(ϕ19.05)		ϕ20/ϕ25	
C12/16	10×10×120	6			ϕ19.05		ϕ12/ϕ16	
C32	16×16×130	5			ϕ25.4		ϕ32	
E16			10×10×60	20	ϕ19.05		ϕ16	
E20			16×16×90	20	ϕ25.4		ϕ20	
E25			16×16×90	20	ϕ25.4		ϕ25	
E32			16(19)×16(13)×90	20	ϕ25.4		ϕ32	
F10			10×10×60	10	ϕ19.05		ϕ10	
F12			10×10×60	10	ϕ19.05		ϕ12	
F16			10×10×60	10	ϕ19.05		ϕ16	
F20			16(19)×16(13)×90	10	ϕ25.4		ϕ20	
F25			16(19)×16(13)×90	10	ϕ25.4		ϕ25	
FL25			16×16×90	12	ϕ16		ϕ25	
FL42			16×16×90	12	ϕ16		ϕ42	
G32			16(19)×16(19)×90	10	-		ϕ32	
K12/16	12(10)×12(10)×100	6(7)			ϕ19.05/ϕ20		ϕ12/ϕ16	
K12E/K16E	12×12×120	6			ϕ19.05/ϕ20		ϕ12/ϕ16	
L10	8×8×100~130	5			ϕ15.875		ϕ10	
L12	10×10×100	6			ϕ19.05		ϕ12	
L16	12(10)×12(10)×130	5			ϕ19.05		ϕ16	
L20,L20E	12×12×130 * Cut-off toolholder :□16㎜	5			ϕ19.05		ϕ20	
L20X,L220	12(13,16)×12(13,16)×120 * Cut-off toolholder :□16㎜	5~7			ϕ19.05/ϕ25		ϕ20	
L25	16×16×130	5			ϕ25.4		ϕ25	
L32	16×16×130	5			ϕ25.4		ϕ32	
M$_2$12,M$_3$12	10×10×120	5	10×10×60	10+α	ϕ19.05		ϕ12	
M$_2$16,M$_3$16	10×10×120	5	10×10×60	10+α	ϕ19.05		ϕ16	
M$_2$20,M$_3$20	16×16×130	5	16×16×90	10+α	ϕ25.4		ϕ20	
M$_2$32,M$_3$32,M$_4$32	16×16×130	5	16×16×90	10+α	ϕ25.4		ϕ32	
M$_4$16	10×10×100	5	10×10×60	10+α	ϕ19.05		ϕ16	
M20	13(12)×13(12)×130	5	10×10×60	10+α	ϕ19.05		ϕ20	
MC20	12×12×120,13×13×120	2+2+2			ϕ19.05/ϕ31.0		ϕ20	
MSL12	10×10×120				-		ϕ12	
R04	8×8×120	5			ϕ15.875		ϕ4	
R07	8×8×120	5			ϕ15.875		ϕ7	
RL01	10(8)×10(8)×90				ϕ16(ϕ20)		ϕ10	
RL02	16×16×90				ϕ20		ϕ20	
RL21	10(12)×10(12)×90				ϕ19.05		ϕ35	

·Manufacturers are in no particular order.

Citizen Machinery (Miyano Products)

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/ Opposed)	Number of tools	Max. Cutting Dia.	Remarks
ABX-51SY2			20×20×125(100)	24	ϕ25	48	ϕ51	
ABX-51SYY2			20×20×125(100)	24	ϕ25	48	ϕ51	
ABX-51TH5			20×20×125(100)	36	ϕ25	72	ϕ51	
ABX-51THY2			20×20×125(100)	36	ϕ25	72	ϕ51	
ABX-64SY2			20×20×125(100)	24	ϕ25	48	ϕ64	
ABX-64SYY2			20×20×125(100)	24	ϕ25	48	ϕ64	
ABX-64TH5			20×20×125(100)	36	ϕ25	72	ϕ64	
ABX-64THY2			20×20×125(100)	36	ϕ25	72	ϕ64	
BNA-34C/C2			20×20×125(100)	8(16)	ϕ25	24	ϕ34	
BNA-34DHY			20×20×125(100)	14(22)	ϕ25	27	ϕ34	
BNA-34DHY2			20×20×125(100)	14(22)	ϕ25	27	ϕ34	
BNA-34S/S2			20×20×125(100)	8(16)	ϕ25	24	ϕ34	
BNA-42C/C2			20×20×125(100)	8(16)	ϕ25	24	ϕ42	
BNA-42DHY			20×20×125(100)	14(22)	ϕ25	27	ϕ42	
BNA-42DHY2			20×20×125(100)	14(22)	ϕ25	27	ϕ42	
BNA-42GTY	20×20×125(100)	3	20×20×125(100)	8(16)	ϕ25	24(7)	ϕ42	
BNA-42MSY2			20×20×125(100)	8(16)	ϕ25	24	ϕ42	
BNA-42S/S2			20×20×125(100)	8(16)	ϕ25	24	ϕ42	
BNC-42C7			20×20×125(100)	8(16)	ϕ25	24	ϕ42	
BND-51C2			20×20×125(100)	12	ϕ25	24	ϕ51	
BND-51S2			20×20×125(100)	12	ϕ25	24	ϕ51	
BND-51SY2			20×20×125(100)	12	ϕ25	24	ϕ51	
BNE-34S6			20×20×125(100)	24	ϕ25	48	ϕ34	
BNE-34SY6			20×20×125(100)	24	ϕ25	48	ϕ34	
BNE-42S6			20×20×125(100)	24	ϕ25	48	ϕ42	
BNE-42SY6			20×20×125(100)	24	ϕ25	48	ϕ42	
BNE-51S6			20×20×125(100)	24	ϕ25	48	ϕ51	
BNE-51SY6			20×20×125(100)	24	ϕ25	48	ϕ51	
BNE-51MSY			20×20×125(100)	24	ϕ25	48	ϕ51	
BNJ-34S3/S5			20×20×125(100)	18	ϕ25	30	ϕ34	
BNJ-34SY3			20×20×125(100)	18	ϕ25	30	ϕ34	
BNJ-34SY5			20×20×125(100)	18	ϕ25	30	ϕ34	
BNJ-42S3			20×20×125(100)	18	ϕ25	30	ϕ42	
BNJ-42S5			20×20×125(100)	18	ϕ25	30	ϕ34	
BNJ-42S6			20×20×125(100)	20	ϕ25	40	ϕ42	
BNJ-42SY3			20×20×125(100)	18	ϕ25	30	ϕ42	
BNJ-42SY5			20×20×125(100)	18	ϕ25	30	ϕ42	
BNJ-42SY6			20×20×125(100)	20	ϕ25	40	ϕ42	
BNJ-51S3/S5			20×20×125(100)	18	ϕ25	30	ϕ51	
BNJ-51SY3			20×20×125(100)	18	ϕ25	30	ϕ51	
BNJ-51SY5			20×20×125(100)	18	ϕ25	30	ϕ51	
BNJ-51SY6			20×20×125(100)	20	ϕ25	40	ϕ51	
GN-3200	12(16)×12(16)×70~120	4~5			ϕ20	4~5	ϕ40	
GN-3200W	12(16)×12(16)×70~120	4~5			ϕ20	4~5	ϕ40	
GN-4200	12(16)×12(16)×70~120	7~8			ϕ20	7~8	ϕ40	
LX-06E2			20×20×125(100)	8	ϕ32	8	ϕ31	
LX-08C			25×25×150	10	ϕ40	10	ϕ51	
LX-08E2			25×25×150	8	ϕ40	8	ϕ51	
LX-08R			20×20×125(100)	10	ϕ25	20	ϕ51	
LZ-01R2			20×20×125(100)	12	ϕ25	24	ϕ31	
LZ-01RY2			20×20×125(100)	12	ϕ25	24	ϕ31	
LZ-02R2			20×20×125(100)	10	ϕ25	20	ϕ51	
LZ-02RY2			20×20×125(100)	10	ϕ25	20	ϕ51	
RL01Ⅲ	10×10×70~120	2~3			ϕ16	2~3	ϕ10	
RL01Ⅴ	10×10×70~120	2~3			ϕ16	2~3	ϕ10	
RL03	12(16)×12(16)×70~120	4~5			ϕ20	4~5	ϕ40	

* Number of tools shown in parentheses is the maximum number of toolholder mountable including ϕ25 sleeves.

·Manufacturers are in no particular order.

Star Micronics

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
ECAS-12	10×10×95~150	6			ϕ22		ϕ13	
ECAS-20T			16×16×60~78(80~88)		ϕ22/ϕ32		ϕ20	
ECAS-32T			16×16×60~78(80~88)	10	ϕ22/ϕ32		ϕ32	
JNC-10			8×8×65	6			ϕ10	
JNC-16			10×10×80	6			ϕ16	
JNC-25/32			10×10×78~120	10	ϕ22		ϕ25/32	
KJR-16B/25B			16×16×78	12/16	ϕ22/ϕ32			
KNC-16/20			16×16×68	16	ϕ22			
KNC-25Ⅱ/32Ⅱ			16×16×78	20	ϕ22/ϕ32			
RNC-10	10×10×80~120	5			ϕ22			
RNC-16	10×10×80~120	5			ϕ22			
SA-16R	10×10×95~120	6			ϕ22			
SB-16 (A/C/D/E)	12×12×95~130	5			ϕ22/(ϕ22)	4/4		Only D/E for back clamp sleeves
	12(10)×12(10)×95~130	6			ϕ22/(ϕ22)	4/4		
SB-12Ⅱ(C/E)	12×12×95~130	6			ϕ22/(ϕ22)	4/4		Only E for back clamp sleeves
SB-16Ⅱ(C/E)	12(10)×12(10)×95~130	6			ϕ22/(ϕ22)	4/4		
SB-20 A/C/E	12×12×95~130	6			ϕ22/ϕ22	4/4		
SB-12R typeG	12×12×95~130	6			ϕ22/ϕ22	4/4	ϕ13	
	10×10×95~130	7			ϕ22/ϕ22	4/4		
SB-16R/20R typeN	12×12×95~130	6			ϕ22/ϕ22	4/4	ϕ16/ϕ23	
	10×10×95~130	7			ϕ22/ϕ22	4/4		
SB-16R/20R typeG	12×12×95~130	6			ϕ22/ϕ22	4/4	ϕ16/ϕ23	
	10×10×95~130	7			ϕ22/ϕ22	4/4		
SC20	12×12×95~130	5			ϕ22/-	4		
	10×10×95~130	6				4/4		
SE-12B/16B	10×10×95~120	5			ϕ22		ϕ13/16	
SG-42			16×16×84~88(71~82)		ϕ22/ϕ32		ϕ42	
			20×20×84~88					
SH-7	8×8×95~120	5			ϕ22		ϕ7	
SH-12/16	10×10×95~120	5			ϕ22		ϕ13/16	
SI-12/12C	10×10×80~130	6			ϕ22		ϕ13	
SR-10J	8×8×67~110 (Spacer is needed)	6			ϕ16	4		
SR-20RⅡ	12×12×100~135	6		4	ϕ22/ϕ22	6/12	ϕ23	Toolpost for 2 toolholders (deep boring) on the front side
SR-20Ⅲ	12×12×95~135	6			ϕ22/ϕ22	6/12	ϕ23	
SR-20ⅣtypeA	12×12×100~130	7			ϕ22/ϕ22	6/12	ϕ23	
SR-20ⅣtypeB	12×12×100~130	7			ϕ22/ϕ22	6/12	ϕ23	
SR-25J/32J	16×16×95~155	6		4	ϕ22+ϕ32/ϕ22		ϕ32	
SR-38typeB	16×16×95~135	4			ϕ22+ϕ32	5/ 13	ϕ38	
	16×16×100	2						
	20×20×105~135(Cut-Off)	1						
ST-20			12×12×73~79		ϕ22/ϕ32		ϕ20	
			12×12×65~73(Cut-Off)					
			16×16×64~73					
			16×16×65~73(Cut-Off)					
ST-38			16×16×83~88		ϕ22/ϕ32		ϕ32/ϕ38	
			16×16×71~82					
			16×16×84~88(Cut-Off)					
			20×20×84~88					
			20×20×84~88(Cut-Off)					
SV-38R	16×16×105~135	4	16×16×84~88		ϕ22/ϕ32	- / 8	ϕ32/ϕ38	
	20×20×115~135(Cut-Off)	1	16×16×71~82					
			20×20×84~88					
SV-12/20	12×12×95~135	5	12×12×70~78		ϕ22/ϕ32			
	16×16×95~135	4	16×16×65~70					
SV-32	16×16×95~135	4	16×16×60~78(80~88)		ϕ22/ϕ32		ϕ7	
SW-7	8×8×80~120	6						
SW-12RⅡ	10×10×95~115	7			ϕ16/ϕ16+ϕ22	4/8	ϕ13	
SW-20	12×12×80~150	6			ϕ22	4/8	ϕ23	
	16×16×80~144							

·Manufacturers are in no particular order.

Tsugami

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
B0123-Ⅲ	12×12×85	9			ϕ20/-	4/-	ϕ12	
B0124/125/126-Ⅲ	12×12×85	9			ϕ20/ϕ20	4/4	ϕ12	
B0128W	12×12×85	9			ϕ20/ϕ20	4/4	ϕ12	
B0203-Ⅲ	12×12×85	9			ϕ20/ϕ20	4/4	ϕ20	
B0204/205/206-Ⅲ	12×12×85	9			ϕ20/ϕ20	4/4	ϕ20	
B0208W	12×12×85	9			ϕ20/ϕ20	4/4	ϕ20	
BW207J	12×12×85/16×16×85	5/2			ϕ20/ϕ20	5/4	ϕ20	
BW208J	12×12×85/16×16×85	5/2			ϕ20/ϕ20	5/4	ϕ20	
BW208ZJ	12×12×85/16×16×85	5/2			ϕ20/ϕ20	5/4	ϕ20	
BW209ZJ	12×12×85/16×16×85	5/2			ϕ20/ϕ20	5/4	ϕ20	
B0265/265B/266-Ⅱ	16×16×100	12			ϕ25/ϕ25	5/4	ϕ26	
B0325/325B/326-Ⅱ	16×16×100	12			ϕ25/ϕ25	5/4	ϕ32	
B0385/385L	20×20×125	8			ϕ32/ϕ32	3/5	ϕ38	
B038T			20×20×125	St.8	ϕ32/ϕ25		ϕ38	
B073/074-Ⅱ	8×8×85	9			ϕ20	4	ϕ7	
BH20/BH20Z	12×12×85	4	12×12×85	St.12	ϕ25/ϕ32		ϕ20	
BH38	16×16×125	5	20×20×125	St.12	ϕ25/ϕ32		ϕ38.1	
BM163-Ⅲ	12×12×85	9			ϕ20/-	4/-	ϕ16	
BM164/165-Ⅲ	12×12×85	9			ϕ20/ϕ20	4/4	ϕ16	
C150/CH154	12×12×60~100	4~6					ϕ80	
C180	12×12×60~100	4~6					ϕ120	
C220/220T	12×12×60~100	6~8					ϕ120	
C300-Ⅳ	16×16×100~130	6~10					ϕ165	
C300H	16×16×100~130	6~10					ϕ165	
P013	8×8×100~120	6			ϕ16/-	3/-	ϕ1	
P013-Ⅱ	8×8×100~120	6			ϕ16/-	3/-	ϕ1	
P014	8×8×100~120	6			ϕ16/ϕ16	3/3	ϕ1	
P014-Ⅱ	8×8×100~120	6			ϕ16/ϕ16	3/3	ϕ1	
P033	8×8×100~120	6			ϕ16/-	3/-	ϕ3	
P033-Ⅱ	8×8×100~120	6			ϕ16/-	3/-	ϕ3	
P034	8×8×100~120	6			ϕ16/ϕ16	3/3	ϕ3	
P034-Ⅱ	8×8×100~120	6			ϕ16/ϕ16	3/3	ϕ3	
S205/206/SS207	12×12×100	8			ϕ22/ϕ20	5/4	ϕ20	
SS26	16×16×100	7			ϕ22/ϕ20	5/4	ϕ26	
SS32/32L	16×16×100	7			ϕ22/ϕ20	5/4	ϕ32	
SS20M					-/ϕ20	-/1	ϕ20	
SS267	16×16×100	7			ϕ22/ϕ20	5/4	ϕ26	
SS327	16×16×100	7			ϕ22/ϕ20	5/4	ϕ32	
MB25			20×20×90	2×St.8	ϕ20/ϕ32	5/4	ϕ25	
M42J/M42SD			20×20×125	St.12	ϕ25/ϕ32		ϕ42	
M50J/M50SY-Ⅲ			20×20×100	St.12	ϕ20/ϕ32		ϕ51	
M06JC			20×20×125	St.8	ϕ25		ϕ220/ϕ42	
M06J-Ⅱ			25×25×150	St.8	ϕ32/ϕ40		ϕ260/ϕ51	
M08J-Ⅱ			25×25×150	St.8	ϕ32/ϕ40		ϕ280/ϕ65	
M06D			25×25×150	St.12	ϕ40		ϕ260/ϕ51	
M08D			25×25×150	St.12	ϕ40		ϕ280/ϕ65	
M06SD			25×25×150	St.12	ϕ40		ϕ260/ϕ51	
M08SD			25×25×150	St.12	ϕ40		ϕ280/ϕ65	
M06SY			25×25×150	St.12	ϕ40		ϕ260/ϕ51	
M08SY			25×25×150	St.12	ϕ40		ϕ280/ϕ65	
TMU1	20×20×100~125	1	20×20×125	St.16	ϕ32/ϕ32		ϕ38	
TMB2	20×20×100~125	1	20×20×125	St.16	ϕ32/ϕ32		ϕ51	
TMA8-Ⅳ	20×20×100~125	1			ϕ32/ϕ32		ϕ65	
TMA8J	20×20×100~125	1			ϕ32/ϕ32		ϕ65	
TMA8H	20×20×100~125	1			ϕ32/ϕ32		ϕ65	

·Manufacturers are in no particular order.

Nomura DS

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/ Opposed)	Number of tools	Max. Cutting Dia.	Remarks
NN-10C	10×10×130	6			ϕ17		ϕ10	
NN-10CS	10×10×130	5			ϕ17	4	ϕ10	
NN-10SⅡ	10×10×130	5			ϕ23		ϕ10	
NN-10SB5	10×10×130	5			ϕ23		ϕ13	
NN-10T	10×10×130	7			ϕ23		ϕ10	
NN-16HⅢ	12×12×130	6			ϕ23		ϕ16	
NN-16J	12.7×12.7×130	6			ϕ23		ϕ16	
NN-16SB5	10×10×130	5			ϕ23		ϕ16	
NN-16SB6 Type1	12.7×12.7×130	7			ϕ17(ϕ22)	4	ϕ16	
NN-16SB6 Type2	12.7×12.7×130	5			ϕ17(ϕ22)	4	ϕ16	
NN-16SB6 Type2.5	12.7×12.7×130	6			ϕ17(ϕ22)	5	ϕ16	
NN-16SB6 Type3	12.7×12.7×130	5			ϕ17(ϕ22)	4	ϕ16	
NN-16SB7	12.7×12.7×130	5			ϕ16	4	ϕ16	
NN-16UⅢ	12×12×130	5			ϕ23		ϕ16	
NN-16UB5	12×12×130	5			ϕ23		ϕ16	
NN-20CS	12.7×12.7×130	5(6)			ϕ22	4	ϕ20(ϕ25)	
NN-20HⅢ	12×12×130	6			ϕ23		ϕ20	
NN-20J	12.7×12.7×130	6			ϕ23		ϕ20	
NN-20J2	12.7×12.7×130	6			ϕ22	4	ϕ20	
NN-20UⅢ	12×12×130	5			ϕ23		ϕ20	
NN-20U5	12.7×12.7×150	5(6)			ϕ22	4	ϕ20(ϕ25)	
NN-20UB5	12×12×130	5			ϕ23		ϕ20	
NN-20UB7	12×12×130	6			ϕ23		ϕ20	
NN-20UB8	12.7×12.7×150	5(6)			ϕ22	4	ϕ20(ϕ25)	
NN-20YB	12×12×130	6			ϕ23		ϕ20	
NN-25YB/32YB	16×16×130	5			ϕ23/ϕ32		ϕ25/ϕ32	
NN-32UB8	16×16×130	2			ϕ22	3	ϕ32	
	12.7×12.7×150	3(4)			ϕ32	1		
NN-32YB2	16×16×130	5			ϕ22/ϕ32	4	ϕ32	
NN-32YB2 XB	16×16×130	6			ϕ22/ϕ32	5/1	ϕ32	

·Manufacturers are in no particular order.

Eguro

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/ Opposed)	Number of tools	Max. Cutting Dia.	Remarks
SANAX-6	12×12	5 (MAX.)		5	ϕ16		ϕ15	
SANAX-8	16×16	5 (MAX.)		5	ϕ25/ϕ30		ϕ20	
	12×12	7 (MAX.)		5	ϕ25/ϕ30		ϕ20	
SANAX-10	16×16	5 (MAX.)		5	ϕ25/ϕ30		ϕ25.5	
EBN-10EX	12×12	6 (MAX.)			ϕ20		ϕ25.5	
NUCBOY-8EX	12×12	6 (MAX.)			ϕ20		ϕ20	
NUCLET-10EX	16×16	10 (MAX.)			ϕ20		ϕ25.5	
NUCPAL-10EX	16×16	10 (MAX.)			ϕ20		ϕ25.5	

·Manufacturers are in no particular order.

List of Instruments and Applicable Small Tools and Toolholders

List of Instruments and Applicable Small Tools and Toolholders

Models of major machine tool manufacturers				Applicable Toolholders
Manufacturer	Model (Automatic Lathe)	Toolholder Size	Total Length of Attached Toolholder (MAX.)	
Citizen Machinery	A12,A16,B12,L12,M$_4$16,RL01,RL21	10×10	100	…1010F-··
	K12,K16	12×12		…1212F-··
	RL02	16×16		…1616H-··
	B12E,B16E,BL12,C12,C16,M$_2$12,M$_2$16 M$_3$12,M$_3$16,MSL12	10×10	120	…1010JX-··
	A20,A20Ⅶ,B20,BL20,BL25,K12E,K16E L20X,L220	12×12		…1212JX-··
	L16,L20,L20E	12×12	130	…1212JX-··
	C32,L25,L32,M20,M$_2$20,M$_2$32 M$_3$20,M$_3$32,M$_4$32	16×16		…1616JX-··
Star Micronics	RNC-10,RNC-16,SA-16R,SE-12B/16B SH-12/16	10×10	120	…1010JX-··
	SI-12,SI-12C	10×10	130	…1010JX-··
	SB-16A,SB-16C,SB-16D,SC20	12×12	130	…1212JX-··
	SR20RⅡ,SR20Ⅲ,SV12,SV20	12×12	135	…1212JX-··
	SV32,SV32J,SV32JⅡ	16×16		…1616JX-··
	ECAS-12	10×10	150	…1010JX-··
	ECAS-20	12×12		…1212JX-··
	SR25J,SR32J	16×16		…1616JX-··
Tsugami	B007	10×10	85	…1010F-··
	B0,BA,BC,BH20,BM,BU12,BU20 BS12,BS18,BS20,BW2	12×12		…1212F-··
	C004,C150,C180,C220	12×12	100	…1212F-··
	BH38,BS26,BS32,BU26,BU38	16×16		…1616H-··
Nomura DS	NN-10C,NN-10CS,NN-10SⅡ NN-10SB5,NN-10SⅡ,NN-10T,NN-16SB5	10×10	130	…1010JX-··
	NN-16HⅢ,NN-16UB5,NN-16UⅢ,NN-16J NN-20HⅢ,NN-20UⅢ,NN-20UB5,NN-20YB	12×12		…1212JX-··
	NN-25YB,NN-32YB2 XB	16×16		…1616JX-··

·Manufacturers are in no particular order.

Parts Compatibility of Lever Lock Toolholders

1) For better usability of lever lock toolholders, some levers, lock screws and shims are modified.
2) It is highly recommended to use only new parts. However, they are compatible with conventional parts and can be used together with them.
3) It is possible to use new parts only with a toolholder which has been in use.
4) When purchasing replacements, order them stating the new numbers.
5) Some of the shims remain unmodified.

Classification	Ref. to Page	Toolholder Description		Spare Parts					
				Lever		Lock Screw		Shim	
				New No.	Conventional	New No.	Conventional	New No.	Conventional
External Toolholder	D8	PCLNR/L	····-09	LL-1N	LL-1	LS-1N	LS-1	LC-32N	LC-32
			····-12	LL-2N	LL-2	LS-2N	LS-2	LC-42N	LC-42
			····-16	LL-5N	LL-5	LS-4N	LS-4	LC-53N	LC-53
	D11	PDJNR/L	····-11	LL-1DN	LL-1D	LS-1N	LS-1	LD-32N	LD-32
			····-15	LL-3N	LL-3	LS-2N	LS-2	LD-42	
	D12	PSBNR/L	····-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			····-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
		PSKNR/L	····-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			····-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
	D13	PSSNR/L	····-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			····-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
		PSDNN	····-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			····-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
	D14	PTGNR/L	1212F-11	LL-03N	LL-03	LS-03N	LS-03	-	
			····-11	LL-03TN	LL-03T	LS-03SN	LS-03S	-	
			····-16	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
			····-22	LL-2N	LL-2	LS-2N	LS-2	LT-42N	LT-42
		PTFNR/L	1212F-11	LL-03N	LL-03	LS-03N	LS-03	-	
			····-11	LL-03TN	LL-03T	LS-03SN	LS-03S	-	
			····-16	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
			····-22	LL-2N	LL-2	LS-2N	LS-2	LT-42N	LT-42
	D19	PRGCR/L	····-12	LL-1CN	LL-1C	LS-1N	LS-1	LR-12C	
		PRXCR/L	····-12						
		PRGNR/L	····-09	LL-1N	LL-1	LS-1N	LS-1	LR-80	
			····-12	LL-2N	LL-2	LS-2N	LS-2	LR-81	
	D20	PWLNR/L	····-06	LL-1N	LL-1	LS-1N	LS-1	LW-32N	LW-32
			····-08	LL-2N	LL-2	LS-2N	LS-2	LW-42N	LW-42
Boring Bars	F68	□16M- PCLNR/L	09-20	LL-03SN	LL-03S	LS-03SN	LS-03S	-	
		□20Q-	09-27	LL-1N	LL-1	LS-1SN	LS-1S	LC-32N	LC-32
		□25R-	09-32						
		····- PCLNR/L	12-··	LL-2N	LL-2	LS-2N	LS-2	LC-42NR/L	LC-42R/L
	F69	····- PDUNR/L	11-··	LL-1DN	LL-1D	LS-1SN	LS-1S	LD-32N	LD-32
	F75	····- PTUNR/L	11-··	LL-03TN	LL-03T	LS-03SN	LS-03S	-	
		S25R- PTUNR/L	16-30	LL-03SN	LL-03S	LS-03SN	LS-03S	-	
		S32S-	16-40	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
		S40T-	16-50						
	F76	□16M- PWLNR/L	06-20	LL-03SN	LL-03S	LS-03SN	LS-03S	-	
		□20Q-	06-27	LL-1N	LL-1	LS-1SN	LS-1S	LW-32N	LW-32
		□25R-	06-32						
	F78	····- PWLNR/L	08-··	LL-2N	LL-2	LS-2N	LS-2	LW-42NR/L	LW-42R/L
Turning Mill	N5	T63H- PCLNR/L	-DX12	LL-2N	LL-2	LS-2N	LS-2	LC-42N	LC-42
		T63H- PCMNN	-□12						
		T63H- PDJNR/L	-DX15	LL-3N	LL-3	LS-2N	LS-2	LD-42	
	N6	T63H- PDNNN	-□15						
		T63H- PTGNR/L	-DX16	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
	N7	T63H- PWLNR/L	-DX08	LL-2N	LL-2	LS-2N	LS-2	LW-42N	LW-42

Index

T1~T17

Index Descriptions of the products described in this book are listed in alphabetic order.

Description Index

○ : Figure, □ : Alphabet

Description	Page	Category
Numeric		
16ER A○○	J12,J14	Insert (Threading)
16ER AG○○	J12,J14	Insert (Threading)
16ER G○○	J12,J14	Insert (Threading)
16ER A○○-TF	J12,J14	Insert (Threading) / TF series
16ER AG○○-TF	J12,J14	Insert (Threading) / TF series
16ER G○○-TF	J12,J14	Insert (Threading) / TF series
16ER ○○BSPT	J10	Insert (Threading)
16ER ○○BSPT-TF	J10	Insert (Threading) / TF series
16ER ○○(.○)NPT	J10	Insert (Threading)
16ER ○○UN	J8	Insert (Threading)
16ER ○○UN-TF	J8	Insert (Threading) / TF series
16ER ○○W	J8	Insert (Threading)
16ER ○○W-TF	J8	Insert (Threading) / TF series
16ER$^{R}_{L}$ ○○○ISO	J6	Insert (Threading)
16ER ○○○ISO-TF	J6	Insert (Threading) / TF series
16ER ○○○TR	J14	Insert (Threading)
16ER ○○○○	J12,J14	Insert (Threading)
22ER N○○	J12,J14	Insert (Threading)
22ER ○○UN	J8	Insert (Threading)
22ER ○○○ISO	J6	Insert (Threading)
22ER ○○○TR	J14	Insert (Threading)
06IR ○○○○(○)	J13,J15	Insert (Threading)
08IR ○○○○(○)	J13,J15	Insert (Threading)
11IR A○○	J13,J15	Insert (Threading)
11IR ○○BSPT	J11	Insert (Threading)
11IR ○○BSPT-TF	J11	Insert (Threading) / TF series
11I$^{R}_{L}$ ○○○ISO	J7	Insert (Threading)
11IR ○○○ISO-TF	J7	Insert (Threading) / TF series
11IR ○○○○○	J13,J15	Insert (Threading)
16IR A○○	J13,J15	Insert (Threading)
16IR AG○○	J13,J15	Insert (Threading)
16IR G○○	J13,J15	Insert (Threading)
16IR ○○BSPT	J11	Insert (Threading)
16IR ○○BSPT-TF	J11	Insert (Threading) / TF series
16IR ○○(.○)NPT	J11	Insert (Threading)
16IR ○○UN	J9	Insert (Threading)
16IR ○○UN-TF	J9	Insert (Threading) / TF series
16IR ○○W	J9	Insert (Threading)
16IR ○○W-TF	J9	Insert (Threading) / TF series
16I$^{R}_{L}$ ○○○ISO	J7	Insert (Threading)
16IR ○○○ISO-TF	J7	Insert (Threading) / TF series
16IR ○○○TR	J15	Insert (Threading)
16IR ○○○○(○)	J13,J15	Insert (Threading)
22IR N○○	J13,J15	Insert (Threading)
22IR ○○UN	J9	Insert (Threading)
22IR ○○○ISO	J7	Insert (Threading)
22IR ○○○TR	J15	Insert (Threading)
2FEKM ○○○-○○○-○○	L12	Solid End Mill
2FEKS ○○○-○○○-○○	L12	Solid End Mill
2FESL ○○○-○○○-○○	L11	Solid End Mill
2FESM ○○○-○○○-○○	L10,L11	Solid End Mill
2FESS ○○○-○○○-○○	L10	Solid End Mill
2FESW ○○○-○○○-○○(A)	L14	Solid End Mill (for Automatic Lathe)
2SEB ○○○-○○○-R○○	L31	Solid End Mill (Ball-Nose)
2UEBS ○○○-○○○-○○	L32	Solid End Mill (Ball-Nose)
2ZDK ○○○	L49	Counterboring
2ZDK ○○○S	L50,L51	Counterboring
2ZDK ○○○S-P	L50	Counterboring
3AESL ○○○-○○○-○○	L46	Solid End Mill
3AESM ○○○-○○○-○○	L46	Solid End Mill
3AFK ○○○-○○○	L42,L43	Solid End Mill
3AFK ○○○-○○○-○○○	L42,L43	Solid End Mill
3FESW ○○○-○○○-○○(A)	L14	Solid End Mill (for Automatic Lathe)
3NESM ○○○-○○○-○○	L44	Solid End Mill
3NFSL ○○○-○○○-○○	L45	Solid End Mill
3UEBS ○○○-○○○-○○	L32	Solid End Mill (Ball-Nose)
3UFSM ○○○-○○○-○○	L15	Solid End Mill
3ZFKM ○○○-○○○-○○	L19	Solid End Mill
3ZFKS ○○○-○○○-○○	L19	Solid End Mill
4FEKM ○○○-○○○-○○	L13	Solid End Mill
4FESM ○○○-○○○-○○	L13	Solid End Mill
4FESW ○○○-○○○-○○	L14	Solid End Mill (for Automatic Lathe)
4JER ○○○-○○○-R○○	L37	Solid End Mill
4MFK ○○○-○○○	L21	Solid End Mill
4MFR ○○○-○○○-R○○	L21	Solid End Mill
4PGRM ○○○-○○○-○○-R○○○	L17	Solid End Mill
4TFK ○○○-○○○	L23	Solid End Mill
4TFR ○○○-○○○-R○○	L23	Solid End Mill
4YEBM ○○○-○○○-○○	L33	Solid End Mill (Ball-Nose)
4YECM ○○○-○○○-○○-C○○	L24	Solid End Mill
4YEKM ○○○-○○○-○○	L24	Solid End Mill
4YERM ○○○-○○○-○○-R○○○	L24	Solid End Mill
5DEKM ○○○-○○○-○○	L25	Solid End Mill
5DERM ○○○-○○○-○○-R○○○	L25	Solid End Mill
6PDRS ○○○-○○○-○○	L34	Solid End Mill
6PFK ○○○-○○○(○)	L29	Solid End Mill
8PFK ○○○-○○○(○)	L29	Solid End Mill
○HFSM ○○○-○○○-○○	L38	Solid End Mill
○HFSS ○○○-○○○-○○	L38	Solid End Mill
○NFSM ○○○-○○○-○○	L45	Solid End Mill
○PGSL ○○○-○○○-○○	L16	Solid End Mill
○PGSM ○○○-○○○-○○	L16	Solid End Mill
○PGSS ○○○-○○○-○○	L16	Solid End Mill
○RDSL ○○○-○○○-○○	L26	Solid End Mill
○RDSM ○○○-○○○-○○	L26	Solid End Mill
○RFRS ○○○-○○○-○○-R○○○	L27	Solid End Mill
○RFSM ○○○-○○○-○○	L27	Solid End Mill
○UGSM ○○○-○○○-○○	L39	Solid End Mill
○YFSM ○○○-○○○-○○	L25	Solid End Mill
556C$^{R}_{L}$	D23,P8	Spare Parts (Shim)
A		
A63-WH- C○○-○○(○)	N10	Toolholder (HSK Tooling / Previous Description)
A63-WH- KGBA$^{R}_{L}$-16	N9	Grooving (HSK Tooling / Previous Description)
A63-WH- KGBA$^{R}_{L}$-22-○○	N9	Grooving (HSK Tooling / Previous Description)
A63-WH- KTNR-○○	N9	Threading (HSK Tooling / Previous Description)
A63-WH- N○○-○○(○)	N10	Toolholder (HSK Tooling / Previous Description)
A63-WH- PCLN$^{R}_{L}$-DX12	N5	Toolholder (HSK Tooling / Previous Description)
A63-WH- PCMNN-□12	N5	Toolholder (HSK Tooling / Previous Description)
A63-WH- PDJN$^{R}_{L}$-DX15	N5	Toolholder (HSK Tooling / Previous Description)
A63-WH- PDNNN-□15	N6	Toolholder (HSK Tooling / Previous Description)
A63-WH- PTGN$^{R}_{L}$-DX16	N6	Toolholder (HSK Tooling / Previous Description)
A63-WH- PWLN$^{R}_{L}$-DX08	N7	Toolholder (HSK Tooling / Previous Description)
A63-WH- S2525$^{R}_{L}$-105	N3	Toolholder (HSK Tooling / Previous Description)
A63-WH- WTENN-□16	N6	Toolholder (HSK Tooling / Previous Description)
A63-WH- WWMNN-□08	N7	Toolholder (HSK Tooling / Previous Description)
A○○□- DCLN$^{R}_{L}$-○○-○○	F67	Boring Bars (Double Clamp)
A○○□- DDUN$^{R}_{L}$-○○-○○	F70	Boring Bars (Double Clamp)
A○○□- DSKN$^{R}_{L}$-○○-○○	F73	Boring Bars (Double Clamp)
A○○□- DTFN$^{R}_{L}$-○○-○○	F74	Boring Bars (Double Clamp)
A○○□- DWLN$^{R}_{L}$-○○-○○	F77	Boring Bars (Double Clamp)
A○○□- PCLNR○○-○○	F68	Boring Bars
A○○□- PDUNR○○-○○	F69	Boring Bars
A○○□- PTUNR○○-○○	F75	Boring Bars
A○○□- PWLNR○○-○○	F76	Boring Bars
A○○□- SCLC$^{R}_{L}$-○○-○○AE	F39	Boring Bars (Dynamic Bar)
A○○□- SCLC$^{R}_{L}$-○○-○○E	F88,P23	Boring Bars (Discontinued Description)
A○○□- SCLP$^{R}_{L}$-○○-○○AE	F41	Boring Bars (Dynamic Bar)
A○○□- SCLP$^{R}_{L}$-○○-○○E	F88,P23	Boring Bars (Discontinued Description)
A○○□- SDQC$^{R}_{L}$-○○-○○AE	F44	Boring Bars (Dynamic Bar)
A○○□- SDUC$^{R}_{L}$-○○-○○AE	F43	Boring Bars (Dynamic Bar)
A○○□- SDZC$^{R}_{L}$-○○-○○AE	F45	Boring Bars (Dynamic Bar)
A○○□- STLC$^{R}_{L}$-○○-○○AE	F47	Boring Bars (Dynamic Bar)
A○○□- STLP$^{R}_{L}$-○○-○○AE	F49	Boring Bars (Dynamic Bar)
A○○□- STUP$^{R}_{L}$-○○-○○E	F88,P23	Boring Bars (Discontinued Description)
A○○□- SVJB$^{R}_{L}$-○○-○○AE	F52	Boring Bars (Dynamic Bar)
A○○□- SVJC$^{R}_{L}$-○○-○○AE	F52	Boring Bars (Dynamic Bar)
A○○□- SVJP$^{R}_{L}$-○○-○○AE	F52	Boring Bars (Dynamic Bar)
A○○□- SVPB$^{R}_{L}$-○○-○○AE	F54	Boring Bars (Dynamic Bar)
A○○□- SVPC$^{R}_{L}$-○○-○○AE	F54	Boring Bars (Dynamic Bar)
A○○□- SVUB$^{R}_{L}$-○○-○○AE	F57	Boring Bars (Dynamic Bar)
A○○□- SVUC$^{R}_{L}$-○○-○○AE	F57	Boring Bars (Dynamic Bar)
A○○□- SVZB$^{R}_{L}$-○○-○○AE	F57	Boring Bars (Dynamic Bar)
A○○□- SVZC$^{R}_{L}$-○○-○○AE	F57	Boring Bars (Dynamic Bar)
A○○□- SWUB$^{R}_{L}$-○○-○○AE	F59	Boring Bars (Dynamic Bar)
A○○□- SWUP$^{R}_{L}$-○○-○○AE	F59	Boring Bars (Dynamic Bar)
AABSR ○○○○□(□)○○F	E17,E46,P20	Toolholder (Back Turning)
AABWR ○○○○□(□)○○F	E18,E19,E46,P20	Toolholder (Back Turning)
ABS ○○R○○○○	B94,E17	Insert (Back Turning)
ABS ○○R○○○○M	B94,E17	Insert (Back Turning)

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ABW	○○R○○○○	**B94,E18,E19**	Insert (Back Turning)
ABW	○○R○○○○M	**B94,E18,E19**	Insert (Back Turning)
ACLCR/L	○○○○□-○○F	**E46,P21**	Toolholder (Turning/Discontinued Description)
ACLCR/L	○○○○□□-○○FF	**E22**	Toolholder (Turning)
AD○○□		**F66**	Boring Bars (AD Bar Adaptor)
ADJCR/L	○○○○□-○○F	**E46,P21**	Toolholder (Turning/Discontinued Description)
ADJCR/L	○○○○□□-○○FF	**E24**	Toolholder (Turning)
ADNCR	○○○○□-○○F	**E46,P21**	Toolholder (Turning/Discontinued Description)
AJ-	○×○○(-○.○)	**K25,P2**	Spare Parts (Adjusting screw / Chamfering Attachment)
AJ-412		**M36**	Spare Parts (Adjusting screw)
AJM5F		**N14,N15,N16**	Spare Parts (Axial adjustment screw)
AJM6		**N14**	Spare Parts (Axial adjustment screw)
AP-1416		**M158,M159**	Spare Parts (Cam Pin)
AP-1820		**M158,M159**	Spare Parts (Cam Pin)
APMT	○○○○○○ER/L-NB○	**M18**	Insert (Milling)
APMT	○○○○○○ER-NB○P	**M18**	Insert (Milling)
AVJBR/L	○○○○□-○○F	**E46,P21**	Toolholder (Turning/Discontinued Description)
AVJBR/L	○○○○□□-○○FF	**E30**	Toolholder (Turning)
AVVBR/L	○○○○□-○○F	**E46,P21**	Toolholder (Turning/Discontinued Description)
B			
BCS	-○	**H27,P13**	Spare Parts (Clamp Set)
BDGT	○○○○○○FR-JA	**M18**	Insert (Milling)
BDMT	○○○○○○ER-JS	**M18**	Insert (Milling)
BDMT	○○○○○○ER-JT	**M18,M19**	Insert (Milling)
BDMT	○○○○○○ER-N○	**M19**	Insert (Milling)
BDMT	○○○○○○FR	**C35,M25**	Insert (Milling)
BGIAR	○○-○	**G63**	Blade (Grooving)
BH3X6		**F81,P2**	Spare Parts (Screw)
BH3X12		**D33,D34,D35,P2**	Spare Parts (Screw)
BH6X10TR		**G23,G24,G25,G76, G80,G81,H17,P2**	Spare Parts (Screw)
BH6X25		**G11,P2**	Spare Parts (Screw)
BH8X30		**P2**	Spare Parts (Screw)
BT○○K-	M○○-○○	**M58**	BT Arbor (for Modular End Mill)
C			
C○○□-	SCLCR/L○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
C○○□-	SCLCR/L○○-○○A	**F39**	Boring Bars (Dynamic Bar)
C○○□-	SCLCR/L○○-○○AN	**F39**	Boring Bars (Dynamic Bar)
C○○□-	SCLCR/L○○-○○-AS	**F87**	Boring Bars (Assembly(AS) / Discontinued Description)
C○○○□-	SCLCR○○-○○○EZ	**F19**	Boring Bars (EZ Bar PLUS)
C○○□-	SCLPR/L○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
C○○□-	SCLPR/L○○-○○-○/○	**F90,P23**	Boring Bars (Discontinued Description)
C○○□-	SDUCR/L○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
C○○□-	SJLCR/L○○-○○○	**F46**	Boring Bars
C○○□-	SJZCR/L○○-○○○	**F46**	Boring Bars
C○○□-	STLBR/L○○-○○A	**F49**	Boring Bars (Dynamic Bar)
C○○□-	STLBR/L○○-○○AN	**F49**	Boring Bars (Dynamic Bar)
C○○□-	STUBR/L○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
C○○□-	STUPR/L○○-○○	**F90,F91,P23**	Boring Bars (Discontinued Description)
C○○□-	STUPR/L○○-○○-○/○	**F90,F91,P23**	Boring Bars (Discontinued Description)
C○○□-	STUPR○○-○○-AS	**F87**	Boring Bars (Assembly(AS) / Discontinued Description)
C○○□-	STXBR/L○○-○○○	**F51**	Boring Bars
C○○□-	STXPR/L○○-○○	**F51**	Boring Bars
C○○□-	STZBR/L○○-○○○	**F51**	Boring Bars
C○○□-	SWUBR/L○○-○○	**F91,P24**	Boring Bars (Discontinued Description)
C○○□-	SWUBR/L○○-○○A	**F59**	Boring Bars (Dynamic Bar)
C○○□-	SWUBR/L○○-○○AN	**F59**	Boring Bars (Dynamic Bar)
C○○□-	SWUBR/L○○-○○-AS	**F87**	Boring Bars (Assembly(AS) / Discontinued Description)
C○○□-	SWUBR/L○○-○○-○/○	**F91,P24**	Boring Bars (Discontinued Description)
C○○□-	SWUPR/L○○-○○	**F91,P24**	Boring Bars (Discontinued Description)
C○○□-	SWUPR/L○○-○○-○/○	**F91,P24**	Boring Bars (Discontinued Description)
C09N		**M32,P15**	Spare Parts (Clamp)
C17R		**P15**	Spare Parts (Clamp)
C20R		**P15**	Spare Parts (Clamp)
C25R		**P15**	Spare Parts (Clamp)
C43R		**M40**	Spare Parts (Clamp)
C44R		**M40**	Spare Parts (Clamp)
C90SD	○○○○-12R/L	**M158,M159**	Spare Parts (Cartridge)
C90SP	○○○○-10R/L	**M158,M159**	Spare Parts (Cartridge)
C91R		**M94**	Spare Parts (Clamp)
C92R		**M94**	Spare Parts (Clamp)
CB-11		**D25,D34,D35,P16**	Spare Parts (Chipbreaker)
CB-12		**D26,F79,P16**	Spare Parts (Chipbreaker)
CB-13		**D26,F79,P16**	Spare Parts (Chipbreaker)

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CB-14		**D23,P16**	Spare Parts (Chipbreaker)
CB-15		**D23,P16**	Spare Parts (Chipbreaker)
CB-16		**D22,D23,F79,P16**	Spare Parts (Chipbreaker)
CB-17		**D22,P16**	Spare Parts (Chipbreaker)
CB-51		**D25,P16**	Spare Parts (Chipbreaker)
CB-S3220		**E42,P16**	Spare Parts (Chipbreaker)
CB-S4220		**E42,P16**	Spare Parts (Chipbreaker)
CBSNR/L	○○○○□-○○	**D38**	Toolholder (Turning)
CBSNR/L	○○○○B-12-A20	**F62**	Boring Bars (for Bearing Machining)
CB-T2212		**E43,P16**	Spare Parts (Chipbreaker)
CB-T3220		**E43,P16**	Spare Parts (Chipbreaker)
CCET	○○○○○○(○)FR/L-USF	**B53**	Insert (Turning)
CCET	○○○○○○(○)MFR/L-J	**B55**	Insert (Turning)
CCET	○○○○○○(○)MFR/L-U	**B53**	Insert (Turning)
CCET	○○○○○○(○)MFR/L-USF	**B53**	Insert (Turning)
CCET	○○○○○○(○)MR/L-F	**B52**	Insert (Turning)
CCET	○○○○○○(○)MR/L-FSF	**B51**	Insert (Turning)
CCET	○○○○○○(○)R/L-FSF	**B51**	Insert (Turning)
CCGT	○○○○○○	**B50**	Insert (Turning)
CCGT	○○○○○○AH	**B55**	Insert (Turning)
CCGT	○○○○○○ER/L-U	**B54**	Insert (Turning)
CCGT	○○○○○○(○)FR/L-U	**B53**	Insert (Turning)
CCGT	○○○○○○(○)M	**B50**	Insert (Turning)
CCGT	○○○○○○M-CF	**B49**	Insert (Turning)
CCGT	○○○○○○MER/L-U	**B54**	Insert (Turning)
CCGT	○○○○○○(○)MF	**B51**	Insert (Turning)
CCGT	○○○○○○MF-GF	**B49**	Insert (Turning)
CCGT	○○○○○○MF-GQ	**B49**	Insert (Turning)
CCGT	○○○○○○MFP-GF	**B49**	Insert (Turning)
CCGT	○○○○○○MFP-GQ	**B50**	Insert (Turning)
CCGT	○○○○○○MFP-SK	**B49**	Insert (Turning)
CCGT	○○○○○○(○)MFR/L-U	**B54**	Insert (Turning)
CCGT	○○○○○○MP-CF	**B49**	Insert (Turning)
CCGT	○○○○○○MP-CK	**B49**	Insert (Turning)
CCGT	○○○○○○(○)MR/L-F	**B52**	Insert (Turning)
CCGT	○○○○○○R/L-A3	**B55**	Insert (Turning)
CCGT	○○○○○○(○)R/L-F	**B52**	Insert (Turning)
CCGW	○○○○○○	**B55,C24**	Insert (Turning)
CCGW	○○○○○○NE	**C24**	Insert (Turning)
CCGW	○○○○○○SE	**C24**	Insert (Turning)
CCLNR/L	○○○○□-○○	**D22,P20**	Toolholder (Turning)
CCLNR/L	○○○○□-○○A	**D32,P20**	Toolholder (Turning)
CCLNR/L	○○○○□-○○GX	**D28**	Toolholder (Turning)
CCMT	○○○○○○	**B50,C24**	Insert (Turning)
CCMT	○○○○○○GK	**B50**	Insert (Turning)
CCMT	○○○○○○HQ	**B50**	Insert (Turning)
CCMT	○○○○○○MQ	**B51**	Insert (Turning)
CCMT	○○○○○○NE	**C24**	Insert (Turning)
CCMT	○○○○○○PP	**B50**	Insert (Turning)
CCMT	○○○○○○SE	**C24**	Insert (Turning)
CCMT	○○○○○○WP	**B50**	Insert (Turning)
CCMW	○○○○○○MEF	**C14**	Insert (Turning)
CCMW	○○○○○○S○○○○○MES	**C14**	Insert (Turning)
CCMW	○○○○○○S○○○○○SET	**C14**	Insert (Turning)
CCMW	○○○○○○T○○○○○ME	**C14**	Insert (Turning)
CCMW	○○○○○○T○○○○○SE	**C14**	Insert (Turning)
CCMW	○○○○○○S○○○○○MET	**C14**	Insert (Turning)
CCRNR/L	○○○○□-○○A	**D32**	Toolholder (Turning)
CDHNR/L	○○○○□-○○GX	**D29**	Toolholder (Turning)
CDJNR/L	○○○○□-○○	**D23**	Toolholder (Turning)
CDJNR/L	○○○○□-○○GX	**D29**	Toolholder (Turning)
CE-010		**D22,D23,F79,P13**	Spare Parts (Clamp Set)
CE-020		**D25,D26,D34,D35,P13**	Spare Parts (Clamp Set)
CE-030		**D27,P13**	Spare Parts (Clamp Set)
CE-030A		**D25,D27,D32,D33, D34,D35,D36,P13**	Spare Parts (Clamp Set)
CE-040		**D25,D27,D35,P13**	Spare Parts (Clamp Set)
CE-111		**P15**	Spare Parts (Clamp)
CE-121		**P15**	Spare Parts (Clamp)
CE-131		**P15**	Spare Parts (Clamp)
CE-141		**P15**	Spare Parts (Clamp)
CE-220		**D22,D25,P13**	Spare Parts (Clamp Set)
CE-320		**F79,P13**	Spare Parts (Clamp Set)
CE-360S		**F81,P13**	Spare Parts (Clamp Set)
CE-410		**D28,D29,D30, D31,F80,P13**	Spare Parts (Clamp Set)

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CELNR/L ○○○○□-○○	**D23**	Toolholder (Turning)
CGA-3R/L	**G39,P15**	Spare Parts (Clamp)
CGA-4R/L	**G39,P15**	Spare Parts (Clamp)
CGA-5R/L	**G39,P15**	Spare Parts (Clamp)
CGBR/L	**G11,P15**	Spare Parts (Clamp)
CGH-1R/L	**G38,G61,P15**	Spare Parts (Clamp)
CGH-2R/L	**G38,G61,P15**	Spare Parts (Clamp)
CGH-3R/L	**G38,P15**	Spare Parts (Clamp)
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CGIA-4R	**G63,P15**	Spare Parts (Clamp)
CGIA-5R	**G63,P15**	Spare Parts (Clamp)
CH-20R	**M44,P15**	Spare Parts (Clamp)
CINR/L ○○○○S-○○	**J17**	Toolholder (Threading)
CL63-1	**N3,N4,N5,N6,N7, N8,N9,N10,P19**	Spare Parts (Coolant Pipe)
CL100-1	**N3,N4,N10,P19**	Spare Parts (Coolant Pipe)
CNGA ○○○○○○	**B19**	Insert (Turning)
CNGA ○○○○○○ME4	**C6**	Insert (Turning)
CNGA ○○○○○○MEF	**C6**	Insert (Turning)
CNGA ○○○○○○S○○○○○	**B98**	Insert (Turning)
CNGA ○○○○○○S○○○○○ME	**C6**	Insert (Turning)
CNGA ○○○○○○S○○○○○MEH	**C6**	Insert (Turning)
CNGA ○○○○○○S○○○○○MEP	**C6**	Insert (Turning)
CNGA ○○○○○○S○○○○○MET	**C6**	Insert (Turning)
CNGA ○○○○○○S○○○○○MEW	**C6**	Insert (Turning)
CNGA ○○○○○○S○○○○○SE	**C7**	Insert (Turning)
CNGA ○○○○○○S○○○○○SET	**C7**	Insert (Turning)
CNGA ○○○○○○T○○○○○	**B98**	Insert (Turning)
CNGA ○○○○○○T○○○○○ME	**C6**	Insert (Turning)
CNGA ○○○○○○T○○○○○SE	**C7**	Insert (Turning)
CNGG ○○○○○○AH	**B19**	Insert (Turning)
CNGG ○○○○○○FP-TK	**B17**	Insert (Turning)
CNGG ○○○○○○HQ	**B14**	Insert (Turning)
CNGG ○○○○○○MFP-SK	**B17**	Insert (Turning)
CNGG ○○○○○○R/L	**B20**	Insert (Turning)
CNGG ○○○○○○R/L-25R	**B20**	Insert (Turning)
CNGG ○○○○○○R/L-A3	**B19**	Insert (Turning)
CNGG ○○○○○○R/L-S	**B20**	Insert (Turning)
CNGG ○○○○○○TK	**B18**	Insert (Turning)
CNGG ○○○○○○Z	**B20**	Insert (Turning)
CNGM ○○○○○○S○○○○○BB○	**C7**	Insert (Turning)
CNGN ○○○○○○S○○○○○	**B98**	Insert (Turning)
CNGN ○○○○○○T○○○○○	**B98**	Insert (Turning)
CNGU ○○○○○○MER-U	**B46**	Insert (Turning)
CNGU ○○○○○○(○)MFR-F	**B46**	Insert (Turning)
CNGU ○○○○○○(○)MFR-U	**B46**	Insert (Turning)
CNGU ○○○○○○MF-SK	**B46**	Insert (Turning)
CNGU ○○○○○○MFP-SK	**B46**	Insert (Turning)
CNGX ○○○○○○T○○○○○	**B98**	Insert (Turning)
CNMA ○○○○○○	**B19**	Insert (Turning)
CNMA ○○○○○○S○○○○○	**B98**	Insert (Turning)
CNMG ○○○○○○	**B16**	Insert (Turning)
CNMG ○○○○○○AH	**B19**	Insert (Turning)
CNMG ○○○○○○C	**B19**	Insert (Turning)
CNMG ○○○○○○CJ	**B14**	Insert (Turning)
CNMG ○○○○○○CQ	**B14**	Insert (Turning)
CNMG ○○○○○○GC	**B19**	Insert (Turning)
CNMG ○○○○○○GP	**B14**	Insert (Turning)
CNMG ○○○○○○GS	**B15**	Insert (Turning)
CNMG ○○○○○○GT	**B15**	Insert (Turning)
CNMG ○○○○○○HQ	**B14**	Insert (Turning)
CNMG ○○○○○○HS	**B15**	Insert (Turning)
CNMG ○○○○○○MQ	**B18**	Insert (Turning)
CNMG ○○○○○○MS	**B18**	Insert (Turning)
CNMG ○○○○○○MU	**B18**	Insert (Turning)
CNMG ○○○○○○PG	**B15**	Insert (Turning)
CNMG ○○○○○○PH	**B16**	Insert (Turning)
CNMG ○○○○○○PP	**B14**	Insert (Turning)
CNMG ○○○○○○PQ	**B14**	Insert (Turning)
CNMG ○○○○○○PS	**B15**	Insert (Turning)
CNMG ○○○○○○PT	**B15**	Insert (Turning)
CNMG ○○○○○○TK	**B18**	Insert (Turning)
CNMG ○○○○○○TN-V	**B15**	Insert (Turning)
CNMG ○○○○○○WP	**B14**	Insert (Turning)
CNMG ○○○○○○WQ	**B14**	Insert (Turning)

Description	Page	Category
CNMG ○○○○○○XF	**B17**	Insert (Turning)
CNMG ○○○○○○XP	**B17**	Insert (Turning)
CNMG ○○○○○○XQ	**B17**	Insert (Turning)
CNMG ○○○○○○XS	**B17**	Insert (Turning)
CNMG ○○○○○○ZS	**B19**	Insert (Turning)
CNMM ○○○○○○M	**C23**	Insert (Turning)
CNMM ○○○○○○M-NE	**C23**	Insert (Turning)
CNMM ○○○○○○M-SE	**C23**	Insert (Turning)
CNMM ○○○○○○PX	**B16**	Insert (Turning)
CNMN ○○○○○○S○○○○○	**C19**	Insert (Turning)
CNMN ○○○○○○T○○○○○	**B98**	Insert (Turning)
CNMU ○○○○○○E-GK	**B46**	Insert (Turning)
CP-2D	**D14,F74,P16**	Spare Parts (Clamp)
CP-3D	**D8,D10,D12,D20,F67, F70,F73,F74,F77,P16**	Spare Parts (Clamp)
CP-5D	**D16,P16**	Spare Parts (Clamp)
CP-8TE	**M95,P16**	Spare Parts (Clamp)
CP-8W	**M95,P16**	Spare Parts (Clamp)
CPGB ○○○○○○S○○○○○MES	**C14**	Insert (Turning)
CPGB ○○○○○○S○○○○○MET	**C14**	Insert (Turning)
CPGB ○○○○○○S○○○○○SET	**C14**	Insert (Turning)
CPGB ○○○○○○T○○○○○ME	**C14**	Insert (Turning)
CPGB ○○○○○○T○○○○○SE	**C14**	Insert (Turning)
CPMB ○○○○○○	**B56**	Insert (Turning)
CPMH ○○○○○○	**B56,C25**	Insert (Turning)
CPMH ○○○○○○HQ	**B56**	Insert (Turning)
CPMH ○○○○○○NE	**C25**	Insert (Turning)
CPMH ○○○○○○R/L-Y	**B56**	Insert (Turning)
CPMH ○○○○○○SE	**C25**	Insert (Turning)
CPMT ○○○○○○GP	**B56**	Insert (Turning)
CPMT ○○○○○○PP	**B56**	Insert (Turning)
CPMT ○○○○○○XP	**B56**	Insert (Turning)
CPMT ○○○○○○XQ	**B56**	Insert (Turning)
CP-RCR/L	**D38,F62,P13**	Spare Parts (Clamp Set)
CP8X15TL	**M38,P2**	Spare Parts (Screw)
CP8X23TL	**M38,P2**	Spare Parts (Screw)
CPS-1	**F61,P14**	Spare Parts (Clamp Set)
CPS-2	**F60,F61,P14**	Spare Parts (Clamp Set)
CPS-2P	**E42,E43,P14**	Spare Parts (Clamp Set)
CPS-2S	**M113,P14**	Spare Parts (Clamp Set)
CPS-2TR	**M110,P14**	Spare Parts (Clamp Set)
CPS-3	**E42,E43,F60, F61,P14**	Spare Parts (Clamp Set)
CPS-4V	**G55,N15,P14**	Spare Parts (Clamp Set)
CPS-5E	**M113,P14**	Spare Parts (Clamp Set)
CPS-5F	**G55,M192,P14**	Spare Parts (Clamp Set)
CPS-5R/L	**D17,P14**	Spare Parts (Clamp Set)
CPS-5S	**J16,J17,N9,P14**	Spare Parts (Clamp Set)
CPS-5V	**G55,G88,G90, G100,N15,P14**	Spare Parts (Clamp Set)
CPS-6F	**M192,P14**	Spare Parts (Clamp Set)
CPS-6M	**M39,M43,M51,P14**	Spare Parts (Clamp Set)
CPS-6S	**J16,J17,N9,P14**	Spare Parts (Clamp Set)
CPS-6V	**G55,G90,G93, G100,M194,P14**	Spare Parts (Clamp Set)
CPS-8V	**G90,G93,G100,P14**	Spare Parts (Clamp Set)
CRDNN ○○○○□-○○	**D27**	Toolholder (Turning)
CRDNN ○○○○□-○○A	**D33**	Toolholder (Turning)
CRSNR/L ○○○○□-○○	**D27**	Toolholder (Turning)
CRSNR/L ○○○○□-○○A	**D33**	Toolholder (Turning)
CS-2D	**D14,F74,P2**	Spare Parts (Screw)
CS-3D	**D8,D10,D12,D20,F67, F70,F73,F74,F77,P2**	Spare Parts (Screw)
CS-5D	**D16,P2**	Spare Parts (Screw)
CSBPR/L ○○○○□-○○N	**E42,P22**	Toolholder (Turning)
CSDNN ○○○○□-○○	**D25**	Toolholder (Turning)
CSDNN ○○○○□-○○A	**D35**	Toolholder (Turning)
CSDNN ○○○○□-○○GX	**D30**	Toolholder (Turning)
CSDPN ○○○○□-○○N	**E42**	Toolholder (Turning)
CSKNR/L ○○○○□-○○	**D25**	Toolholder (Turning)
CSKNR/L ○○○○□-○○A	**D34**	Toolholder (Turning)
CSKNR/L ○○○○□-○○GX	**D31**	Toolholder (Turning)
CSKPR ○○○○□-○○N	**E42**	Toolholder (Turning)
CS-NR/L ○○○○□-○○	**D25,P20**	Toolholder (Turning)
CS-NR/L ○○○○□-○○GX	**D31**	Toolholder (Turning)
CSRNR/L ○○○○□-○○	**D25**	Toolholder (Turning)

Description		Page	Category
CSRN$^{R}/_{L}$	○○○○□-○○A	**D34**	Toolholder (Turning)
CSRN$^{R}/_{L}$	○○○○□-○○GX	**D30**	Toolholder (Turning)
CSSN$^{R}/_{L}$	○○○○□-○○	**D25**	Toolholder (Turning)
CSSN$^{R}/_{L}$	○○○○□-○○A	**D35**	Toolholder (Turning)
CSSN$^{R}/_{L}$	○○○○□-○○GX	**D30**	Toolholder (Turning)
CSSP$^{R}/_{L}$	○○○○□-○○N	**E42**	Toolholder (Turning)
CSYN$^{R}/_{L}$	○○○○□-○○	**D25**	Toolholder (Turning)
CSYN$^{R}/_{L}$	○○○○□-○○A	**D34**	Toolholder (Turning)
CSYN$^{R}/_{L}$	○○○○□-○○GX	**D31**	Toolholder (Turning)
CT○○T○	-45A	**K21,K22,K23,K25**	Insert (Drilling) / Chamfering
CTDPR	○○CA○○	**N15**	Toolholder (Cartridge)
CTEPR	○○CA○○	**N15**	Toolholder (Cartridge)
CTFP$^{R}/_{L}$	○○○○□-○○N	**E43**	Toolholder (Turning)
CTFPR	○○CA○○	**N15**	Toolholder (Cartridge)
CTGP$^{R}/_{L}$	○○○○□-○○N	**E43**	Toolholder (Turning)
CTJN$^{R}/_{L}$	○○○○□-○○	**D26**	Toolholder (Turning)
CTJN$^{R}/_{L}$	○○○○□-○○A	**D36**	Toolholder (Turning)
CTTP$^{R}/_{L}$	○○○○□-○○N	**E43,P22**	Toolholder (Turning)
CTUN$^{R}/_{L}$	○○○○□-○○	**D26**	Toolholder (Turning)
CTUN$^{R}/_{L}$	○○○○□-○○A	**D36,P20**	Toolholder (Turning)
D			
DA	○○○○M-GM	**K6,K7,K8**	Insert (Drilling)
DC	○○○○M-SC	**K18,K19,K20**	Insert (Drilling)
DC-42		**F67,P8**	Spare Parts (Shim)
DC-44		**D8,P8**	Spare Parts (Shim)
DCET	○○○○○○(○)F$^{R}/_{L}$-JSF	**B64**	Insert (Turning)
DCET	○○○○○○(○)F$^{R}/_{L}$-USF	**B62**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}/_{L}$-J	**B64**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}/_{L}$-JSF	**B64**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}/_{L}$-U	**B62**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}/_{L}$-USF	**B62**	Insert (Turning)
DCET	○○○○○○(○)M$^{R}/_{L}$-F	**B61**	Insert (Turning)
DCET	○○○○○○(○)M$^{R}/_{L}$-FSF	**B60**	Insert (Turning)
DCET	○○○○○○(○)$^{R}/_{L}$-FSF	**B60**	Insert (Turning)
DCGT	○○○○○○	**B59**	Insert (Turning)
DCGT	○○○○○○AH	**B65**	Insert (Turning)
DCGT	○○○○○○CF	**B57**	Insert (Turning)
DCGT	○○○○○○CK	**B57**	Insert (Turning)
DCGT	○○○○○○(○)E$^{R}/_{L}$-J	**B65**	Insert (Turning)
DCGT	○○○○○○E$^{R}/_{L}$-U	**B63**	Insert (Turning)
DCGT	○○○○○○(○)F$^{R}/_{L}$-J	**B64**	Insert (Turning)
DCGT	○○○○○○(○)F$^{R}/_{L}$-U	**B62**	Insert (Turning)
DCGT	○○○○○○(○)M	**B59**	Insert (Turning)
DCGT	○○○○○○M-CF	**B57**	Insert (Turning)
DCGT	○○○○○○M-CK	**B57**	Insert (Turning)
DCGT	○○○○○○(○)ME$^{R}/_{L}$-J	**B65**	Insert (Turning)
DCGT	○○○○○○ME$^{R}/_{L}$-U	**B63**	Insert (Turning)
DCGT	○○○○○○(○)MF	**B59**	Insert (Turning)
DCGT	○○○○○○MF-GF	**B57**	Insert (Turning)
DCGT	○○○○○○MF-GQ	**B58**	Insert (Turning)
DCGT	○○○○○○MFP-GF	**B57**	Insert (Turning)
DCGT	○○○○○○MFP-GQ	**B58**	Insert (Turning)
DCGT	○○○○○○MFP-SK	**B57**	Insert (Turning)
DCGT	○○○○○○(○)MF$^{R}/_{L}$-J	**B64**	Insert (Turning)
DCGT	○○○○○○(○)MF$^{R}/_{L}$-U	**B63**	Insert (Turning)
DCGT	○○○○○○MP-CF	**B57**	Insert (Turning)
DCGT	○○○○○○MP-CK	**B58**	Insert (Turning)
DCGT	○○○○○○(○)M$^{R}/_{L}$-F	**B61**	Insert (Turning)
DCGT	○○○○○○$^{R}/_{L}$-A3	**B65**	Insert (Turning)
DCGT	○○○○○○(○)$^{R}/_{L}$-F	**B61**	Insert (Turning)
DCGW	○○○○○○	**B65**	Insert (Turning)
DCLN$^{R}/_{L}$	○○○○□-○○	**D8**	Toolholder (Turning)
DCMT	○○○○○○	**B59,C25**	Insert (Turning)
DCMT	○○○○○○GK	**B58**	Insert (Turning)
DCMT	○○○○○○GP	**B58**	Insert (Turning)
DCMT	○○○○○○HQ	**B59**	Insert (Turning)
DCMT	○○○○○○MQ	**B60**	Insert (Turning)
DCMT	○○○○○○NE	**C25**	Insert (Turning)
DCMT	○○○○○○PP	**B58**	Insert (Turning)
DCMT	○○○○○○$^{R}/_{L}$-NE	**C25**	Insert (Turning)
DCMT	○○○○○○SE	**C25**	Insert (Turning)
DCMT	○○○○○○XP	**B59**	Insert (Turning)
DCMT	○○○○○○XQ	**B59**	Insert (Turning)
DCMW	○○○○○○MEF	**C15**	Insert (Turning)
DCMW	○○○○○○S○○○○○MES	**C15**	Insert (Turning)

Description		Page	Category
DCMW	○○○○○○S○○○○○MET	**C15**	Insert (Turning)
DCMW	○○○○○○S○○○○○SET	**C15**	Insert (Turning)
DCMW	○○○○○○T○○○○○ME	**C15**	Insert (Turning)
DCMW	○○○○○○T○○○○○SE	**C15**	Insert (Turning)
DCMX	○○○○○○WP	**B58**	Insert (Turning)
DD-42		**F70,P8**	Spare Parts (Shim)
DD-42-16		**F70,P8**	Spare Parts (Shim)
DD-43		**D10,P8**	Spare Parts (Shim)
DD-44		**D10,P8**	Spare Parts (Shim)
DDJN$^{R}/_{L}$	○○○○□-○○○○	**D10**	Toolholder (Turning)
DDHN$^{R}/_{L}$	○○○○□-○○○○	**D10**	Toolholder (Turning)
DMC	○○○	**M109**	End Mill
DMC	○○○H	**M111**	End Mill
DMC	○○○SX	**M110**	End Mill
DMC	○○○SXT	**M110**	End Mill
DMC	○○○SX-○○○	**M110**	End Mill
DMC	○○○-S○○	**M109**	End Mill
DN10		**F67,F70,F73, F74,F77,P19**	Spare Parts (Nozzle)
DN20		**F67,F70,F73, F74,F77,P19**	Spare Parts (Nozzle)
DNGA	○○○○○○ME4	**C8**	Insert (Turning)
DNGA	○○○○○○MEF	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○	**B99**	Insert (Turning)
DNGA	○○○○○○S○○○○○ME	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○MEH	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○MEP	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○MET	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○SE	**C9**	Insert (Turning)
DNGA	○○○○○○S○○○○○SET	**C9**	Insert (Turning)
DNGA	○○○○○○T○○○○○	**B99**	Insert (Turning)
DNGA	○○○○○○T○○○○○ME	**C8**	Insert (Turning)
DNGA	○○○○○○T○○○○○SE	**C9**	Insert (Turning)
DNGG	○○○○○○AH	**B27**	Insert (Turning)
DNGG	○○○○○○FP-TK	**B25**	Insert (Turning)
DNGG	○○○○○○MFP-SK	**B24**	Insert (Turning)
DNGG	○○○○○○$^{R}/_{L}$	**B27**	Insert (Turning)
DNGG	○○○○○○$^{R}/_{L}$-A3	**B27**	Insert (Turning)
DNGG	○○○○○○$^{R}/_{L}$-S	**B27**	Insert (Turning)
DNGG	○○○○○○TK	**B25**	Insert (Turning)
DNGM	○○○○○○S○○○○○BB○	**C9**	Insert (Turning)
DNGN	○○○○○○S○○○○○	**B99**	Insert (Turning)
DNGN	○○○○○○T○○○○○	**B99**	Insert (Turning)
DNGU	○○○○○○MER-U	**B47**	Insert (Turning)
DNGU	○○○○○○(○)MFR-F	**B47**	Insert (Turning)
DNGU	○○○○○○(○)MFR-U	**B47**	Insert (Turning)
DNGU	○○○○○○MF-SK	**B47**	Insert (Turning)
DNGU	○○○○○○MFP-SK	**B47**	Insert (Turning)
DNGX	○○○○○○T○○○○○	**B99**	Insert (Turning)
DNMA	○○○○○○	**B26**	Insert (Turning)
DNMG	○○○○○○	**B23**	Insert (Turning)
DNMG	○○○○○○AH	**B27**	Insert (Turning)
DNMG	○○○○○○C	**B26**	Insert (Turning)
DNMG	○○○○○○CJ	**B22**	Insert (Turning)
DNMG	○○○○○○CQ	**B22**	Insert (Turning)
DNMG	○○○○○○GC	**B26**	Insert (Turning)
DNMG	○○○○○○GP	**B21**	Insert (Turning)
DNMG	○○○○○○GS	**B22**	Insert (Turning)
DNMG	○○○○○○GT	**B23**	Insert (Turning)
DNMG	○○○○○○HQ	**B21**	Insert (Turning)
DNMG	○○○○○○HS	**B23**	Insert (Turning)
DNMG	○○○○○○MQ	**B25**	Insert (Turning)
DNMG	○○○○○○MS	**B25**	Insert (Turning)
DNMG	○○○○○○MU	**B25**	Insert (Turning)
DNMG	○○○○○○PG	**B22**	Insert (Turning)
DNMG	○○○○○○PH	**B24**	Insert (Turning)
DNMG	○○○○○○PP	**B21**	Insert (Turning)
DNMG	○○○○○○PQ	**B21**	Insert (Turning)
DNMG	○○○○○○PS	**B23**	Insert (Turning)
DNMG	○○○○○○PT	**B23**	Insert (Turning)
DNMG	○○○○○○TK	**B25**	Insert (Turning)
DNMG	○○○○○○TN-V	**B22**	Insert (Turning)
DNMG	○○○○○○XF	**B24**	Insert (Turning)
DNMG	○○○○○○XP	**B24**	Insert (Turning)
DNMG	○○○○○○XQ	**B24**	Insert (Turning)
DNMG	○○○○○○XS	**B24**	Insert (Turning)

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○ : Figure, □ : Alphabet

Description		Page	Category
DNMG	○○○○○○ZS	**B26**	Insert (Turning)
DNMM	○○○○○○M	**C23**	Insert (Turning)
DNMM	○○○○○○M-NE	**C23**	Insert (Turning)
DNMM	○○○○○○M-SE	**C23**	Insert (Turning)
DNMM	○○○○○○PX	**B24**	Insert (Turning)
DNMU	○○○○○○E-GK	**B47**	Insert (Turning)
DPET	○○○○○○(○)F$^{R}_{L}$-USF	**B66**	Insert (Turning)
DPET	○○○○○○(○)MF$^{R}_{L}$-USF	**B66**	Insert (Turning)
DPET	○○○○○○(○)M$^{R}_{L}$-FSF	**B66**	Insert (Turning)
DPET	○○○○○○(○)$^{R}_{L}$-FSF	**B66**	Insert (Turning)
DR	○○-○○	**M142**	Spare Parts (Drive-Ring)
DR	○○-○○□	**M142**	Spare Parts (Drive-Ring)
DR	○○○○-○○○○	**M143**	Spare Parts (Drive-Ring)
DR	○○○○-○○○○□	**M143**	Spare Parts (Drive-Ring)
DR12CR-IN		**K63**	Cartridge (Drill)
DR12CR-OUT		**K63**	Cartridge (Drill)
DR20CR-IN		**K63**	Cartridge (Drill)
DR20CR-OUT		**K63**	Cartridge (Drill)
DS	○○○	**K53**	Insert (Drilling)
DS-42		**F73,P8**	Spare Parts (Shim)
DS-44		**D12,P8**	Spare Parts (Shim)
DSBN$^{R}_{L}$	○○○○□-○○	**D12**	Toolholder (Turning)
DT-7		**G49,G50,K54,K56, K58,K60,M188,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-8		**K56,K58,K60,M134, M138,M166,M190,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-9		**K25**	Spare Parts (Torx Wrench / Screwdriver type)
DT-10		**K69,M45,M97,M134, M138,M166,M180, M181,M186,M188, M190,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-15		**K25,K56,K58,K60,K62, M49,M101,M104,M105, M134,M138,M166,M180, M181,M190,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-20		**K41,K43,K45,K46,K57, K58,K59,K60,K61,K62, K63,M97,M112,M166, M180,M181,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-25		**K41,K43,K45,K46,K57, K59,K63,M181,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-32		**D14,F74,P8**	Spare Parts (Shim)
DT-42		**F74,P8**	Spare Parts (Shim)
DTGN$^{R}_{L}$	○○○○□-○○	**D14**	Toolholder (Turning)
DTM-6		**K40,K42,K44,K46,M72, M73,M134,M138,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-7		**K40,K42,K44,K46,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-8		**K40,K42,K44,K46, M62,M63,M64,M65, M80,M81,M83,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-10		**K40,K42,K44,K46,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-15		**K41,K42,K44,K46,M27, M63,M64,M65,M80,M81, M83,M91,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTP-9		**M158,M159,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTP-15		**M34,M158,M159,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTP-20		**M96,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTPM-8		**M55,M56,M77,M78, M125,M177,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTPM-10		**M175,M177,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTPM-15		**M55,M56,M77,M78,M117, M119,M120,M170,M171, M175,M177,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DV-33		**D16,P8**	Spare Parts (Shim)
DVLN$^{R}_{L}$	○○○○□-○○	**D16**	Toolholder (Turning)
DVPN$^{R}_{L}$	○○○○□-○○	**D16**	Toolholder (Turning)
DW-42		**F77,P8**	Spare Parts (Shim)
DW-44		**D20,P8**	Spare Parts (Shim)
DWLN$^{R}_{L}$	○○○○□-○○	**D20**	Toolholder (Turning)
DVVNN	○○○○□-○○	**D16**	Toolholder (Turning)
E			
E○○□-	SCLC$^{R}_{L}$○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
E○○□-	SCLC$^{R}_{L}$○○-○○A	**F39**	Boring Bars (Dynamic Bar)
E○○□-	SCLC$^{R}_{L}$○○-○○A-○/○	**F39**	Boring Bars (Dynamic Bar)
E○○□-	SCLC$^{R}_{L}$○○-○○AN	**F39**	Boring Bars (Dynamic Bar)
E○○□-	SCLCR○○-○○AN○/○	**F39**	Boring Bars (Dynamic Bar)
E○○□-	SCLP$^{R}_{L}$○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
E○○□-	SCLP$^{R}_{L}$○○-○○A	**F41**	Boring Bars (Dynamic Bar)
E○○□-	SCLP$^{R}_{L}$○○-○○A-○/○	**F41**	Boring Bars (Dynamic Bar)
E○○□-	SCLP$^{R}_{L}$○○-○○AN	**F41**	Boring Bars (Dynamic Bar)
E○○□-	SCLPR○○-○○AN○/○	**F41**	Boring Bars (Dynamic Bar)
E○○□-	SDQC$^{R}_{L}$○○-○○A	**F44**	Boring Bars (Dynamic Bar)
E○○□-	SDQC$^{R}_{L}$○○-○○A-○/○	**F44**	Boring Bars (Dynamic Bar)
E○○□-	SDUC$^{R}_{L}$○○-○○A	**F43**	Boring Bars (Dynamic Bar)
E○○□-	SDUC$^{R}_{L}$○○-○○A-○/○	**F43**	Boring Bars (Dynamic Bar)
E○○□-	SDZC$^{R}_{L}$○○-○○A	**F45**	Boring Bars (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○A	**F49**	Boring Bars (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○A-○/○	**F49**	Boring Bars (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○AN	**F49**	Boring Bars (Dynamic Bar)
E○○□-	STLPR○○-○○AN○/○	**F49**	Boring Bars (Dynamic Bar)
E○○□-	STUP$^{R}_{L}$○○-○○	**F91,P23**	Boring Bars (Discontinued Description)
E○○□-	SVPBR○○-○○A	**F54**	Boring Bars (Dynamic Bar)
E○○□-	SVPCR○○-○○A	**F54**	Boring Bars (Dynamic Bar)
E○○□-	SVUBR○○-○○A	**F57**	Boring Bars (Dynamic Bar)
E○○□-	SVUCR○○-○○A	**F57**	Boring Bars (Dynamic Bar)
E○○□-	SWUB$^{R}_{L}$○○-○○A	**F59**	Boring Bars (Dynamic Bar)
E○○□-	SWUB$^{R}_{L}$○○-○○A-○/○	**F59**	Boring Bars (Dynamic Bar)
E○○□-	SWUB$^{R}_{L}$○○-○○AN	**F59**	Boring Bars (Dynamic Bar)
E○○□-	SWUBR○○-○○AN○/○	**F59**	Boring Bars (Dynamic Bar)
E○○□-	SWUP$^{R}_{L}$○○-○○A	**F59**	Boring Bars (Dynamic Bar)
E○○□-	SWUP$^{R}_{L}$○○-○○A-○/○	**F59**	Boring Bars (Dynamic Bar)
ENGN	○○○○○○S○○○○○	**B99**	Insert (Turning)
ENGN	○○○○○○T○○○○○	**B99**	Insert (Turning)
EZBR	○○○○○○-○○○NB	**C21,C33,F17**	EZ Bars (Boring)
EZBR	○○○○○○HP-○○○F	**F14**	EZ Bars (Boring)
EZBR	○○○○○○HP-○○○H	**F14**	EZ Bars (Boring)
EZBR	○○○○○○HP-○○○H-LT	**F15**	EZ Bars (Boring)
EZBR	○○○○○○ST-○○○F	**F16**	EZ Bars (Boring)
EZBR	○○○○○○ST-○○○H	**F16**	EZ Bars (Boring)
EZFGR	○○○○○○-○○○	**G68**	EZ Bars (Internal Face Grooving)
EZGR	○○○○○○-○○○	**G43**	EZ Bars (Internal Grooving)
EZGR	○○○○○○-○○○S	**G43**	EZ Bars (Internal Grooving)
EZTR	○○○○○○-○○-○○○	**J24**	EZ Bars (Internal Threading)
EZH	○○○○○(.○)CT-○○○	**F22,F23,F82**	Sleeve
EZH	○○○○○(.○)HP-○○○	**F24,F25,F82**	Sleeve
EZH	○○○○○(.○)ST-○○○	**F26,F27,F82**	Sleeve
EZVBR	○○○○○○-○○○	**F20**	EZ Bars (Boring / Internal Facing / Copying)
F			
FDM-	○○○	**K75**	Fine Micro Drill
FDM-	○○○M(1)	**K73,K74**	Fine Micro Drill
FGG$^{R}_{L}$	○○○○-○○	**G31**	Insert (Grooving)
FH-2		**P17**	Spare Parts (Hexagon Wrench / Flag type)
FH-2.5		**P17**	Spare Parts (Hexagon Wrench / Flag type)
FMM	○○-○○	**G97**	Insert (Face Grooving)
FMN	○	**G97**	Insert (Face Grooving)
FS-	○○	**K25**	Spare Parts (Drill fitting screw for Chamfering Attachment)
FT-6		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-7		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-8		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-10		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-15		**P17**	Spare Parts (Torx Wrench / Flag type)
FTK	○	**G99**	Insert (Face Grooving)
FTS-15		**F65**	Spare Parts (Torx Wrench / Flag type)
FTP-5		**K9,K10,K11,K12, K13,K14,K15,P17**	Spare Parts (Torx Plus Wrench / Flag type)
FTP-6		**K9,K10,K11,K12,K13, K14,K15,M130,P17**	Spare Parts (Torx Plus Wrench / Flag type)
FTP-7		**K9,K10,K11,K12,K13, K14,K15,P17**	Spare Parts (Torx Plus Wrench / Flag type)
G			
GA	○○	**G39**	Insert (Grooving)
GB	○○$^{R}_{L}$○○○	**C30,G10**	Insert (Grooving)
GB	○○$^{R}_{L}$○○○R	**G10**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○	**C20,C30,G6,G8**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○F	**G7**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○GM	**G7**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○MY	**G7**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○R	**G8**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○RF	**G8**	Insert (Grooving)

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Description		Page	Category
GBF	○○R/L○○○-○○○	**G12**	Insert (Grooving)
GDFM	○○○○N-○○○CM	**G75**	Insert (Face Grooving)
GDFM	○○○○N-○○○DM	**G75**	Insert (Face Grooving)
GDFM	○○○○N-○○○GH	**G75**	Insert (Face Grooving)
GDFM	○○○○N-○○○GM	**G75**	Insert (Face Grooving)
GDFMS	○○○○N-○○○DM	**G75**	Insert (Face Grooving)
GDG	○○○○N-○○○GS	**G19**	Insert (Grooving)
GDG	○○○○N-○○○PG	**H12**	Insert (Cut-Off)
GDG	○○○○R-○○○PG-○○D	**H12**	Insert (Cut-Off)
GDGS	○○○○N-○○○NB	**C20,C31,G20**	Insert (Grooving)
GDM	○○○○N-○○○GM	**G19**	Insert (Grooving)
GDM	○○○○N-○○○GMI	**G59**	Insert (Grooving)
GDM	○○○○N-○○○GL	**G19**	Insert (Grooving)
GDM	○○○○N-○○○PF	**H12**	Insert (Cut-Off)
GDM	○○○○N-○○○PH	**G19,H13**	Insert (Grooving / Cut-Off)
GDM	○○○○N-○○○PM	**H13**	Insert (Cut-Off)
GDM	○○○○N-○○○PQ	**H12**	Insert (Cut-Off)
GDM	○○○○N-○○○R-CM	**G19,G59**	Insert (Grooving)
GDM	○○○○R/L-○○○PF-○○D	**H12**	Insert (Cut-Off)
GDM	○○○○R-○○○PM-○D	**H13**	Insert (Cut-Off)
GDM	○○○○R-○○○PQ-○○D	**H12**	Insert (Cut-Off)
GDMS	○○○○N-○○○GM	**G19**	Insert (Grooving)
GDMS	○○○○N-○○○PH	**G19,H13**	Insert (Grooving / Cut-Off)
GDMS	○○○○N-○○○PM	**H13**	Insert (Cut-Off)
GDMS	○○○○R-○○○PM-○D	**H13**	Insert (Cut-Off)
GER/L	○○○-○○○□	**G47,G48**	Insert (Grooving)
GER	○○○-○○○□□	**G47,G48**	Insert (Grooving)
GFVR/L	○○○○□-○○○(○)□	**G90**	Toolholder (Face Grooving)
GFVSR/L	○○○○□-○○AA	**G88,P25**	Toolholder (Face Grooving)
GFVSR/L	○○○○□-H□	**G92**	Toolholder (Face Grooving)
GFVSR/L	○○○○□-○○○(○)□	**G92,G93**	Toolholder (Face Grooving)
GFVTR/L	○○○○□-○○AA	**G88,P25**	Toolholder (Face Grooving)
GFVTR/L	○○○○□-○○○(○)□	**G92,G93**	Toolholder (Face Grooving)
GFVTR/L	○○○○□-H□	**G92**	Toolholder (Face Grooving)
GH	○○○○(○)-○○	**B107,G39,G61**	Insert (Grooving)
GHU	○○-○○	**G39,G61**	Insert (Grooving)
GIA	○○	**G63**	Insert (Grooving)
GIFVR/L	○○○○B-○○○□	**G100**	Toolholder (Face Grooving)
GIVR/L	○○○○-○□(□)	**G55**	Toolholder (Internal Grooving)
GIVR/L	○○○○-○□E	**G55**	Toolholder (Internal Grooving)
GIVR/L	○○○○-○□W	**G55**	Toolholder (Internal Grooving)
GMG	○○○○-○○○MG	**G30,G62,G98**	Insert (Grooving)
GMG	○○○○-○○○MS	**G30**	Insert (Grooving)
GMG	○○○○-○○○R	**G30**	Insert (Grooving)
GMG	○○○○-○○○RU	**G30**	Insert (Grooving)
GMGA	○○○○-○○○R	**G31,G62,G98**	Insert (Grooving)
GMM	3014-04	**G31**	Insert (Grooving)
GMM	3014-15R	**G31**	Insert (Grooving)
GMM	3014-15RU	**G31**	Insert (Grooving)
GMM	○○○○-MT	**G32,H20**	Insert (Grooving / Cut-Off)
GMM	○○○○-NB	**G32,H20**	Insert (Grooving / Cut-Off)
GMM	○○○○R/L-MT-15D	**G32,H20**	Insert (Cut-Off)
GMM	○○○○R/L-TK-8D	**G32,H20**	Insert (Cut-Off)
GMM	○○○○R/L-TMR-6D	**H20**	Insert (Cut-Off)
GMM	○○○○-TK	**G32,H20**	Insert (Cut-Off)
GMM	○○○○-TMR	**H20**	Insert (Cut-Off)
GMM	○○○○-○○○MS	**G30**	Insert (Grooving)
GMM	○○○○-○○○MW	**G30,G62,G98**	Insert (Grooving)
GMM	○○○○-○○○R	**G30**	Insert (Grooving)
GMM	○○○○-○○○V	**G60**	Insert (Grooving)
GMM	○○○○-○○○VR	**G60**	Insert (Grooving)
GMN	○(.○)	**C20,C30,G32,G33,H20**	Insert (Grooving)
GMN	○-TK	**G32,H20**	Insert (Cut-Off)
GMR/L	○-TK-8D	**G32,H20**	Insert (Cut-Off)
GMR/L	○(.○)-○(○)D	**G32,H20**	Insert (Cut-Off)
GMGW	○○○○-○○R	**C31,G40**	Insert (Grooving)
GMGW	○○○○-○○R-HR	**C31,G40**	Insert (Grooving)
GOMT	○○○○○○ER-D	**M19**	Insert (Milling)
GP-1		**K56,K58,K60,P19**	Spare Parts (Plug)
GP-2		**K56,K57,K58,K59, K60,K61,K62,P19**	Spare Parts (Plug)
GS-50		**G16,G36,G57,G59, G60,J22,J23,P2**	Spare Parts (Screw)
GS-50S		**P2**	Spare Parts (Screw)
GS-4090TR/L W		**P2**	Spare Parts (Screw)
GVR/L	○○○-○○○□(□)	**C30,G53,M193**	Insert (Grooving)

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GVFR/L	○○○-○○○AA	**G89**	Insert (Face Grooving)
GVFR/L	○○○-○○○□	**C30,G95,M194**	Insert (Face Grooving)
GVFR/L	○○○-○○○□R	**G95**	Insert (Face Grooving)
H			
HA○○	PCLNR/L12-○○	**F63**	Boring Bars (AD Bar Interchangeable Head)
HA○○	PDUNR/L15-○○	**F64**	Boring Bars (AD Bar Interchangeable Head)
HA○○	PTFNR/L16-○○	**F64**	Boring Bars (AD Bar Interchangeable Head)
HA○○	SCLCR/L09-○○	**F65**	Boring Bars (AD Bar Interchangeable Head)
HA○○	SDUCR/L11-○○	**F65**	Boring Bars (AD Bar Interchangeable Head)
HF20X53H		**M64,P2**	Spare Parts (Screw with Coolant Hole)
HF24X60H		**M64,P2**	Spare Parts (Screw with Coolant Hole)
HH3X6		**F85,P2**	Spare Parts (Screw)
HH3X12		**D32,D33,D34,D35, D36,F85,P2**	Spare Parts (Screw)
HH4X12		**G93,K63,P3**	Spare Parts (Screw)
HH4X16		**M44,P2**	Spare Parts (Screw)
HH5X15		**G63,P2**	Spare Parts (Screw)
HH5X16		**D23,G21,G22,G34,G35, G36,G37,G82,H14,H16, H22,H23,P2**	Spare Parts (Screw)
HH5X20		**F66,G96,G97,P2**	Spare Parts (Screw)
HH5X25		**G22,G34,G35,G36, G37,G96,G97,H16, H22,H23,H27,P2**	Spare Parts (Screw)
HH5X30		**F66,P2**	Spare Parts (Screw)
HH6X12		**K63,P2**	Spare Parts (Screw)
HH6X16		**N14,N15,N16,P2**	Spare Parts (Screw)
HH6X20		**F66,G39,G62, N15,N16,P2**	Spare Parts (Screw)
HH6X25		**G22,G34,G38,G40, G61,G98,H22,P2**	Spare Parts (Screw)
HH6X30		**F66,H27,P2**	Spare Parts (Screw)
HH8X25		**M34,M55,M78,M81, M175,N14,P2**	Spare Parts (Screw)
HH8X25H		**M64,M73,P2**	Spare Parts (Screw with Coolant Hole)
HH8X30		**N14**	Spare Parts (Screw)
HH8X35		**P2**	Spare Parts (Screw)
HH8X40		**P2**	Spare Parts (Screw)
HH8X50		**P2**	Spare Parts (Screw)
HH8X55		**P2**	Spare Parts (Screw)
HH8X65		**P2**	Spare Parts (Screw)
HH8X70		**P2**	Spare Parts (Screw)
HH8X80		**P2**	Spare Parts (Screw)
HH8X85		**P2**	Spare Parts (Screw)
HH8X100		**P2**	Spare Parts (Screw)
HH8X110		**P2**	Spare Parts (Screw)
HH10X25		**M181,P3**	Spare Parts (Screw)
HH10X30		**M27,M55,M78,M81,M91, M117,M170,M175,P3**	Spare Parts (Screw)
HH10X30H		**M64,M73,P3**	Spare Parts (Screw with Coolant Hole)
HH10X30M		**M34,P3**	Spare Parts (Screw)
HH10X30S		**M34,M38,M40,M96,P3**	Spare Parts (Screw)
HH10X35		**M147,P3**	Spare Parts (Screw)
HH10X40		**M81,P3**	Spare Parts (Screw)
HH12X25		**P3**	Spare Parts (Screw)
HH12X35		**M27,M32,M48,M49,M55,M78, M81,M82,M83,M91,M101 ,M104,M117,M147,M158, M159,M170,M175,M181,P3**	Spare Parts (Screw)
HH12X35H		**M64,P3**	Spare Parts (Screw with Coolant Hole)
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HH12X55		**P3**	Spare Parts (Screw)
HH12X65		**P3**	Spare Parts (Screw)
HH12X80		**P3**	Spare Parts (Screw)
HH12X85		**P3**	Spare Parts (Screw)
HH12X100		**P3**	Spare Parts (Screw)
HH12X110		**P3**	Spare Parts (Screw)
HH12X120		**P3**	Spare Parts (Screw)
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HH12X140		**P3**	Spare Parts (Screw)
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HS5X5	**F85,N14,N15,N16,P4**	Spare Parts (Screw)
HS6X4P	**F84,G51,P4**	Spare Parts (Screw)
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JCET ○○○○○○M$^{R}_{L}$-FSF	**B67**	Insert (Turning)
JCET ○○○○○○$^{R}_{L}$-FSF	**B67**	Insert (Turning)
JCGT ○○○○○○M$^{R}_{L}$-F	**B67**	Insert (Turning)
JCGT ○○○○○○$^{R}_{L}$-F	**B67**	Insert (Turning)
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K		
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KFMS$^{R}_{L}$ ○○○○□○○(○)○○(○)-○	**G96,G97**	Toolholder (Face Grooving)
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KGA$^{R}_{L}$ ○○○○□-○	**G39**	Toolholder (Grooving)
KGB$^{R}_{L}$ ○○○○□-○○	**G11**	Toolholder (Grooving)
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KGBAS$^{R}_{L}$ ○○○○□-○○	**G9**	Toolholder (Grooving)
KGBAS$^{R}_{L}$ ○○○○□22-○○	**G9**	Toolholder (Grooving)
KGBAS$^{R}_{L}$ ○○○○□22-○○T5	**G9**	Toolholder (Grooving)
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KGDF$^{R}_{L}$ ○○○○X○○(○)-○□S	**G78,G79,G80,G81**	Toolholder (Face Grooving)
KGDF$^{R}_{L}$ ○○○○□○○(○)-○B-Z	**G82**	Toolholder (Face Grooving)
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KGD$^{R}_{L}$ ○○○○-C	**G23,G25,G78,G79, G80,G81,H17**	Toolholder Body (Grooving / Cut-Off)
KGD$^{R}_{L}$ ○○○○□(□)-○(.○)T○○	**G22,H16**	Toolholder (Grooving / Cut-Off)
KGD$^{R}_{L}$ ○○○○□(□)-○(.○)	**G21,H14**	Toolholder (Grooving / Cut-Off)
KGD$^{R}_{L}$ ○○○○□□-○(.○)D○○	**G21,H14**	Toolholder (Grooving / Cut-Off)
KGD$^{R}_{L}$ ○○○○X-○T○○S	**G23,H17**	Toolholder (Grooving / Cut-Off)
KGDS$^{R}_{L}$ ○○○○-C	**G24,G25,G83,G84**	Toolholder (Grooving)
KGDS$^{R}_{L}$ ○○○○JX-○(.○)B	**H15**	Toolholder (Cut-Off)
KGDS$^{R}_{L}$ ○○○○X-○T○○S	**G24**	Toolholder (Grooving)
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KGHS$^{R}_{L}$ ○○○○□-○	**G38,P25**	Toolholder (Grooving)
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KGIAR ○○○○B-○	**G63**	Toolholder (Internal Grooving)
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KGM$^{R}_{L}$ ○○○○□-○T○○	**G35,H23**	Toolholder (Grooving)
KGM$^{R}_{L}$ ○○○○□-○(.○)-○○(○)	**G34,G108,H22,H30,P25**	Toolholder (Grooving)
KGM$^{R}_{L}$ ○○○○□□-○(.○)	**G34,H22**	Toolholder (Grooving)
KGMM$^{R}_{L}$ ○○○○□-○	**G36**	Toolholder (Grooving)
KGMS$^{R}_{L}$ ○○○○□-○	**G36**	Toolholder (Grooving)
KGMU$^{R}_{L}$ ○○○○□	**G37**	Toolholder (Grooving)
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KPT-32	**E43,F61,P8**	Spare Parts (Shim)
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KTG$^{R}_{L}$ ○○○○□22-○○	**G16**	Toolholder (Grooving)
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KTKB ○○-○SS	**H26**	Blade (Cut-Off)
KTKB$^{R}_{L}$ ○○-○S	**H26**	Blade (Cut-Off)
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KTKH$^{R}_{L}$ ○○○○□-○-○○○S	**H30**	Toolholder (Cut-Off)
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KTNSR ○○○○□-○○	**J16**	Toolholder (Threading)
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L		
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LC-42N	**D8,E40,N5,P9**	Spare Parts (Shim)
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LD-32N	**D11,F69,P9**	Spare Parts (Shim)
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LL-03SN	**F68,F75,F76,P7**	Spare Parts (Lock Pin)
LL-03TN	**D14,F75,P7**	Spare Parts (Lock Pin)
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LL-1DN	**D11,F69,P7**	Spare Parts (Lock Pin)
LL-1K	**F64,P7**	Spare Parts (Lock Pin)
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LL-3N	**D11,F72,N5,N6,P7**	Spare Parts (Lock Pin)
LL-4	**D11,P7**	Spare Parts (Lock Pin)
LL-5N	**D8,P7**	Spare Parts (Lock Pin)
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LNEU ○○○○-○○S(-○)	**M148**	Insert (Milling)
LOF07R	**M36**	Spare Parts (Cartridge)
LOGU ○○○○○○ER-GM	**M13**	Insert (Milling)
LOMU ○○○○○○ER-GH	**M13**	Insert (Milling)
LOMU ○○○○○○ER-GM	**M13**	Insert (Milling)
LOMU ○○○○○○ER-SM	**M13**	Insert (Milling)
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LS-05	**D19,P4**	Spare Parts (Lock Screw)
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LS-1T	**D37,P4**	Spare Parts (Lock Screw)
LS-2N	**D8,D11,D12,D13,D14,D19,D20,E40,F68,F72,F78,N5,N6,N7,N14,P4**	Spare Parts (Lock Screw)
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LT-42N-20	**D14,P9**	Spare Parts (Shim)
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LTP-15	**F63,F64,P17**	Spare Parts (Torx Plus Wrench / L-shaped type)
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PDJN$^{R}_{L}$	○○○○□-○○	**D11**	Toolholder (Turning)
PDJN$^{R}_{L}$	○○○○□-○○U	**D11**	Toolholder (Turning)
PH	○○○○-○○	**F84**	Sleeve (for Tip-Bars)
PNEA	○○○○XNTN-T01020	**M14**	Insert (Milling)
PNEG	○○○○XNEN-GL	**M14**	Insert (Milling)
PNEG	○○○○XNER-W	**M14**	Insert (Milling)
PNEG	○○○○XNTR-T00515	**M14**	Insert (Milling)
PNEU	○○○○ANEL-GL	**M15**	Insert (Milling)
PNEU	○○○○ANER-GL	**M15**	Insert (Milling)
PNEU	○○○○ANER-W	**M15**	Insert (Milling)
PNMG	○○○○XNEN-GH	**M14**	Insert (Milling)
PNMG	○○○○XNEN-GM	**M14**	Insert (Milling)
PNMU	○○○○ANER-GH	**M15**	Insert (Milling)
PNMU	○○○○ANEL-GM	**M15**	Insert (Milling)
PNMU	○○○○ANER-GM	**M15**	Insert (Milling)
PNMU	○○○○ANER-SM	**M15**	Insert (Milling)
PP-4		**F72,P7**	Spare Parts (Lock Pin)
PRGC$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
PRGC$^{R}_{L}$	○○○○□-○○BE	**D37,P20**	Toolholder (Turning)
PRGC$^{R}_{L}$	○○○○□-○○BF	**D37,P20**	Toolholder (Turning)
PRGN$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
PRXC$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
PSB$^{R}_{L}$	○○○○-○○NBS	**C21,C34,F37**	Tip-Bars (Boring)
PSB$^{R}_{L}$	○○○○-○○S	**F37**	Tip-Bars (Boring)
PSBN$^{R}_{L}$	○○○○□-○○	**D12**	Toolholder (Turning)
PSBT$^{R}_{L}$	○○○○-○○S	**F37**	Tip-Bars (Boring)
PSDNN	○○○○□-○○	**D13**	Toolholder (Turning)
PSFG$^{R}_{L}$	○○○○-○○S	**G71**	Tip-Bars (Face Grooving)
PSG$^{R}_{L}$	○○○○-○○S	**G46**	Tip-Bars (Internal Grooving)
PSH	○○○○(.○)-○○(○)	**P22**	Sleeve (for 2-Edge Tip-Bars / Discontinued Description)
PSKNR	○○CA○○	**N14**	Toolholder (Cartridge)
PSKN$^{R}_{L}$	○○○○□-○○	**D12**	Toolholder (Turning)
PSSNR	○○CA○○	**N14**	Toolholder (Cartridge)
PSSN$^{R}_{L}$	○○○○□-○○	**D13**	Toolholder (Turning)
PSTR	○○○○-○○S	**J30**	Tip-Bars (Threading)
PSYNR	○○CA○○	**N14**	Toolholder (Cartridge)
PTFNR	○○CA○○	**N14**	Toolholder (Cartridge)
PTFN$^{R}_{L}$	○○○○□-○○	**D14**	Toolholder (Turning)
PTGNR	○○CA○○	**N14**	Toolholder (Cartridge)
PTGN$^{R}_{L}$	○○○○□-○○	**D14**	Toolholder (Turning)
PTLNR	○○○○□□-○○FF	**E41**	Toolholder (Double Sided Tooling)
PTTNR	○○CA○○	**N14**	Toolholder (Cartridge)
PVLN$^{R}_{L}$	○○○○□-○○Q	**D18**	Toolholder (Turning)
PVPN$^{R}_{L}$	○○○○□-○○Q	**D18**	Toolholder (Turning)
PVVNN	○○○○□-○○Q	**D18**	Toolholder (Turning)
PWLN$^{R}_{L}$	○○○○□-○○	**D20**	Toolholder (Turning)
R			
RBG	○○K○○○○○	**B106**	Insert (Turning)
RCGX	○○○○M0-AQ	**B68**	Insert (Turning)
RCGX	○○○○○○E○○○	**B106**	Insert (Turning)
RCGX	○○○○○○P○○○○○	**B106**	Insert (Turning)
RCGX	○○○○○○S○○○○○	**B106**	Insert (Turning)
RCGX	○○○○○○T○○○○○	**B106**	Insert (Turning)
RCMT	○○○○M0-BB	**B95**	Insert (Turning)
RCMX	○○○○M0	**B68**	Insert (Turning)
RDFG	○○FR	**M21**	Insert (Milling)
RDGT	○○○○M0ER-GM	**M16**	Insert (Milling)
RDGT	○○○○M0ER-SM	**M16**	Insert (Milling)
RDHX	○○○○M0T	**M21**	Insert (Milling)
RDMT	○○○○M0EN-GH	**M16**	Insert (Milling)
RDMT	○○○○M0ER-GM	**M16**	Insert (Milling)
RDMT	○○○○M0-H	**M21**	Insert (Milling)
RNGN	○○○○○○E○○○	**B100**	Insert (Turning)
RNGN	○○○○○○K○○○○○	**B100**	Insert (Turning)
RNGN	○○○○○○S○○○○○	**B100**	Insert (Turning)
RNGN	○○○○○○T○○○○○	**B100**	Insert (Turning)
RNMG	○○○○○○	**B28**	Insert (Turning)
RNMN	○○○○○○S○○○○○	**C19**	Insert (Turning)
ROMU	○○○○M0ER-GH	**M16**	Insert (Milling)
ROMU	○○○○M0ER-GM	**M16**	Insert (Milling)
ROMU	○○○○M0ER-SM	**M16**	Insert (Milling)
RPGN	○○○○○○E○○○	**B105**	Insert (Turning)
RPGN	○○○○○○T○○○○○	**B105**	Insert (Turning)
RPGT	○○○○M0ER-GM	**M16**	Insert (Milling)
RPGT	○○○○M0ER-SM	**M16**	Insert (Milling)
RPGX	○○○○○○E○○○	**B106**	Insert (Turning)
RPGX	○○○○○○T○○○○○	**B106**	Insert (Turning)
RPMT	○○○○M0	**M21**	Insert (Milling)
RPMT	○○○○M0-BB	**B95,F62**	Insert (Turning)
RPMT	○○○○M0EN-GH	**M16**	Insert (Milling)
RPMT	○○○○M0ER-GM	**M16**	Insert (Milling)
RPMT	○○○○M0-H	**M21**	Insert (Milling)
S			
S○○-	CH○○	**K21,K22,K23,K24**	Toolholder ("MagicDrill" / Chamfering Attachment)
S○○-	DRS○○○○○	**K54**	Toolholder ("MagicDrill")
S○○-	DRW○○○○○M-○-06	**K68,K69**	Toolholder ("MagicDrill")
S○○-	DRX○○○M-○-○○	**K40,K41,K42,K43, K44,K45,K46**	Toolholder ("MagicDrill")
S○○-	DRZ○○○○○-○○CR	**K63**	Toolholder ("MagicDrill")
S○○-	DRZ○○○○(○○)-○○	**K56,K57,K58,K59, K60,K61,K62**	Toolholder ("MagicDrill")
S○○□-	CCLN$^{R}_{L}$○○-○○A	**F81,P24**	Boring Bars
S○○□-	CCLN$^{R}_{L}$○○-○○GX	**F80**	Boring Bars
S○○□-	CDUN$^{R}_{L}$○○-○○GX	**F80**	Boring Bars
S○○□-	CELNR○○-○○	**F79**	Boring Bars
S○○□-	CSKN$^{R}_{L}$○○-○○	**F79**	Boring Bars
S○○□-	CSKN$^{R}_{L}$○○-○○A	**P24**	Boring Bars (Discontinued Description)
S○○□-	CSKN$^{R}_{L}$○○-○○GX	**F80**	Boring Bars
S○○□-	CSKPR○○-○○	**F60**	Boring Bars
S○○□-	CTUC$^{R}_{L}$○○-○○	**P24**	Boring Bars (Discontinued Description)
S○○□-	CTUNR○○-○○A	**F81**	Boring Bars
S○○□-	CTUP$^{R}_{L}$○○-○○	**F61,P24**	Boring Bars
S○○(.○)□-	KTGFL16	**G15**	Sleeve Holder (Grooving)
S○○(.○)□-	KTTXL16	**J20**	Sleeve Holder (Threading)
S○○□-	PCLN$^{R}_{L}$○○-○○	**F68**	Boring Bars

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S○○□- PDUN^{R}/$_{L}$○○-○○	**F69,F71**	Boring Bars
S○○□- PDZN^{R}/$_{L}$○○-○○	**F71**	Boring Bars
S○○□- PTUN^{R}/$_{L}$○○-○○	**F75**	Boring Bars
S○○□- PWLN^{R}/$_{L}$○○-○○	**F76,F78**	Boring Bars
S○○(.○)□- SCLCL○○	**E34**	Sleeve Holder (Turning)
S○○□- SCLC^{R}/$_{L}$○○-○○	**F89,P23**	Boring Bars (Discontinued Description)
S○○□- SCLC^{R}/$_{L}$○○-○○A	**F39**	Boring Bars (Dynamic Bar)
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S○○○□- SCLCR○○-○○○EZ	**F19**	Boring Bars (EZ Bar PLUS)
S○○□- SCLP^{R}/$_{L}$○○-○○	**F89,P23**	Boring Bars (Discontinued Description)
S○○□- SCLP^{R}/$_{L}$○○-○○A	**F41**	Boring Bars (Dynamic Bar)
S○○□- SCLP^{R}/$_{L}$○○-○○E	**F88,P23**	Boring Bars (Discontinued Description)
S○○□- SDLCL○○	**E35**	Sleeve Holder (Turning)
S○○□- SDQC^{R}/$_{L}$○○-○○A	**F44**	Boring Bars (Dynamic Bar)
S○○□- SDUCL○○	**E35**	Sleeve Holder (Turning)
S○○□- SDUC^{R}/$_{L}$○○-○○	**F89,P23**	Boring Bars (Discontinued Description)
S○○□- SDUC^{R}/$_{L}$○○-○○A	**F43**	Boring Bars (Dynamic Bar)
S○○□- SDUC^{R}/$_{L}$○○-○○E	**F88,P23**	Boring Bars (Discontinued Description)
S○○□- SDZC^{R}/$_{L}$○○-○○	**F89,P23**	Boring Bars (Discontinued Description)
S○○□- SDZC^{R}/$_{L}$○○-○○A	**F45**	Boring Bars (Dynamic Bar)
S○○□- SDZC^{R}/$_{L}$○○-○○E	**F88,P23**	Boring Bars (Discontinued Description)
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S○○□- STUB^{R}/$_{L}$○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
S○○□- STUB^{R}/$_{L}$○○-○○E	**F88,P23**	Boring Bars (Discontinued Description)
S○○□- STUP^{R}/$_{L}$○○-○○	**F90,P23**	Boring Bars (Discontinued Description)
S○○□- STUP^{R}/$_{L}$○○-○○E	**F88,P23**	Boring Bars (Discontinued Description)
S○○□- STWPR○○-○○	**F50,J31**	Toolholder (Boring / Threading)
S○○□- STWP^{R}/$_{L}$○○-○○E	**F50,J31**	Toolholder (Boring / Threading)
S○○(.○) □- STW^{R}/$_{L}$15	**F34,G72**	Toolholder (for Twin Bars)
S○○□- SVJB^{R}/$_{L}$○○-○○A	**F52**	Boring Bars (Dynamic Bar)
S○○□- SVJB^{R}/$_{L}$○○-○○E	**F87,F88,P24**	Boring Bars (Discontinued Description)
S○○□- SVJB^{R}/$_{L}$○○-○○EN	**F88,P24**	Boring Bars (Discontinued Description)
S○○□- SVJC^{R}/$_{L}$○○-○○A	**F52**	Boring Bars (Dynamic Bar)
S○○□- SVJC^{R}/$_{L}$○○-○○E	**F89,P24**	Boring Bars (Discontinued Description)
S○○□- SVJP^{R}/$_{L}$○○-○○A	**F52**	Boring Bars (Dynamic Bar)
S○○□- SVJP^{R}/$_{L}$○○-○○E	**F89,P24**	Boring Bars (Discontinued Description)
S○○□- SVNR12	**P22**	Toolholder (for System Tip-Bars / Discontinued Description)
S○○□- SVNR12N	**F31**	Toolholder (for System Tip-Bars)
S○○(.○) □- SVNR12S	**P22**	Toolholder (for System Tip-Bars / Discontinued Description)
S○○(.○) □- SVNR12SN	**F31**	Toolholder (for System Tip-Bars)
S○○(.○) □- SVNR12SXN	**F33**	Toolholder (for System Tip-Bars)
S○○□- SVNR12XN	**F33,P22**	Toolholder (for System Tip-Bars)
S○○□- SVPB^{R}/$_{L}$○○-○○A	**F54**	Boring Bars (Dynamic Bar)
S○○□- SVPB^{R}/$_{L}$○○-○○E	**F87,F89,P24**	Boring Bars (Discontinued Description)
S○○□- SVPB^{R}/$_{L}$○○-○○EN	**F89,P24**	Boring Bars (Discontinued Description)
S○○□- SVPC^{R}/$_{L}$○○-○○A	**F54**	Boring Bars (Dynamic Bar)
S○○□- SVPC^{R}/$_{L}$○○-○○E	**F89,P24**	Boring Bars (Discontinued Description)
S○○(.○) □- SVUBL○○	**E36**	Sleeve Holder (Turning)
S○○□- SVUCL○○	**E36**	Sleeve Holder (Turning)
S○○□- SVUB^{R}/$_{L}$○○-○○A	**F57**	Boring Bars (Dynamic Bar)
S○○□- SVUB^{R}/$_{L}$○○-○○E	**F87,F89,P24**	Boring Bars (Discontinued Description)
S○○□- SVUB^{R}/$_{L}$○○-○○EN	**F89,P24**	Boring Bars (Discontinued Description)
S○○□- SVUC^{R}/$_{L}$○○-○○A	**F57**	Boring Bars (Dynamic Bar)
S○○□- SVUC^{R}/$_{L}$○○-○○E	**F89,P24**	Boring Bars (Discontinued Description)
S○○□- SVZB^{R}/$_{L}$○○-○○A	**F57**	Boring Bars (Dynamic Bar)
S○○□- SVZB^{R}/$_{L}$○○-○○E	**F87,F89,P24**	Boring Bars (Discontinued Description)
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S○○□- SVZC^{R}/$_{L}$○○-○○E	**F89,P24**	Boring Bars (Discontinued Description)
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S○○□- SWUB^{R}/$_{L}$○○-○○AE	**F59**	Boring Bars (Dynamic Bar)
S○○□- SWUB^{R}/$_{L}$○○-○○E	**F89,P24**	Boring Bars (Discontinued Description)
S○○□- SWUB^{R}/$_{L}$○○-○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
S○○□- SWUP^{R}/$_{L}$○○-○○A	**F59**	Boring Bars (Dynamic Bar)
S○○□- SWUP^{R}/$_{L}$○○-○○E	**F89,P24**	Boring Bars (Discontinued Description)
S○○□- SYXP^{R}/$_{L}$○○-○○E	**P24**	Boring Bars (Discontinued Description)
S○○□- WWLN^{R}/$_{L}$○○-○○E	**F78**	Boring Bars
SF○○- DRA○○○M-○	**K12,K13,K14**	Toolholder ("MagicDrill")
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SS○○- DRC○○○M-○	**K21,K22,K23**	Toolholder ("MagicDrill")
SABSR ○○○○□(□)-○○F	**E17,E47,P20**	Toolholder (Turning)
SABWR ○○○○□(□)-○○F	**E18,E19,E47,P20**	Toolholder (Turning)
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SB-1TR	**F49,F51,P5**	Spare Parts (Screw)
SB-2TR	**F51,J17,P5**	Spare Parts (Screw)
SB-3STR	**F50,J31,P5**	Spare Parts (Screw)
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SB-1635TR	**F19,F39,F46,P5**	Spare Parts (Screw)
SB-1840TRP	**M130,P5**	Spare Parts (Screw)
SB-2035TR	**F19,F39,F49,F59,P5**	Spare Parts (Screw)
SB-2035TRG	**M72,P5**	Spare Parts (Screw)
SB-2040TR	**J17,P5**	Spare Parts (Screw)
SB-2040TRG	**M134,M138,P5**	Spare Parts (Screw)
SB-2042TRG	**K40,K42,K44,K46, M72,M73,P5**	Spare Parts (Screw)
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SB-2045TRN	**G49,G50,P5**	Spare Parts (Screw)
SB-2050TR	**E29,E32,E33,E36,F52,F54, F57,F59,F72,F87,J17,P5**	Spare Parts (Screw)
SB-2060TR	**P5**	Spare Parts (Screw)
SB-2080TR	**K54,P5**	Spare Parts (Screw)
SB-2250TR	**F47,K40,K42,K44, K46,M188,P5**	Spare Parts (Screw)
SB-2255TR	**G49,G50,G51,P5**	Spare Parts (Screw)
SB-2260TR	**K56,K58,K60, M188,P5**	Spare Parts (Screw)
SB-2290TR	**K54,P5**	Spare Parts (Screw)
SB-2545TR	**F39,F45,F49,F59, M62,M63,M109,P5**	Spare Parts (Screw)
SB-2555TRG	**M62,M63,M64,M65,M80, M81,M83,M134,M138,P5**	Spare Parts (Screw)
SB-2555TRP	**M177,P5**	Spare Parts (Screw)
SB-2560TR	**E34,E35,F43,F44, F45,F47,M190,P5**	Spare Parts (Screw)
SB-2570TR	**E21,E23,E25,E26,E27,E28, E29,E30,E31,E32,E33,E34, E36,E39,F52,F54,F57,G49, G50,G51,K40,K42,K44,K46, K56,K58,K60,P5**	Spare Parts (Screw)
SB-3060TR	**F41,F49,M45,M109, M180,M186,M190,P5**	Spare Parts (Screw)
SB-3060TRG	**P5**	Spare Parts (Screw)
SB-3065TRP	**M55,M56,M77, M78,M125,P5**	Spare Parts (Screw)
SB-3070TRG	**M134,M138,P5**	Spare Parts (Screw)
SB-3070TRP	**M175,M177,P5**	Spare Parts (Screw)
SB-3080TR	**D14,E17,E18,E19,E29,E38,F30, F31,F33,F34,F35,F74,G49,G72, G73,K40,K42,K44,K46,M97, M180,M181,M188,N16,P5**	Spare Parts (Screw)
SB-3580TR	**F65,P5**	Spare Parts (Screw)
SB-3590TRP	**M158,M159,P5**	Spare Parts (Screw)
SB-3592TR	**K69,P5**	Spare Parts (Screw)
SB-4050TRN	**H10,P5**	Spare Parts (Screw)
SB-4060TR	**M110,M111,P5**	Spare Parts (Screw)
SB-4065TR	**E34,F39,F41,F43, F44,F45,F49,F59, M110,M111,M192,P5**	Spare Parts (Screw)
SB-4070TRG	**M134,M138,P5**	Spare Parts (Screw)
SB-4070TRN	**M63,M64,M65,M80, M81,M83,P5**	Spare Parts (Screw)
SB-4070TRS	**G14,G15,J22,P5**	Spare Parts (Screw)
SB-4070TRW	**G13,G14,J20,P6**	Spare Parts (Screw)
SB-4075TRP	**M119,M120,P5**	Spare Parts (Screw)
SB-4082TPR	**M34,P5**	Spare Parts (Screw)

Description	Page	Category
SB-4085TR	D8,D10,D12,D16,D20,E20,E23, E25,E26,E27,E28,E35,F67,F70, F73,F74,F77,G49,J17,K41,K42, K44,K46,K56,K58,K60,K62, M180,M181,M190,M192,P5	Spare Parts (Screw)
SB-4085TRP	**M170,M171,P5**	Spare Parts (Screw)
SB-4090TRP	**M55,M56,M77,M78,P5**	Spare Parts (Screw)
SB-4090TRPN	**M117,M175,M177,P5**	Spare Parts (Screw)
SB-4590TRWN	**E12,H8,J18,P6**	Spare Parts (Screw)
SB-5070TR	**M186,P5**	Spare Parts (Screw)
SB-5085TR	**K57,K58,K59,K60,K61, K62,K63,M97,M112,P5**	Spare Parts (Screw)
SB-5090TR	**E23,F62,K41,K43, K45,K46,M186,P5**	Spare Parts (Screw)
SB-25100TR	**K54,P5**	Spare Parts (Screw)
SB-40115TR	**F87,M180,M181,P5**	Spare Parts (Screw)
SB-40120TR	**G21,H14,H15,P5**	Spare Parts (Screw)
SB-40125TRN	**E30,E31,F52,F54, F57,N8,P5**	Spare Parts (Screw)
SB-40140TR	**G63,M49,M101, M104,M105,P5**	Spare Parts (Screw)
SB-40140TRN	**M27,M91,P5**	Spare Parts (Screw)
SB-45130TR	**M96,P5**	Spare Parts (Screw)
SB-50120TR	**M180,M181,P5**	Spare Parts (Screw)
SB-50120TRP	**M117,M119,M175,M177,P5**	Spare Parts (Screw)
SB-50120TRS	**M34,P5**	Spare Parts (Screw)
SB-50140TR	**M27,M91,P5**	Spare Parts (Screw)
SB-50140TRP	**M170,M171,P5**	Spare Parts (Screw)
SB-60120TR	**G23,G24,G25,G76,G80,G81, H17,K41,K43,K45,K46,K57, K59,K63,M49,M101,M104, M105,M181,P5**	Spare Parts (Screw)
SC-30067	**M166,P6**	Spare Parts (Screw)
SC-35085	**M166,P6**	Spare Parts (Screw)
SC-40100	**M166,P6**	Spare Parts (Screw)
SC-50130	**M166,P6**	Spare Parts (Screw)
SC-60160	**M166,P6**	Spare Parts (Screw)
SC-60210	**M166,P6**	Spare Parts (Screw)
SCACR/L ○○○○□-○○	**E47,P21**	Toolholder (Turning/Discontinued Description)
SCACR ○○○○□-○○FF	**E47,P21**	Toolholder (Turning/Discontinued Description)
SCLCR/L ○○○○□-○○	**E23,E47,P21**	Toolholder (Turning)
SCLCR/L ○○○○□(□)-○○FF	**E23**	Toolholder (Turning)
SCLNR ○○○○□-○○FF	**E38**	Toolholder (for Small Double-Sided Tools)
SCMT ○○○○○○HQ	**B69**	Insert (Turning)
SDCN ○○○○AUTN	**M10**	Insert (Milling)
SDCT ○○○○○□□-□□	**M161**	Insert (Milling)
SDCT ○○○○○□R/L-□□	**M161**	Insert (Milling)
SDET ○○○○○□□-□□	**M161**	Insert (Milling)
SDET ○○○○○□R/L-□□	**M161**	Insert (Milling)
SDJCR/L ○○○○□-○○	**E25**	Toolholder (Turning)
SDJCR/L ○○○○□-○○F	**E47,P21**	Toolholder (Turning/Discontinued Description)
SDJCR ○○○○□□-○○-F○○	**E20**	Toolholder (Goose-neck holder)
SDJCR/L ○○○○□(□)-○○FF	**E25**	Toolholder (Turning)
SDLCR/L ○○○○□-○○FF	**P21**	Toolholder (Turning/Discontinued Description)
SDLNR ○○○○□-○○FF	**E38**	Toolholder (for Small Double-Sided Tools)
SDKN ○○○○AUFN	**C35,M10,M25**	Insert (Milling)
SDKN ○○○○AUFN-NE	**C35,M25**	Insert (Milling)
SDKN ○○○○AUTN	**M10**	Insert (Milling)
SDKR ○○○○AUEN-S	**M10**	Insert (Milling)
SDKW ○○○○AESN	**M22**	Insert (Milling)
SDKW ○○○○AETN	**M22**	Insert (Milling)
SDKW ○○○○○○FN	**M22**	Insert (Milling)
SDKW ○○○○○○TN	**M22**	Insert (Milling)
SDLCR/L ○○○○□(□)-○○FF	**E26,E47**	Toolholder (Turning)
SDLPR/L ○○○○□-○○F	**E47,P21**	Toolholder (Turning/Discontinued Description)
SDLPR/L ○○○○□(□)-○○FF	**E28**	Toolholder (Turning)
SDMR ○○○○AUER-H	**M10**	Insert (Milling)
SDMT ○○T○○○C	**M22**	Insert (Milling)
SDMT ○○○○AESR-H	**M22**	Insert (Milling)
SDMT ○○○○○○E-K	**M22**	Insert (Milling)
SDNCN ○○○○□(□)-○○	**E27,E47,P21**	Toolholder (Turning)
SDNCR/L ○○○○□□-○○F	**E27,E47,P21**	Toolholder (Turning)
SDXCR/L ○○○○□ (□) -○○	**E26,E47,P21**	Toolholder (Turning)
SE-3070TRP	**M158,M159,P6**	Spare Parts (Screw)
SE-40050TRN	**M147,M148,M149,P6**	Spare Parts (Screw)
SE-40055TR	**M147,M148,M149,P6**	Spare Parts (Screw)

Description	Page	Category
SE-40068TR	**M147,M148,M149,P6**	Spare Parts (Screw)
SE-40080TR	**M148,M149,P6**	Spare Parts (Screw)
SE-40090TR	**M147,M148,M149,P6**	Spare Parts (Screw)
SE-40100TR	**M148,M149,P6**	Spare Parts (Screw)
SE-40120TR	**G34,H22,P6**	Spare Parts (Screw)
SE-50125TR	**G21,G22,G34,H14, H16,H22,P6**	Spare Parts (Screw)
SEEN ○○○○AFFN	**C35,M25**	Insert (Milling)
SEEN ○○○○AFFN-NE	**C35,M25**	Insert (Milling)
SEEN ○○○○AFFR-W	**C35,M10,M25**	Insert (Milling)
SEEN ○○○○AFTN	**M10**	Insert (Milling)
SEEN ○○○○AFTR-W	**M10**	Insert (Milling)
SEGN ○○○○○○NE	**C29**	Insert (Milling)
SEKN ○○○○AFFN	**M10**	Insert (Milling)
SEKN ○○○○AFTN	**M10**	Insert (Milling)
SEKN ○○○○EFTR	**M10**	Insert (Milling)
SEKR ○○○○AFEN-S	**M10**	Insert (Milling)
SEKT ○○○○AFEN-S	**M22**	Insert (Milling)
SEKW ○○○○AFTN	**M22**	Insert (Milling)
SEKW ○○○○○○FN	**M22**	Insert (Milling)
SEKW ○○○○○○TN	**M22**	Insert (Milling)
SEMM ○○○○○○PESR	**M22**	Insert (Milling)
SEMR ○○○○AFER-H	**M10**	Insert (Milling)
SEMT ○○○○○○C	**M22**	Insert (Milling)
SFR/L- ○○○(○)□	**G92,G93,G94**	Blade (Face Grooving)
SH ○○○○-○○○	**F85**	Sleeve (for Boring Bar)
SH-50150TR	**M36,P6**	Spare Parts (Cartridge Clump Screw)
SHA ○○○○-○○○	**F84,G51**	Sleeve (for Automatic Lathe SIGE)
SHA ○○○○.○-○○○	**F84,G51**	Sleeve (for Automatic Lathe SIGE)
SHC ○○○○-○○	**F85**	Coolant Sleeve (for Boring Bar)
SHE ○○○○-○○	**K49**	Adjustment Sleeve (for MagicDrill)
SHEM ○○○○-○○	**K55**	Adjustment Sleeve (for MagicDrill DRS)
SHL- ○	**F85**	Spare Parts (Back Cover)
SIGER/L ○○○○□-EH	**G49**	Toolholder (Internal Grooving)
SIGER/L ○○○○□-WH	**G50**	Toolholder (Internal Grooving)
SIGER ○○○○□-WH-90	**G51**	Toolholder (Internal Grooving / for Automatic Lathe)
SINR/L ○○○○S-○○	**J17**	Toolholder (Threading)
SINR/L ○○○○S-○○E	**J17**	Toolholder (Threading)
SJS- ○	**F86**	Coolant Joint
SLT ○○-○○□□□	**M144**	Insert (Slot Mill MSTA)
SM○○○○A	**N14,N15,N16**	Spare Parts (Plate)
SM○○○○B	**N14**	Spare Parts (Plate)
SNCN ○○○○XNTN	**M11**	Insert (Milling)
SNGA ○○○○○○	**B31**	Insert (Turning)
SNGA ○○○○○○MEF	**C10**	Insert (Turning)
SNGA ○○○○○○S○○○○○	**B101**	Insert (Turning)
SNGA ○○○○○○S○○○○○ME	**C10**	Insert (Turning)
SNGA ○○○○○○S○○○○○MEH	**C10**	Insert (Turning)
SNGA ○○○○○○S○○○○○MEP	**C10**	Insert (Turning)
SNGA ○○○○○○S○○○○○MET	**C10**	Insert (Turning)
SNGA ○○○○○○T○○○○○	**B101**	Insert (Turning)
SNGA ○○○○○○T○○○○○ME	**C10**	Insert (Turning)
SNGG ○○○○○○R/L-25R	**B32**	Insert (Turning)
SNGG ○○○○○○R/L-B/C	**B32**	Insert (Turning)
SNGN ○○○○○○S○○○○○	**B101**	Insert (Turning)
SNGN ○○○○○○T○○○○○	**B101,B102**	Insert (Turning / Milling)
SNGX ○○○○○○T○○○○○	**B102**	Insert (Turning)
SNKN ○○○○XNTN	**M11**	Insert (Milling)
SNMA ○○○○○○	**B31**	Insert (Turning)
SNMA ○○○○○○S○○○○○	**B101**	Insert (Turning)
SNMF ○○○○XNTN	**M11**	Insert (Milling)
SNMF ○○○○○○-21	**B95,F62**	Insert (Turning)
SNMG ○○○○○○	**B29**	Insert (Turning)
SNMG ○○○○○○C	**B31**	Insert (Turning)
SNMG ○○○○○○GC	**B31**	Insert (Turning)
SNMG ○○○○○○HQ	**B29**	Insert (Turning)
SNMG ○○○○○○HS	**B29**	Insert (Turning)
SNMG ○○○○○○MQ	**B31**	Insert (Turning)
SNMG ○○○○○○MS	**B31**	Insert (Turning)
SNMG ○○○○○○MU	**B31**	Insert (Turning)
SNMG ○○○○○○PG	**B29**	Insert (Turning)
SNMG ○○○○○○PH	**B30**	Insert (Turning)
SNMG ○○○○○○PQ	**B29**	Insert (Turning)
SNMG ○○○○○○PS	**B29**	Insert (Turning)
SNMG ○○○○○○PT	**B29**	Insert (Turning)
SNMG ○○○○○○R/L-C	**B32**	Insert (Turning)

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Description	Page	Category
SNMG ○○○○○○XP	**B30**	Insert (Turning)
SNMG ○○○○○○XQ	**B30**	Insert (Turning)
SNMG ○○○○○○XS	**B30**	Insert (Turning)
SNMG ○○○○○○ZS	**B31**	Insert (Turning)
SNMM ○○○○○○PX	**B30**	Insert (Turning)
SNMN ○○○○○○	**B31,M11**	Insert (Turning / Milling)
SNMN ○○○○○○S○○○○○	**C19**	Insert (Turning)
SNMN ○○○○○○T○○○○○	**B102**	Insert (Turning)
SOKN 13T3AXFN	**M10**	Insert (Milling)
SOKN ○○○○AXFN-NE	**C35,M25**	Insert (Milling)
SOKN 13T3AXTN	**M10**	Insert (Milling)
SOKR 13T3AXEN-J	**M10**	Insert (Milling)
SOMT ○○○○AXEN-J	**M22**	Insert (Milling)
SOMT ○○○○○○ER-FL	**M17**	Insert (Milling)
SOMT ○○○○○○ER-GM	**M17**	Insert (Milling)
SOMT ○○○○○○ER-LD	**M17**	Insert (Milling)
SOMW ○○○○AXFN	**M22**	Insert (Milling)
SOMW ○○○○AXTN	**M22**	Insert (Milling)
SP-2D	**D14,P18**	Spare Parts (Spring)
SP-3D	**D8,D10,D12,D20,F67, F70,F73,F74,F77,P18**	Spare Parts (Spring)
SP-5	**G63,P18**	Spare Parts (Spring)
SP-5D	**D16,P18**	Spare Parts (Spring)
SP-6	**G11,G38,G39,G61,P18**	Spare Parts (Spring)
SP-8	**P18**	Spare Parts (Spring)
SP3X4	**F30,F31,F33,P6**	Spare Parts (Screw)
SP3X6	**M44,P6**	Spare Parts (Screw)
SP3X8	**D38,E42,E43,J16,J17, M39,M43,M51,M95,N9,P6**	Spare Parts (Screw)
SP3X10	**F60,F61,P6**	Spare Parts (Screw)
SP4X9	**M38,P6**	Spare Parts (Screw)
SP8X35	**M38,P6**	Spare Parts (Mounting Bolt)
SP-129	**D34,D35,P10**	Spare Parts (Shim)
SP-130A	**P11**	Spare Parts (Shim)
SP-141	**D25,D30,D31,D34,D35,P10**	Spare Parts (Shim)
SP-141P	**F79,F80,P11**	Spare Parts (Shim)
SP-143	**D25,D34,D35,P10**	Spare Parts (Shim)
SP-143P	**F79,P11**	Spare Parts (Shim)
SP-148	**D34,D35,P10**	Spare Parts (Shim)
SP-162	**D25,D30,D31,P10**	Spare Parts (Shim)
SP-210A	**F81,P11**	Spare Parts (Shim)
SP-219	**D36,P10**	Spare Parts (Shim)
SP-221	**D26,P10**	Spare Parts (Shim)
SP-223	**D26,P10**	Spare Parts (Shim)
SP-230P	**P11**	Spare Parts (Shim)
SP-341P	**F79,P11**	Spare Parts (Shim)
SP-342	**D23,P10**	Spare Parts (Shim)
SP-420A	**F81,P11**	Spare Parts (Shim)
SP-429	**D32,P11**	Spare Parts (Shim)
SP-441	**D22,D28,P10**	Spare Parts (Shim)
SP-441P	**F80,P11**	Spare Parts (Shim)
SP-443	**D22,P10**	Spare Parts (Shim)
SP-443P	**P11**	Spare Parts (Shim)
SP-454	**D22,P10**	Spare Parts (Shim)
SP-521	**D29,P11**	Spare Parts (Shim)
SP-521P	**F80,P11**	Spare Parts (Shim)
SP-523	**P11**	Spare Parts (Shim)
SP-523P	**P11**	Spare Parts (Shim)
SP-541	**D29,P11**	Spare Parts (Shim)
SP-543	**P11**	Spare Parts (Shim)
SP-826	**D33,P11**	Spare Parts (Shim)
SP-829	**D33,P11**	Spare Parts (Shim)
SP-841	**D27,D33,P11**	Spare Parts (Shim)
SP-843	**D27,D33,P11**	Spare Parts (Shim)
SP-849	**D33,P11**	Spare Parts (Shim)
SP-861	**D27,P11**	Spare Parts (Shim)
SPCN ○○○○EDTR	**M11**	Insert (Milling)
SPCN ○○○○EETR1	**M11**	Insert (Milling)
SPCN ○○○○XPTR	**M11**	Insert (Milling)
SPCT ○○T○○○□□-□□	**M160**	Insert (Milling)
SPCT ○○T○○○□R/L-□□	**M160**	Insert (Milling)
SPEN ○○○○EEER	**M11**	Insert (Milling)
SPEN ○○○○EESR	**M11**	Insert (Milling)
SPET ○○T○○○□R/L-□□	**M160**	Insert (Milling)
SPGH ○○○○○○L	**B69**	Insert (Turning)
SPGN ○○○○○○	**B69,C29,M11**	Insert (Turning / Milling)
SPGN ○○○○○○NE	**C29**	Insert (Turning / Milling)
SPGN ○○○○○○S○○○○○	**B105**	Insert (Turning)
SPGN ○○○○○○T○○○○○	**B105**	Insert (Turning)
SPGR ○○○○○○R/L	**B69**	Insert (Turning)
SPKN ○○○○EDER	**M11**	Insert (Milling)
SPKN ○○○○EDFR	**M11**	Insert (Milling)
SPKN ○○○○EDTR/L	**M11**	Insert (Milling)
SPKN ○○○○XETR	**M11**	Insert (Milling)
SPKN ○○○○XPFR	**M11**	Insert (Milling)
SPKN ○○○○XPTR/L	**M11**	Insert (Milling)
SPKR ○○○○EDER-S	**M11**	Insert (Milling)
SPMN ○○○○○○	**B69,M11**	Insert (Turning / Milling)
SPMR ○○○○EDER-H	**M11**	Insert (Milling)
SPMR ○○○○○○	**B69**	Insert (Turning)
SPMR ○○○○○○G	**B69**	Insert (Turning)
SPMT ○○○○EDER-NB○	**M23**	Insert (Milling)
SPMT ○○○○EDER-NB○P	**M23**	Insert (Milling)
SPMT ○○○○□□□□-NB○□	**M23**	Insert (Milling)
SPMT ○○○○□□□□-V	**M23**	Insert (Milling)
SPMT ○○○○○○EN-NB○	**M24**	Insert (Milling)
SPMT ○○○○○○EN-NB○P	**M24**	Insert (Milling)
SPMT ○○○○○○EN-V	**M24**	Insert (Milling)
SPMT ○○○○○○E-Z	**M24**	Insert (Milling)
SP-RC	**D38,P12**	Spare Parts (Shim)
SPW-6045	**M96,P6**	Spare Parts (Screw)
SPW-7050	**M27,M91,P6**	Spare Parts (Screw)
SRCPR/L ○○○○B-○○-A○○	**F62**	Boring Bars (for Bearing Machining)
SS-4N	**E30,E31,F52,F55,F57,N8,P6**	Spare Parts (Shim Screw)
STDER ○○CA○○	**N16**	Toolholder (Cartridge)
STDPR ○○CA○○	**N16**	Toolholder (Cartridge)
STEER ○○CA○○	**N16**	Toolholder (Cartridge)
STEPR ○○CA○○	**N16**	Toolholder (Cartridge)
STFER ○○CA○○	**N16**	Toolholder (Cartridge)
STFPR ○○CA○○	**N16**	Toolholder (Cartridge)
STGCR/L ○○○○□-○○	**E29**	Toolholder (Turning)
STGPR/L ○○○○□-○○	**E29,P21**	Toolholder (Turning)
STLNR ○○○○□-○○FF	**E39**	Toolholder (for Small Double-Sided Tools)
STWR/L ○○○○□-15	**F34,G72,P22**	Toolholder (for Twin Bars)
STWSR ○○○○□(□)-15T	**F35,G73,P22**	Toolholder (for Twin Bars)
SV-60136R	**M94,P6**	Spare Parts (Screw)
SV-60136TR	**M40,P6**	Spare Parts (Screw)
SVJBR/L ○○○○□-○○	**E30**	Toolholder (Turning)
SVJBR/L ○○○○□-○○F	**E48,P21**	Toolholder (Turning/Discontinued Description)
SVJBR/L ○○○○□-○○N	**E30**	Toolholder (Turning)
SVJBR/L ○○○○□□-○○FF	**E30**	Toolholder (Turning)
SVJPR/L ○○○○□(□)-○○FF	**E32**	Toolholder (Turning)
SVLPR/L ○○○○□-○○F	**E48,P21**	Toolholder (Turning/Discontinued Description)
SVLPR/L ○○○○□-○○FF	**E48,P21**	Toolholder (Turning/Discontinued Description)
SVLPR ○○○○□□-○○-F○○	**E21**	Toolholder (Goose-neck holder)
SVLPR/L ○○○○□(□)-○○FF	**E32,E48**	Toolholder (Turning)
SVNR ○○○○□-12	**P22**	Toolholder (for System Tip-Bars / Discontinued Description)
SVNR ○○○○□-12N	**F30**	Toolholder (for System Tip-Bars)
SVN-32	**F87,P12**	Spare Parts (Shim)
SVN-32N	**E30,E31,F52,F55, F57,N8,P12**	Spare Parts (Shim)
SVN-32S	**E30,E31,F52,F55,F57,P12**	Spare Parts (Shim)
SVNSR ○○○○□-12-○○	**P22**	Toolholder (for System Tip-Bars / Discontinued Description)
SVNSR ○○○○□-12-○○N	**F30**	Toolholder (for System Tip-Bars)
SVNSR ○○○○□-12-○○XN	**F33**	Toolholder (for System Tip-Bars)
SVPBR/L ○○○○□(□)-○○	**E31,E48,P22**	Toolholder (Turning)
SVPBR/L ○○○○□-○○N	**E31,P22**	Toolholder (Turning)
SVPPR/L ○○○○□-○○	**E48,P21**	Toolholder (Turning/Discontinued Description)
SVPPR/L ○○○○□(□)-○○FF	**E33,P21**	Toolholder (Turning)
SVVBN ○○○○□(□)-○○	**E31,E48,P22**	Toolholder (Turning)
SVVBN ○○○○□-○○N	**E31,P22**	Toolholder (Turning)
SW-1.8	**N14,N15,N16**	Spare Parts (Axial screw driver)
SYXPR/L ○○○○□-○○F	**P21**	Toolholder (Turning/Discontinued Description)
T		
T63H- BL○○○-○○○	**P28**	Toolholder (HSK Tooling / Discontinued Description)
T63H- C○○-○○(○)	**N10**	Toolholder (HSK Tooling)
T63H- KGBAR/L-16	**N9**	Grooving (HSK Tooling)
T63H- KGBAR/L-22-○○	**N9**	Grooving (HSK Tooling)
T63H- KTNR-○○	**N9**	Threading (HSK Tooling)
T63H- N○○-○○(○)	**N10**	Toolholder (HSK Tooling)
T63H- PCLNR/L-DX12	**N5**	Toolholder (HSK Tooling)

Description		Page	Category
T63H-	PCMNN-□12	**N5**	Toolholder (HSK Tooling)
T63H-	PDJN$^{R}/_{L}$-DX15	**N5**	Toolholder (HSK Tooling)
T63H-	PDNNN-□15	**N6**	Toolholder (HSK Tooling)
T63H-	PTGN$^{R}/_{L}$-DX16	**N6**	Toolholder (HSK Tooling)
T63H-	PWLN$^{R}/_{L}$-DX08	**N7**	Toolholder (HSK Tooling)
T63H-	S2020R-105T	**N4**	Toolholder (HSK Tooling)
T63H-	S2525-○○(○)F	**N4**	Toolholder (HSK Tooling)
T63H-	S2525$^{R}/_{L}$-○○○	**N3**	Toolholder (HSK Tooling)
T63H-	SVLB$^{R}/_{L}$-DX16N	**N8**	Toolholder (HSK Tooling)
T63H-	SVVBN-□16N	**N8**	Toolholder (HSK Tooling)
T63H-	WTENN-□16	**N6**	Toolholder (HSK Tooling)
T63H-	WWMNN-□08	**N7**	Toolholder (HSK Tooling)
T100H-	C○○-○○(○)	**N10**	Toolholder (HSK Tooling)
T100H-	N○○-○○(○)	**N10**	Toolholder (HSK Tooling)
T100H-	S2525-○○○F	**N4**	Toolholder (HSK Tooling)
T100H-	S2525R-○○○T	**N4**	Toolholder (HSK Tooling)
T100H-	S2525$^{R}/_{L}$-○○○	**N3**	Toolholder (HSK Tooling)
TBET	○○○○○○(○)M$^{R}/_{L}$	**B70**	Insert (Turning)
TBGN	○○○○○○F	**C18**	Insert (Turning)
TBGN	○○○○○○S○○○○○	**B105**	Insert (Turning)
TBGN	○○○○○○T○○○○○	**C18**	Insert (Turning)
TBGT	○○○○○○CF	**B70**	Insert (Turning)
TBGT	○○○○○○(○)M	**B70**	Insert (Turning)
TBGT	○○○○○○M-CF	**B70**	Insert (Turning)
TBGT	○○○○○○MP-CF	**B70**	Insert (Turning)
TBGT	○○○○○○(○)$^{R}/_{L}$	**B70**	Insert (Turning)
TBGW	○○○○○○	**B70,C26**	Insert (Turning)
TBGW	○○○○○○NE	**C26**	Insert (Turning)
TBMT	○○○○○○	**C26**	Insert (Turning)
TBMT	○○○○○○DP	**B70**	Insert (Turning)
TBMT	○○○○○○NE	**C26**	Insert (Turning)
TCET	○○○○○○(○)F$^{R}/_{L}$-USF	**B71**	Insert (Turning)
TCET	○○○○○○(○)MF$^{R}/_{L}$-USF	**B71**	Insert (Turning)
TCGN	○○○○○○	**B73**	Insert (Turning)
TCGN	○○○○○○T○○○○○	**B105**	Insert (Turning)
TCGR	○○○○○○L-F	**B73**	Insert (Turning)
TCGT	○○○○○○E$^{R}/_{L}$-U	**B72**	Insert (Turning)
TCGT	○○○○○○(○)F$^{R}/_{L}$-U	**B72**	Insert (Turning)
TCGT	○○○○○○ME$^{R}/_{L}$-U	**B72**	Insert (Turning)
TCGT	○○○○○○(○)MF$^{R}/_{L}$-U	**B72**	Insert (Turning)
TCGT	○○○○○○$^{R}/_{L}$-A3	**B73**	Insert (Turning)
TCGW	○○○○○○	**B73,C26**	Insert (Turning)
TCGW	○○○○○○NE	**C26**	Insert (Turning)
TCGW	○○○○○○SE	**C26**	Insert (Turning)
TCMT	○○○○○○	**C26**	Insert (Turning)
TCMT	○○○○○○HQ	**B71**	Insert (Turning)
TCMT	○○○○○○NE	**C26**	Insert (Turning)
TCMT	○○○○○○SE	**C26**	Insert (Turning)
TCMX	○○○○○○WP	**B71**	Insert (Turning)
TEEN	○○○○PTFR	**C35,M25**	Insert (Milling)
TEEN	○○○○PTFR-NE	**C35,M25**	Insert (Milling)
TEEN	○○○○PTTR	**M12**	Insert (Milling)
TEKN	○○○○PTFR	**C35,M12,M25**	Insert (Milling)
TEKN	○○○○PTFR-NE	**C35,M25**	Insert (Milling)
TEKN	○○○○PTTR	**M12**	Insert (Milling)
TEKR	○○○○PTER-S	**M12**	Insert (Milling)
TEMR	○○○○PTER-H	**M12**	Insert (Milling)
TEMT	○○○○○○-AQ	**M24**	Insert (Milling)
TG	○○$^{R}/_{L}$○○○	**G16,G57**	Insert (Grooving)
TGF	○○$^{R}/_{L}$○○○-○○○	**C30,G15**	Insert (Grooving)
TH-3L		**M158,M159**	Spare Parts (Wrench)
TH-4		**M36,M44,P18**	Spare Parts (Hexagon Wrench / T-shaped type)
TH8X15		**M44,P6**	Spare Parts (Screw)
TKN	○(.○)	**H25**	Insert (Cut-Off)
TKN	○(.○)-P	**H25**	Insert (Cut-Off)
TK$^{R}/_{L}$	○(.○)	**H25**	Insert (Cut-Off)
TK$^{R}/_{L}$	○(.○)-P	**H25**	Insert (Cut-Off)
TKF	○○L○○○-ASR	**C32,E16**	Insert (Grooving / Turning)
TKF	○○$^{R}/_{L}$○○○-AS	**C32,E16**	Insert (Grooving / Turning)
TKF	○○$^{R}/_{L}$○○○-NB(○.○)	**C32,E16,H6,H7**	Insert (Grooving / Turning)
TKF	○○$^{R}/_{L}$○○○-NB-○○DR	**H6,H7**	Insert (Cut-Off)
TKF	○○$^{R}/_{L}$○○○-S	**H6,H7**	Insert (Cut-Off)
TKF	○○$^{R}/_{L}$○○○-S-○○DR	**H6,H7**	Insert (Cut-Off)
TKF	○○$^{R}/_{L}$○○○-T	**H6,H7**	Insert (Cut-Off)
TKF	○○$^{R}/_{L}$○○○-T-○○DR	**H6,H7**	Insert (Cut-Off)
TKFB	○○L○○○○○MR	**B92,E12**	Insert (Back Turning)

Description		Page	Category
TKFB	○○R○○○○○-GQ	**B93,E12**	Insert (Back Turning)
TKFB	○○R○○○○○M	**B92,E12**	Insert (Back Turning)
TKFB	○○R○○○○○P-GQ	**B93,E12**	Insert (Back Turning)
TKFS	○○$^{R}/_{L}$○○○-S	**H11**	Insert (Cut-Off)
TKFT	12$^{R}/_{L}$□○○○○(○)	**J18**	Insert (Threading)
TN-32		**J16,J17,N9,P12**	Spare Parts (Shim)
TN-43		**J16,J17,N9,P12**	Spare Parts (Shim)
TNEG	○○○○○○$^{R}/_{L}$-SSF	**B38**	Insert (Turning)
TNGA	○○○○○○	**B37**	Insert (Turning)
TNGA	○○○○○○ME6	**C10**	Insert (Turning)
TNGA	○○○○○○MEF	**C10**	Insert (Turning)
TNGA	○○○○○○S○○○○○	**B103**	Insert (Turning)
TNGA	○○○○○○S○○○○○ME	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○MEH	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○MEP	**C10**	Insert (Turning)
TNGA	○○○○○○S○○○○○MET	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○SE	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○SET	**C11**	Insert (Turning)
TNGA	○○○○○○T○○○○○	**B103**	Insert (Turning)
TNGA	○○○○○○T○○○○○ME	**C11**	Insert (Turning)
TNGA	○○○○○○T○○○○○SE	**C11**	Insert (Turning)
TNGG	○○○○○○AH	**B37**	Insert (Turning)
TNGG	○○○○○○FP-TK	**B35**	Insert (Turning)
TNGG	○○○○○○MFP-SK	**B35**	Insert (Turning)
TNGG	○○○○○○TK	**B36**	Insert (Turning)
TNGG	○○○○○○$^{R}/_{L}$	**B39**	Insert (Turning)
TNGG	○○○○○○$^{R}/_{L}$-25R	**B39**	Insert (Turning)
TNGG	○○○○○○$^{R}/_{L}$-A3	**B37**	Insert (Turning)
TNGG	○○○○○○$^{R}/_{L}$-B/C	**B38,B39**	Insert (Turning)
TNGG	○○○○○○$^{R}/_{L}$-S	**B38**	Insert (Turning)
TNGM	○○○○○○S○○○○○BB○	**C11**	Insert (Turning)
TNGN	○○○○○○S○○○○○	**B103**	Insert (Turning)
TNGN	○○○○○○T○○○○○	**B103**	Insert (Turning)
TNGU	○○○○○○MER-U	**B48**	Insert (Turning)
TNGU	○○○○○○(○)MFR-F	**B48**	Insert (Turning)
TNGU	○○○○○○(○)MFR-U	**B48**	Insert (Turning)
TNMA	○○○○○○	**B37**	Insert (Turning)
TNMG	○○○○○○	**B34**	Insert (Turning)
TNMG	○○○○○○AH	**B37**	Insert (Turning)
TNMG	○○○○○○C	**B37**	Insert (Turning)
TNMG	○○○○○○CQ	**B33**	Insert (Turning)
TNMG	○○○○○○GC	**B37**	Insert (Turning)
TNMG	○○○○○○GP	**B33**	Insert (Turning)
TNMG	○○○○○○GS	**B33**	Insert (Turning)
TNMG	○○○○○○GT	**B34**	Insert (Turning)
TNMG	○○○○○○HQ	**B33**	Insert (Turning)
TNMG	○○○○○○HS	**B34**	Insert (Turning)
TNMG	○○○○○○MQ	**B36**	Insert (Turning)
TNMG	○○○○○○MS	**B36**	Insert (Turning)
TNMG	○○○○○○MU	**B36**	Insert (Turning)
TNMG	○○○○○○PG	**B33**	Insert (Turning)
TNMG	○○○○○○PH	**B34**	Insert (Turning)
TNMG	○○○○○○PP	**B33**	Insert (Turning)
TNMG	○○○○○○PQ	**B33**	Insert (Turning)
TNMG	○○○○○○PS	**B33**	Insert (Turning)
TNMG	○○○○○○PT	**B34**	Insert (Turning)
TNMG	○○○○○○$^{R}/_{L}$-C	**B39**	Insert (Turning)
TNMG	○○○○○○$^{R}/_{L}$-ST	**B36**	Insert (Turning)
TNMG	○○○○○○TK	**B36**	Insert (Turning)
TNMG	○○○○○○XF	**B35**	Insert (Turning)
TNMG	○○○○○○XP	**B35**	Insert (Turning)
TNMG	○○○○○○XQ	**B35**	Insert (Turning)
TNMG	○○○○○○XS	**B35**	Insert (Turning)
TNMG	○○○○○○ZS	**B37**	Insert (Turning)
TNMM	○○○○○○M	**C23**	Insert (Turning)
TNMM	○○○○○○M-NE	**C23**	Insert (Turning)
TNMM	○○○○○○M-SE	**C23**	Insert (Turning)
TNMM	○○○○○○PX	**B34**	Insert (Turning)
TNMN	○○○○○○S○○○○○	**C19**	Insert (Turning)
TNW-32		**P12**	Spare Parts (Shim)
TPET	○○○○○○(○)F$^{R}/_{L}$-USF	**B78**	Insert (Turning)
TPET	○○○○○○(○)MF$^{R}/_{L}$-USF	**B78**	Insert (Turning)
TPET	○○○○○○(○)M$^{R}/_{L}$-FSF	**B78**	Insert (Turning)
TPET	○○○○○○(○)$^{R}/_{L}$-FSF	**B78**	Insert (Turning)
TPGB	○○○○○○(○)	**B79,C27,J31**	Insert (Turning / Threading)
TPGB	○○○○○○MEF	**C16**	Insert (Turning)

Description Index

○ : Figure, □ : Alphabet

Description		Page	Category
TPGB	○○○○○○NE	C27	Insert (Turning)
TPGB	○○○○○○SE	C26	Insert (Turning)
TPGB	○○○○○○S○○○○○MES	C16	Insert (Turning)
TPGB	○○○○○○S○○○○○MET	C16	Insert (Turning)
TPGB	○○○○○○S○○○○○SET	C16	Insert (Turning)
TPGB	○○○○○○T○○○○○ME	C16	Insert (Turning)
TPGB	○○○○○○T○○○○○SE	C16	Insert (Turning)
TPGH	○○○○○○MR/L	B76	Insert (Turning)
TPGH	○○○○○○MR/L-H	B77	Insert (Turning)
TPGH	○○○○○○R/L	B75	Insert (Turning)
TPGH	○○○○○○R/L-H	B77	Insert (Turning)
TPGN	○○○○○○	B81,C29,M12,M25	Insert (Turning / Milling)
TPGN	○○○○○○NE	C29	Insert (Turning / Milling)
TPGN	○○○○○○SE	C29	Insert (Turning / Milling)
TPGN	○○○○○○S○○○○○	B105	Insert (Turning)
TPGN	○○○○○○S○○○○○SET	C18	Insert (Turning)
TPGN	○○○○○○T○○○○○	B105	Insert (Turning / Milling)
TPGN	○○○○○○T○○○○○ME	C18	Insert (Turning)
TPGN	○○○○○○T○○○○○SE	C18	Insert (Turning)
TPGR	○○○○○○R/L-A/B/C	B81	Insert (Turning)
TPGR	○○○○○○R/L-F	B80	Insert (Turning)
TPGT	○○○○○○CF	B74	Insert (Turning)
TPGT	○○○○○○M-CF	B74	Insert (Turning)
TPGT	○○○○○○MP-CF	B74	Insert (Turning)
TPGW	○○○○○○S○○○○○MET	C16	Insert (Turning)
TPGW	○○○○○○S○○○○○SET	C16	Insert (Turning)
TPGW	○○○○○○T○○○○○ME	C16	Insert (Turning)
TPGW	○○○○○○T○○○○○SE	C16	Insert (Turning)
TPKN	○○○○PDFR	M12	Insert (Milling)
TPKN	○○○○PDTR	M12	Insert (Milling)
TPKR	○○○○PDER-S	M12	Insert (Milling)
TPMH	○○○○○○	C27	Insert (Turning)
TPMH	○○○○○○NE	C27	Insert (Turning)
TPMH	○○○○○○L-NE	C28	Insert (Turning)
TPMH	○○○○○○SE	C27	Insert (Turning)
TPMN	○○○○○○	B81,M12	Insert (Turning / Milling)
TPMR	○○○○PDER-H	M12	Insert (Milling)
TPMR	○○○○○○	B80	Insert (Turning)
TPMR	○○○○○○DP	B80	Insert (Turning)
TPMR	○○○○○○G	B80	Insert (Turning)
TPMR	○○○○○○GP	B80	Insert (Turning)
TPMR	○○○○○○HQ	B80	Insert (Turning)
TPMT	○○○○○○GP	B74	Insert (Turning)
TPMT	○○○○○○HQ	B75	Insert (Turning)
TPMT	○○○○○○PP	B74	Insert (Turning)
TPMT	○○○○○○XP	B75	Insert (Turning)
TPMT	○○○○○○XQ	B75	Insert (Turning)
TPMX	○○○○○○WP	B74	Insert (Turning)
TS-3S		D17,P7	Spare Parts (Lock Pin)
TT	43ER○○○M	J22	Insert (Threading)
TT	○○R/L○○○○	J22,J23	Insert (Threading)
TT-15		M27,M32,M91,P18	Spare Parts (Torx Wrench / T-shaped type)
TT-15L		M147,M149	Spare Parts (Torx Wrench / T-shaped type)
TT-25		M166,P18	Spare Parts (Torx Wrench / T-shaped type)
TT-25L		M49,M101,M104,M105,P18	Spare Parts (Torx Wrench / T-shaped type)
TT-30		M166,P18	Spare Parts (Torx Wrench / T-shaped type)
TTC-20		M36,M40,P18	Spare Parts (Torx Wrench / T-shaped type)
TTC-25		M38,M94,P18	Spare Parts (Torx Wrench / T-shaped type)
TTP-20		M117,M119,M170,M171, M175,M177,P18	Spare Parts (Torx Plus Wrench / T-shaped type)
TTX	32R○○○○(○)	J21	Insert (Threading)
TTX	32R○○○○(○)S	J21	Insert (Threading)
TWBR	○○○○○-○○○	F34	Twin Bars (Turning)
TWBTR	○○○○○-○○○	F35	Twin Bars (Turning)
TWFGL	○○○	G72	Twin Bars (Face Grooving)
TWFGTR	○○○	G73	Twin Bars (Face Grooving)

V

VBET	○○○○○○(○)MR/L-F	B83	Insert (Turning)
VBET	○○○○○○(○)MR/L-FSF	B82	Insert (Turning)
VBET	○○○○○○(○)R/L-FSF	B82	Insert (Turning)
VBET	○○○○○○(○)MR/L-Y	B83	Insert (Turning)
VBGT	○○○○○○(○)MR/L-F	B83	Insert (Turning)
VBGT	○○○○○○(○)MR/L-Y	B84	Insert (Turning)
VBGT	○○○○○○(○)R/L-F	B83	Insert (Turning)
VBGT	○○○○○○(○)R/L-Y	B84	Insert (Turning)
VBGW	○○○○○○MEF	C17	Insert (Turning)
VBGW	○○○○○○S○○○○○MES	C17	Insert (Turning)
VBGW	○○○○○○S○○○○○MET	C17	Insert (Turning)
VBGW	○○○○○○S○○○○○SET	C17	Insert (Turning)
VBGW	○○○○○○T○○○○○ME	C17	Insert (Turning)
VBGW	○○○○○○T○○○○○SE	C17	Insert (Turning)
VBMT	○○○○○○	C28	Insert (Turning)
VBMT	○○○○○○GP	B82	Insert (Turning)
VBMT	○○○○○○HQ	B82	Insert (Turning)
VBMT	○○○○○○NE	C28	Insert (Turning)
VBMT	○○○○○○PP	B82	Insert (Turning)
VBMT	○○○○○○SE	C28	Insert (Turning)
VBMT	○○○○○○VF	B82	Insert (Turning)
VCGT	○○○○○○AH	B85	Insert (Turning)
VCGT	○○○○○○R/L-A3	B85	Insert (Turning)
VCGW	○○○○○○S○○○○○MET	C17	Insert (Turning)
VCGW	○○○○○○S○○○○○SET	C17	Insert (Turning)
VCGW	○○○○○○T○○○○○ME	C17	Insert (Turning)
VCGW	○○○○○○T○○○○○SE	C17	Insert (Turning)
VCMT	○○○○○○	C28	Insert (Turning)
VCMT	○○○○○○HQ	B85	Insert (Turning)
VCMT	○○○○○○NE	C28	Insert (Turning)
VCMT	○○○○○○PP	B85	Insert (Turning)
VCMT	○○○○○○SE	C28	Insert (Turning)
VCMT	○○○○○○VF	B85	Insert (Turning)
VNBR	○○○○-○○(○)	F29	System Tip-bars (Boring)
VNBR	○○○○-○○(○)NB	C34,F29	System Tip-bars (Boring)
VNBR	○○○○(○○)-○○(○)S	F28	System Tip-bars (Boring)
VNBTR	○○○○-○○(○)	F29	System Tip-bars (Boring)
VNBXR	○○○○(○)-○○(○)S	F32	System Tip-bars (Boring)
VNFGR	○○○○-○○	G70	System Tip-bars (Face Grooving)
VNFGR	○○○○-○○NB	C34,G70	System Tip-bars (Face Grooving)
VNGR	○○○○-○○	G45	System Tip-bars (Grooving)
VNGR	○○○○-○○NB	C34,G45	System Tip-bars (Grooving)
VNGA	○○○○○○	B41	Insert (Turning)
VNGA	○○○○○○ME4	C12	Insert (Turning)
VNGA	○○○○○○MEF	C12	Insert (Turning)
VNGA	○○○○○○S○○○○○	B104	Insert (Turning)
VNGA	○○○○○○S○○○○○ME	C12	Insert (Turning)
VNGA	○○○○○○S○○○○○MEH	C12	Insert (Turning)
VNGA	○○○○○○S○○○○○MEP	C12	Insert (Turning)
VNGA	○○○○○○S○○○○○MET	C12	Insert (Turning)
VNGA	○○○○○○S○○○○○SE	C12	Insert (Turning)
VNGA	○○○○○○S○○○○○SET	C12	Insert (Turning)
VNGA	○○○○○○T○○○○○	B104	Insert (Turning)
VNGA	○○○○○○T○○○○○ME	C12	Insert (Turning)
VNGA	○○○○○○T○○○○○SE	C12	Insert (Turning)
VNGG	○○○○○○MFP-SK	B41	Insert (Turning)
VNGG	○○○○○○M-SK	B41	Insert (Turning)
VNGG	○○○○○○R/L	B41	Insert (Turning)
VNMA	○○○○○○S○○○○○	B104	Insert (Turning)
VNMG	○○○○○○	B40	Insert (Turning)
VNMG	○○○○○○GP	B40	Insert (Turning)
VNMG	○○○○○○HQ	B40	Insert (Turning)
VNMG	○○○○○○MQ	B41	Insert (Turning)
VNMG	○○○○○○MS	B41	Insert (Turning)
VNMG	○○○○○○MU	B41	Insert (Turning)
VNMG	○○○○○○PP	B40	Insert (Turning)
VNMG	○○○○○○PQ	B40	Insert (Turning)
VNMG	○○○○○○TN-V	B40	Insert (Turning)
VNMG	○○○○○○R/L-VC	B40	Insert (Turning)
VNMG	○○○○○○VF	B40	Insert (Turning)
VNMM	○○○○○○M	C23	Insert (Turning)
VNMM	○○○○○○M-NE	C23	Insert (Turning)
VNMM	○○○○○○M-SE	C23	Insert (Turning)
VNTR	○○○-○○	J30	System Tip-bars (Threading)
VPET	○○○○○○(○)FR/L-USF	B88	Insert (Turning)
VPET	○○○○○○(○)MR/L-F	B87	Insert (Turning)
VPET	○○○○○○(○)MR/L-FSF	B87	Insert (Turning)
VPET	○○○○○○(○)MFR/L-J	B88	Insert (Turning)
VPET	○○○○○○(○)MFR/L-U	B88	Insert (Turning)
VPET	○○○○○○(○)MFR/L-USF	B88	Insert (Turning)
VPET	○○○○○○(○)R/L-FSF	B87	Insert (Turning)
VPGT	○○○○○○CF	B86	Insert (Turning)
VPGT	○○○○○○CK	B86	Insert (Turning)
VPGT	○○○○○○M-CF	B86	Insert (Turning)

Description	Page	Category
VPGT ○○○○○○M-CK	**B86**	Insert (Turning)
VPGT ○○○○○○MF-GF	**B86**	Insert (Turning)
VPGT ○○○○○○MFP-GF	**B86**	Insert (Turning)
VPGT ○○○○○○MP-CF	**B86**	Insert (Turning)
VPGT ○○○○○○MP-CK	**B86**	Insert (Turning)
W		
W-6	**G38,G61,P18**	Spare Parts (Washer)
W-8	**P18**	Spare Parts (Washer)
W6-14	**P18**	Spare Parts (Washer)
W6X17	**M40,P6**	Spare Parts (Screw)
W6X18	**M158,M159,P6**	Spare Parts (Wedge Lock Screw)
W6X18N	**M32,P6**	Spare Parts (Wedge Lock Screw)
W6X20	**M158,M159,P6**	Spare Parts (Wedge Lock Screw)
W8X16	**M94,P6**	Spare Parts (Screw)
W8X18	**M95,P6**	Spare Parts (Screw)
W8X21	**M36,P6**	Spare Parts (Wedge Lock Screw)
WB-5	**F86,P18**	Spare Parts (Washer)
WB-6	**F86,P18**	Spare Parts (Washer)
WB-8	**F86,P18**	Spare Parts (Washer)
WBET ○○○○○○(○)MR/L-F	**B89**	Insert (Turning)
WBGT ○○○○○○MR/L-CF	**B89**	Insert (Turning)
WBGT ○○○○○○MPR/L-CF	**B89**	Insert (Turning)
WBGT ○○○○○○(○)MR/L-F	**B90**	Insert (Turning)
WBGT ○○○○○○(○)R/L-F	**B90**	Insert (Turning)
WBGW ○○○○○○L	**B90**	Insert (Turning)
WBGW ○○○○○○S○○○○○LSET	**C18**	Insert (Turning)
WBGW ○○○○○○T○○○○○L-SE	**C18**	Insert (Turning)
WBMT ○○○○○○L	**C28,C29**	Insert (Turning)
WBMT ○○○○○○L-NE	**C28,C29**	Insert (Turning)
WBMT ○○○○○○L-SE	**C28,C29**	Insert (Turning)
WBMT ○○○○○○R/L-DP	**B89**	Insert (Turning)
WC- ○○	**M158,M159**	Spare Parts (Wedge)
WCMT ○○○○○○	**K69,K71**	Insert (Drilling)
WCS-1N	**D15,N6,P14**	Spare Parts (Clamp Set)
WCS-8	**D20,F78,N7,P14**	Spare Parts (Clamp Set)
WDRC○(○)	**K21,K22,K23,K26, K27,K28,K29**	Spare Parts (Wrench)
WN-1	**D15,D20,N6,N7,P19**	Spare Parts (Shim Nut)
WNEU ○○○○○○EN-GL	**M17**	Insert (Milling)
WNGA ○○○○○○MEF	**C13**	Insert (Turning)
WNGA ○○○○○○S○○○○○ME	**C13**	Insert (Turning)
WNGA ○○○○○○S○○○○○MET	**C13**	Insert (Turning)
WNGA ○○○○○○S○○○○○SE	**C13**	Insert (Turning)
WNGA ○○○○○○S○○○○○SET	**C13**	Insert (Turning)
WNGA ○○○○○○T○○○○○ME	**C13**	Insert (Turning)
WNGG ○○○○○○AH	**B45**	Insert (Turning)
WNGG ○○○○○○TK	**B44**	Insert (Turning)
WNGG ○○○○○○R/L	**B45**	Insert (Turning)
WNGG ○○○○○○R/L-S	**B45**	Insert (Turning)
WNGT ○○○○○○FN-AM	**M17**	Insert (Milling)
WNMA ○○○○○○	**B45**	Insert (Turning)
WNMG ○○○○○○	**B43**	Insert (Turning)
WNMG ○○○○○○C	**B45**	Insert (Turning)
WNMG ○○○○○○CJ	**B42**	Insert (Turning)
WNMG ○○○○○○CQ	**B42**	Insert (Turning)
WNMG ○○○○○○GC	**B45**	Insert (Turning)
WNMG ○○○○○○GP	**B42**	Insert (Turning)
WNMG ○○○○○○GS	**B43**	Insert (Turning)
WNMG ○○○○○○GT	**B43**	Insert (Turning)
WNMG ○○○○○○HQ	**B42**	Insert (Turning)
WNMG ○○○○○○HS	**B43**	Insert (Turning)
WNMG ○○○○○○MQ	**B44**	Insert (Turning)
WNMG ○○○○○○MS	**B44**	Insert (Turning)
WNMG ○○○○○○MU	**B44**	Insert (Turning)
WNMG ○○○○○○PG	**B43**	Insert (Turning)
WNMG ○○○○○○PH	**B43**	Insert (Turning)
WNMG ○○○○○○PP	**B42**	Insert (Turning)
WNMG ○○○○○○PQ	**B42**	Insert (Turning)
WNMG ○○○○○○PS	**B43**	Insert (Turning)
WNMG ○○○○○○PT	**B43**	Insert (Turning)
WNMG ○○○○○○TK	**B44**	Insert (Turning)
WNMG ○○○○○○WP	**B42**	Insert (Turning)
WNMG ○○○○○○WQ	**B42**	Insert (Turning)
WNMG ○○○○○○XP	**B44**	Insert (Turning)
WNMG ○○○○○○XQ	**B44**	Insert (Turning)

Description	Page	Category
WNMG ○○○○○○XS	**B44**	Insert (Turning)
WNMG ○○○○○○ZS	**B45**	Insert (Turning)
WNMM ○○○○○○M	**C23**	Insert (Turning)
WNMM ○○○○○○M-NE	**C23**	Insert (Turning)
WNMM ○○○○○○M-SE	**C23**	Insert (Turning)
WNMU ○○○○○○EN-GH	**M17**	Insert (Milling)
WNMU ○○○○○○EN-GM	**M17**	Insert (Milling)
WNMU ○○○○○○EN-SM	**M17**	Insert (Milling)
WOF07R	**M36**	Spare Parts (Wedge)
WP-1S	**D15,N6,P7**	Spare Parts (Shim Pin)
WP5X11	**F78,P7**	Spare Parts (Shim Pin)
WP5X15	**D20,N7,P7**	Spare Parts (Shim Pin)
WPGT ○○○○○○MR/L-Y	**B91**	Insert (Turning)
WPGT ○○○○○○R/L-Y	**B91**	Insert (Turning)
WPGW ○○○○○○	**B91**	Insert (Turning)
WPMT ○○○○○○	**C29**	Insert (Turning)
WPMT ○○○○○○GP	**B91**	Insert (Turning)
WPMT ○○○○○○HQ	**B91**	Insert (Turning)
WPMT ○○○○○○NE	**C29**	Insert (Turning)
WPMT ○○○○○○SE	**C29**	Insert (Turning)
WSP-1	**D15,N6,P18**	Spare Parts (Spacer)
WTENN ○○○○□-○○N	**D15**	Toolholder (Turning)
WTJNR/L ○○○○□-○○N	**D15**	Toolholder (Turning)
WTKNR/L ○○○○□-○○N	**D15**	Toolholder (Turning)
WTN-33	**D15,N6,P12**	Spare Parts (Shim)
WTN-33-20	**D15,P12**	Spare Parts (Shim)
WWLNR/L ○○○○□-○○	**D20**	Toolholder (Turning)
WWN-42	**D20,N7,P12**	Spare Parts (Shim)
WWP-42	**F78,P12**	Spare Parts (Shim)
WWP-42-16	**F78,P12**	Spare Parts (Shim)
Z		
ZCMT ○○○○○○	**K53**	Insert (Drilling)
ZCMT ○○○○○○SP	**K53**	Insert (Drilling)
ZCMT ○○○○○○SU	**K53**	Insert (Drilling)
ZXMT ○○○○○○GM	**K38**	Insert (Drilling)
ZXMT ○○○○○○GM-E	**K38**	Insert (Drilling)
ZXMT ○○○○○○GM-I	**K38**	Insert (Drilling)
ZXMT ○○○○○○GH	**K38**	Insert (Drilling)
ZXMT ○○○○○○GH-E	**K38**	Insert (Drilling)
ZXMT ○○○○○○SM	**K38**	Insert (Drilling)
ZXMT ○○○○○○SM-E	**K38**	Insert (Drilling)

MEMO

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Kyocera Unimerco manufactures special inserts and special toolholders with short delivery time

Using customized inserts and holders, you can solve machining tasks that were not previously possible. Kyocera Unimerco can customize the cutting edge with a special profile for the specific task. Furthermore, we can develop special holders, where you can use both special inserts and standard inserts from the Kyocera range.

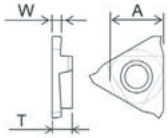
That gives you access to a wide range of standard inserts as well as to unique inserts with custom chip breakers, coatings and carbide grades.

Profile grooving inserts

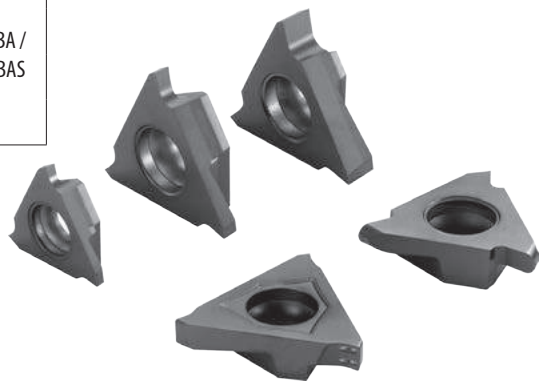
Selection of grades:

Special PVD coated super micro grain carbide for steel machining and uncoated carbide; applicable to steel-, cast iron machining and non-ferrous materials.

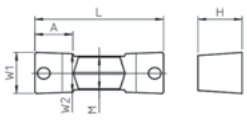
GBA - Triangles

Shape		Type	Dimension (mm)			Clamping	Applicable toolholder
			A	T	W		
		GBA32	9.525	3.18	Max 3.0 ± 0.025	(3) (4) (5)	KGBA / KGBAS
		GBA43[1]	12.70	4.76	Max 4.6 ± 0.025	(3) (4) (5)	
		TGF32[2]	9.525	3.18	Max 3.0 ± 0.025	(4)	
		TNGAXL400	12.70	7.00	Max 6.8 ± 0.025	(4)	

Note:
(1) : Also possibility for MY-type
(2) : For TGF32; use TTX32 blank
(3) : Pin clamping with LGBA-xxxx
(4) : Direct screw clamping
(5) : Top clamping with CGB-xxxx



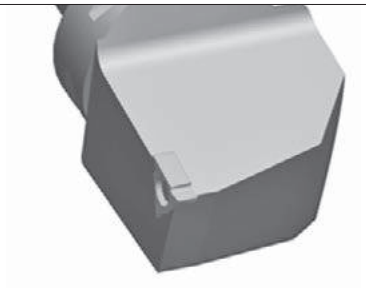
GMG – Dog bone type

Insert	Type	Dimension (mm)					
		W1 up to	W2 up to	A	L	M	H
	GMG2520	2.5 ± 0.02	2.1	5.7	20	2.0	4.3
	GMG3020	3.0 ± 0.02	2.6	5.7	20	2.3	4.3
	GMG3520	3.5 ± 0.02	3.2	5.7	20	2.8	4.3
	GMG4020	4.0 ± 0.02	3.6	5.7	20	3.3	4.3
	GMG5020	5.0 ± 0.02	4.6	5.7	20	4.2	4.3
	GMG6020	6.0 ± 0.02	5.6	5.9	20	5.2	4.3
	GMG7620	7.2 ± 0.02	6.8	6.5	20	4.2	4.3
	GMG9620	9.2 ± 0.02	8.8	4.2	20	4.2	4.3
	GMG8430	8.0 ± 0.02	7.3	10.4	30	6.0	5.5
	GMG10530	10.1 ± 0.02	9.5	9.3	30	6.0	5.5
	GMG12430	12.1 ± 0.02	12.0	9.8	30	9.0	5.5

Example special item

Grooving toolholder

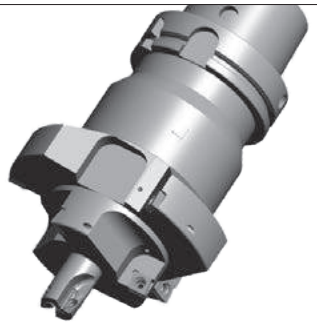
Custom made tool holders for triangles and dog bones. Supplement to special grooving inserts made by KYOCERA UNIMERCO.



MEC milling cutter

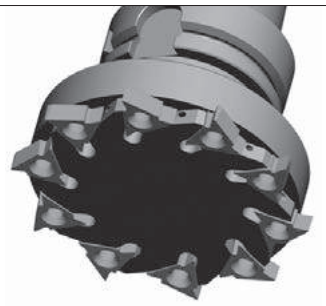
Supplement to standard programme

- Variants of standard MEC; alternative dimensions
- Multifunctional tool with more and different inserts in the same solution
- Based on insert type MEC inserts type 11T3 & 1704 + ISO inserts
- Cylindrical shank or Weldon shank
- Integrated cone – e.g. HSK & Capto
- Cutting diameter range ø20 – ø42 mm (MEC inserts)
- Max overall length = 350 mm



Tool holders with other insert types

Many possibilities for different types of inserts. Different types of machine interface (integrated conical shanks etc.).



DRX Magic Drill

Supplement to standard programme

- DRX drills in special dimension
- DRX step drills (using ISO inserts at the step)
- Diameter from ø13.5 mm and higher
- Insert type ...04, ...05, ...06, ...07, ...09, ...11, ...14 and ...17
- Internal coolant when needed

Reduced unit costs

Many of Kyocera Unimerco's European customers use special inserts and holders for workpieces with special contours, dimensions or tolerances. The customers are able to manufacture the workpieces faster, because the tools are developed for the specific situation, for example with the right chip evacuation.

With customized solutions, the customers reduce the machining operations and programming required. Unit costs fall, just like with customized solid carbide tools.

Special made tools designed and manufactured in Europe

Detailed information on next page

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