THE NEW VALUE FRONTIER

KYOCERA

KYOCERA CUTTING TOOLS

MILLING CATALOG

ADVANCING PRODUCTIVITY

THE NEW VALUE FRONTIER

KYOCERA

Continuously Create New Value
at the Cutting Edge of Technology

ADVANCING PRODUCTIVITY

Contributing to the betterment of world-wide manufacturing and our customers' productivity by providing efficient cutting tool products and high-precision machining solutions

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KYOCERA CUTTING TOOLS

GLOBAL FACILITIES NETWORK

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Okaya Facility (JAPAN)

Yokaichi Facility (JAPAN)

Sendai Facility (JAPAN)

Silong Facility (CHINA)

Incheon Facility (KOREA)

KYOCERA CUTTING TOOLS

GLOBAL TECHNICAL CENTERS

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Sales & Technical Center (Germany)

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KPTI Company Overview

Established in April 2014, KPTI unifies two of the world's leading cutting tool manufacturers, Kyocera Tycom Corporation (KTC) and the Cutting Tool Division of Kyocera Industrial Ceramics Corporation (KICC-CT).

The new company creates a combined enterprise that optimizes the strengths of both organizations and facilitates expansion of Kyocera's overall cutting tool-related business in North America. The new combined entity will unify cutting tool resources to create greater efficiencies while positioning the new organization for continued success.

Customers will benefit from a unified sales and support team offering improved customer service and an expanded portfolio of cutting tool products and solutions for the automotive, aerospace, general machining, medical, power generation, printed circuit board and steel markets.

KPTI North American Operations

Costa Mesa, CA

Administration & Manufacturing

- Administration & Accounting Center
- Micro Tools & Round Tools Manufacturing
- Printed Circuit Board Drill Manufacturing
- Micro Tools & PCB Sales & Customer Service Center

Wapakoneta, OH

Steel Tool Holder Manufacturing

- Indexable Drills
- Milling End Mills & Face Mills
- Boring Bars
- Turning and Grooving Holders
- API Ring Groovers

Hendersonville, NC

KPTI North American HQ

- Indexable Insert Manufacturing
- North American Tech Center
- North American Sales, Marketing & Customer Service Center

KPTI Manufactured Products

Steel Toolholders for Milling, Turning, Grooving, Threading and Drilling Metal

Indexable metal cutting inserts made of carbide, ceramic, cermet, Cubic Boron Nitride, and Polycrystaline diamond

Solid carbide cutting tools for tight tolerance and micro-diameter metal cutting applications

KPTI Markets Served

Automotive

Aerospace

Medical

Printed Circuit Board

Power Generation

How to Order

Kyocera Precision Tools' products are sold exclusively through our North American line of authorized distributors.

Locate a Distributor

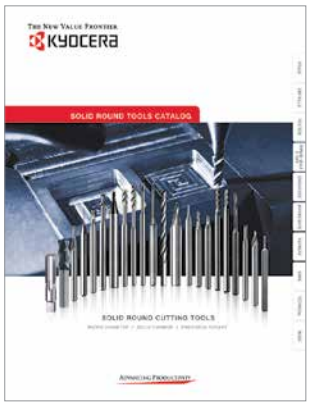
Use our ***Locate a Distributor*** map at:
www.KyoceraPrecisionTools.com/locate

OR

CUSTOMER SERVICE
1.800.823.7284
(OPTION 1)
Monday - Friday
5:00AM - 4:30PM (PST)
8:00AM - 7:30PM (EST)

Using the Kyocera Product Catalogs

All standard Kyocera Precision Tools Products are located in one of these four General Catalogs.



Stock Status Symbols

- ● Indicates that an item is **Stock Standard** and available at our North American Headquarters in North Carolina. Stock Standard items will ship the same day if ordered by 4:30pm (EST).
- ○ Indicates that an item is a World Express and available at our Worldwide Headquarters in Japan. Please allow 7-10 business days for World Express items to arrive.

*All Stock Standard and World Express items are subject to availability.

Authorized Distributor Ordering Guide

TO PLACE ORDERS ONLINE VISIT - http://mykpti.kyocera.com
In addition to placing orders, the MyKPTI distributor website allows you to view real-time product availability, check pricing, view and download product and promotional literature, watch product training videos, and more.

CUSTOMER SERVICE
1.800.823.7284
(OPTION 1)
Monday - Friday
5:00AM - 4:30PM (PST)
8:00AM - 7:30PM (EST)

TECHNICAL SUPPORT
1.800.823.7284
(OPTION 2)
Monday - Friday
4:00AM - 2:00PM (PST)
7:00AM - 5:00PM (EST)

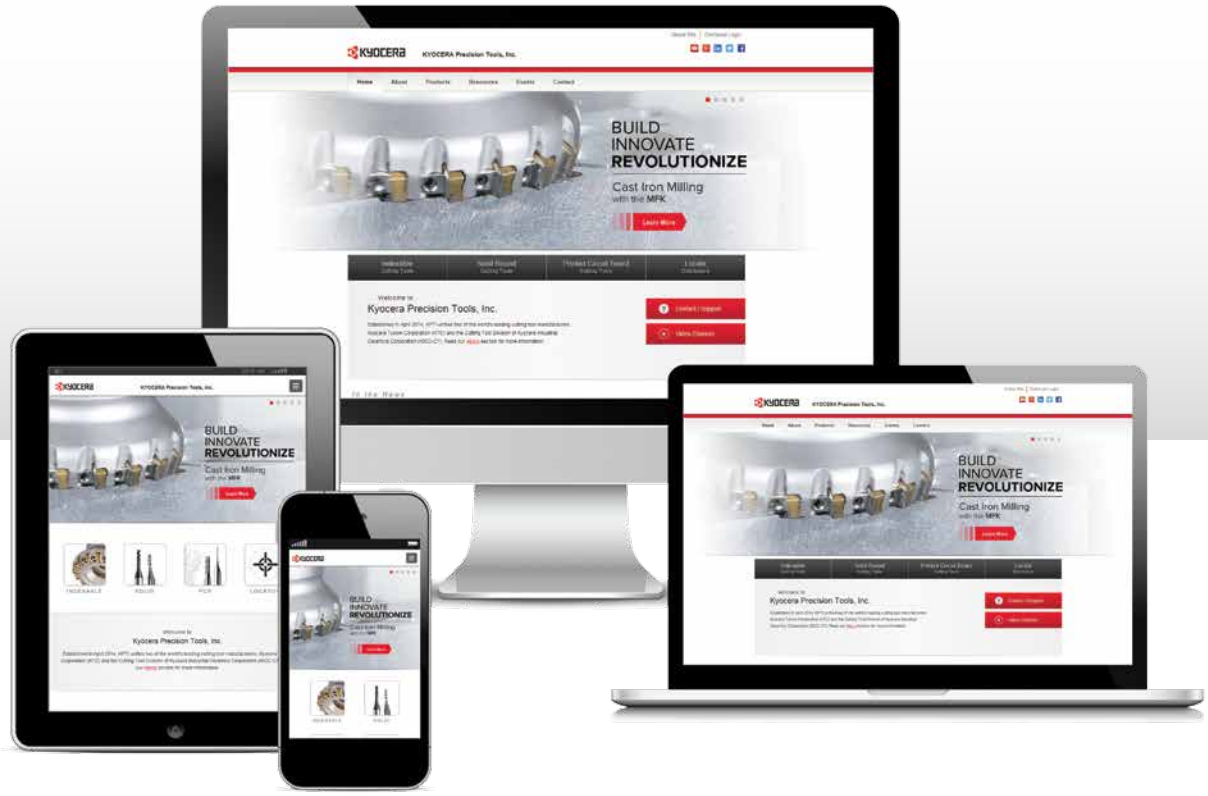
GENERAL INQUIRIES
cuttingtools@kyocera.com

CUSTOMER SERVICE
ctsales@kyocera.com

TECHNICAL CENTER
cttechs@kyocera.com

VISIT US ONLINE

WWW.KYOCERAPRECISIONTOOLS.COM



BUILT FOR SPEED AND OPTIMIZATION ACROSS ALL DEVICES

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- *Locate distributors in your area on-the-go through an updated distributor map*

INSERT GRADES

A1 - A18

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, TN100M					TN60, TN100M								
	TC Series		TC60					TC60							
Carbide	CA Series							CA6535				CA420M			
	PR Series		PR830					PR830							
	MEGACOAT (PR Series)		PR1225, PR1230					PR1225					PR1210		
	MEGACOAT NANO (PR Series)		PR1525					PR1525, PR1535					PR1510		
Carbide												KW10, GW25			

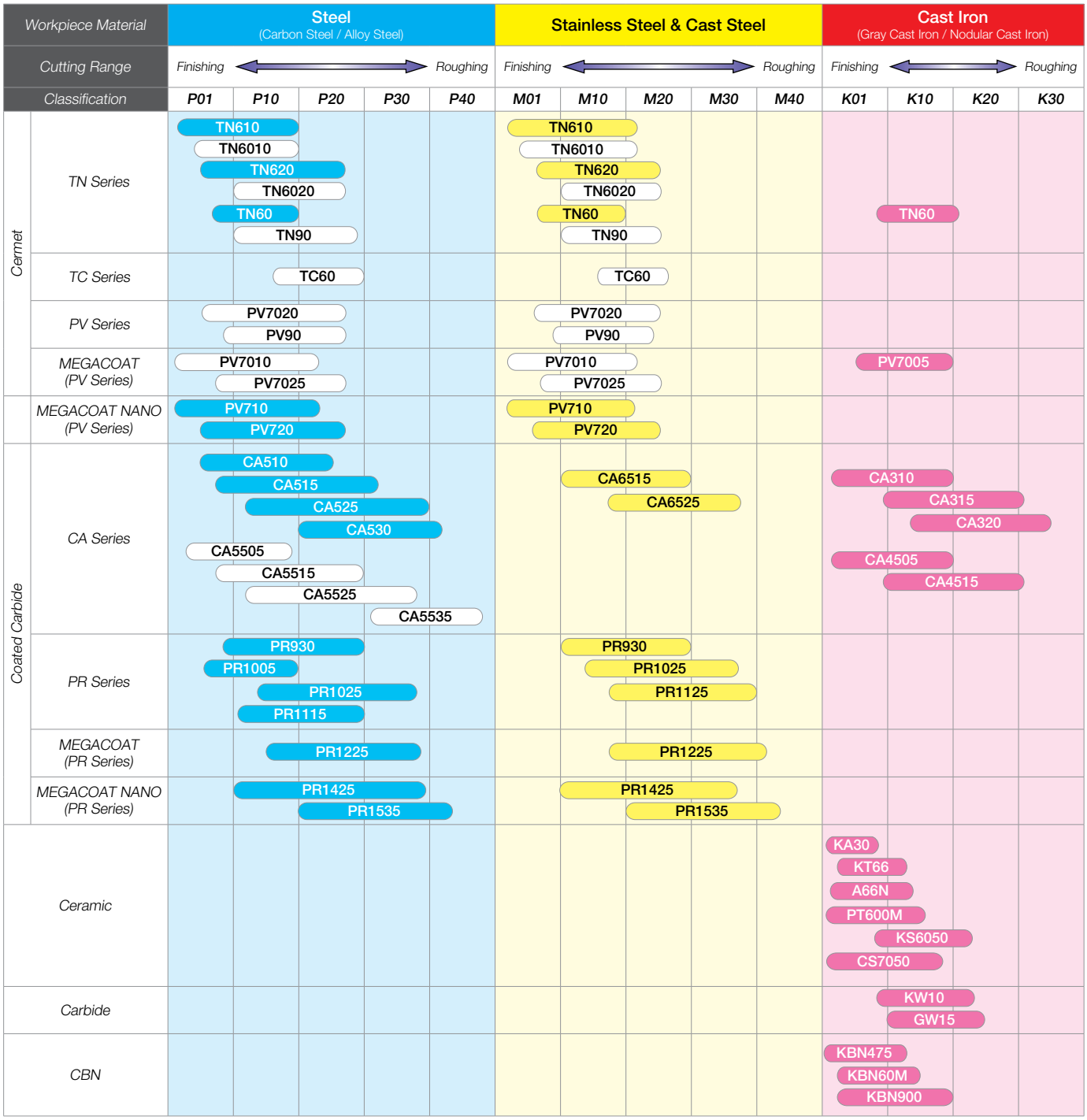
Workpiece Material		Non-Ferrous (Aluminum / Non-Ferrous Metals / Non-Metals)				Difficult-to-Cut Materials (HRSA / Ni-base HRSA)				Difficult-to-Cut Materials (Titanium)				Hard Materials (Hardened Steel / Chilled Cast Iron)			
Cutting Range		Finishing ↔ Roughing				Finishing ↔ Roughing				Finishing ↔ Roughing				Finishing ↔ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	S01	S10	S20	S30	H01	H10	H20	H30
	CA Series					CA6535											
	MEGACOAT (PR Series)										PR1210						
	MEGACOAT NANO (PR Series)						PR1535				PR1535						
Carbide		KW10, GW25									KW10, GW25						
DLC Coating		PDL025															
CBN														KBN525			
PCD		KPD001, KPD010, KPD230, KPD250								KPD001, KPD010							

Drilling

Workpiece Material		Steel (Carbon Steel / Alloy Steel)					Stainless Steel & Nickel-based Alloys					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			PR830, PR660				PR830	PR660						
	MEGACOAT (PR Series)		PR1225, PR1230					PR1225					PR1210		
	MEGACOAT NANO (PR Series)			PR1535				PR1535							
Carbide												KW10, GW15			

Workpiece Material		Non-Ferrous (Aluminum / Non-Ferrous Metals / Non-Metals)				Difficult-to-Cut Materials (Inconel / Titanium)				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, GW15				KW10, GW15						

Turning


Workpiece Material
Steel (Carbon Steel / Alloy Steel)
Stainless Steel & Cast Steel
Cast Iron (Gray Cast Iron / Nodular Cast Iron)
Cutting Range
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
TC Series
TC60
PV Series
PV7020
PV90
MEGACOAT (PV Series)
PV7010
PV7025
PV7005
MEGACOAT NANO (PV Series)
PV710
PV720
Coated Carbide
CA Series
CA510
CA515
CA525
CA530
CA5505
CA5515
CA5525
CA5535
CA6515
CA6525
CA310
CA315
CA320
CA4505
CA4515
PR Series
PR930
PR1005
PR1025
PR1115
PR1125
MEGACOAT (PR Series)
PR1225
MEGACOAT NANO (PR Series)
PR1425
PR1535
Ceramic
KA30
KT66
A66N
PT600M
KS6050
CS7050
Carbide
KW10
GW15
CBN
KBN475
KBN60M
KBN900

Turning

Workpiece Material	Non-Ferrous (Aluminum / Non-Ferrous Metals / Non-Metals)				Difficult-to-Cut Materials (HRSA / Ni-base HRSA)				Hard Materials (Hardened Steel / Chilled Cast Iron)				Powdered 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									
Coated Carbide – PR Series							PR1125									
Coated Carbide – MEGACOAT (PR Series)					PR1305	PR1310	PR1325									
Coated Carbide – MEGACOAT NANO (PR Series)							PR1535									
Cermet													TN6010			
														TN60		
Ceramic						CF1			KT66							
						KS6030			A66N							
						KS6040			PT600M							
CBN									KBN510							
									KBN525							
									KBN900							
MEGACOAT									KBN05M					KBN65M		
									KBN10M					KBN70M		
									KBN25M					KBN570		
									KBN30M							
									KBN35M							

Workpiece Material	Non-Ferrous (Aluminum / Non-Ferrous Metals / Non-Metals)				Difficult-to-Cut Materials (Titanium)				Hard Materials (Hardened Steel / Chilled Cast Iron)				Powdered 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 Coating	PDL025															
PCD	KPD001				KPD001											
	KPD010				KPD010											
	KPD230															
	KPD250															

PVD Coated Carbide for Small Tools

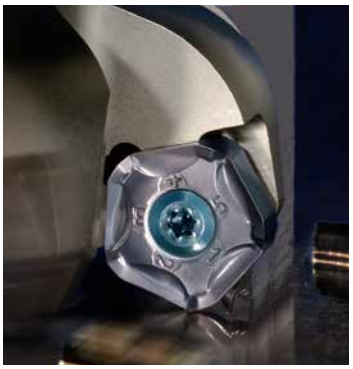
Workpiece Material	Steel (Carbon Steel / Alloy Steel)					Stainless Steel & Cast Steel					Cast Iron (Gray Cast Iron / Nodular Cast Iron)			
Cutting Range	Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Coated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

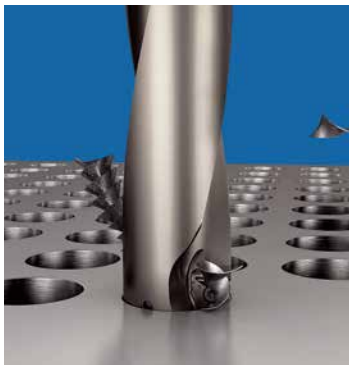
Grooving / Cut-Off

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	MEGACOAT (PV Series)	PV7040										PV7040			
Cermet	TN Series	TN620, TN6020, TN60, TN90					TN620, TN6020, TN60, TN90					TN60			
Cermet	TC Series	TC40	TC60				TC60					TC40			
Coated Carbide	CR Series	CR9025					CR9025								
Coated Carbide	PR Series	PR915, PR930, PR1025, PR1115		PR630, PR660			PR915, PR930, PR1025		PR630, PR660			PR905			
Coated Carbide	MEGACOAT (PR Series)	PR1215, PR1225					PR1215, PR1225						PR1215		
Coated Carbide	MEGACOAT NANO (PR Series)	PR1535					PR1535								
Ceramic												A65, A66N, PT600M			
Carbide													KW10, GW15		

Workpiece Material		Non-Ferrous (Aluminum / Non-Ferrous Metals / Non-Metals)				Difficult-to-Cut Materials (Titanium)				Hard Materials (Hardened Steel / Chilled Cast Iron)				Powdered 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 (PR Series)														PR1215, PR1225		
Cermet															TN60		
Ceramic										A65, A66N, PT600M							
Carbide			KW10, GW15				KW10, GW15										
DLC Coating			PDL025														
CBN										KBN510, KBN525					KBN570		
PCD		KPD001, KPD010				KPD001, KPD010											

PVD / CVD COATED CARBIDE FOR MILLING & DRILLING





PVD Coated Carbide *(MEGACOAT / MEGACOAT NANO)*

KYOCERA's PVD coated carbides for milling and drilling utilize very tough carbide substrates.

The low processing temperature, compared with CVD, leads to improved bending strength, less deterioration of the coating and superior tool life with stable machining.

CVD Coated Carbide

CVD coated carbide grades provide stable, efficient machining at high speeds or for heavy interrupted applications.

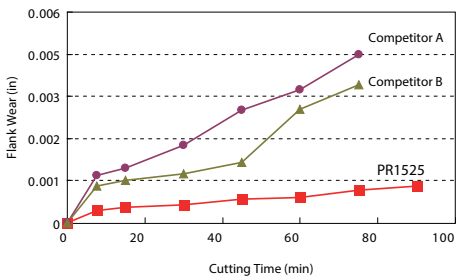
Ti-base (TiN, TiCN) coating with superior hardness and wear resistance or ceramic-base (Al_2O_3) coating with high-thermal stability is applied on a tough carbide substrate. Superior fracture and wear resistance.

FEATURES OF PVD / CVD COATED CARBIDE FOR MILLING & DRILLING

Material	*Description*	*Color*	*Main Component (Coating Composition)*	*Advantages*
P Steel	**PR830**	Gold	TiAlN+TiN	· Improved high temperature stability and wear resistance by TiAlN base PVD coating · Application: Stable and long tool life for milling of steel
	PR1230	Blackish Red	MEGACOAT	· Superior wear and oxidation resistant MEGACOAT on a special tough carbide substrate · Application: Stable and high feed rate milling and drilling of steel
	PR1525	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: Stable and long tool life milling of Steel and Stainless Steel
M Stainless Steel	**PR1025**	Reddish Gray	TiCN	· TiCN base PVD coated on micro-grain carbide · Application: Stable and long tool life milling of stainless steel
	PR1225	Blackish Red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application: General and high feed drilling of steel and stainless steel
K Cast Iron	**PR1210**	Blackish Red	MEGACOAT	· Superior wear and oxidation resistant MEGACOAT on special carbide substrate for cast iron · Application: Highly efficient stable milling and drilling of gray and nodular cast iron and titanium alloys
	PR1510	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: For gray and nodular cast iron, stable wear resistance and toughness
	CA420M	Blackish Red	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	**PR1535**	Blackish Red	MEGACOAT NANO	· Stabilized milling operation and long tool life with MEGACOAT NANO coating technology · Application: PVD for titanium alloy and precipitation hardened stainless steel
	CA6535	Gold	TiCN+Al_2O_3+TiN (CVD)	· High heat resistance and wear resistance with CVD coating with improved stability due to thin film coating · Application: CVD for Ni-base heat resistant alloy and martensitic stainless steel

Wear Resistance Properties (PR1525)

1045



<Cutting Conditions>

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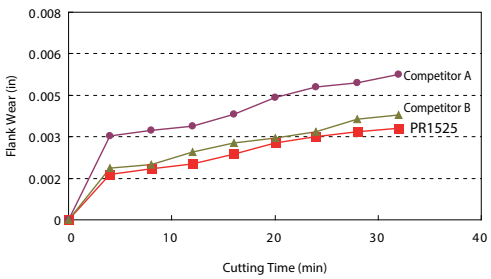
fz=0.005ipt (Vf=7.205 in/min), Dry

D2



<Cutting Conditions>

D2, Vc=390sfm, ap×ae=0.079"x0.394"
fz=0.004ipt (Vf=7.480 in/min), Dry

2 New Grades for Extending Tool Life

when Machining Heat Resistant Alloys and Difficult-to-cut Materials

CA6535 (CVD) NEW

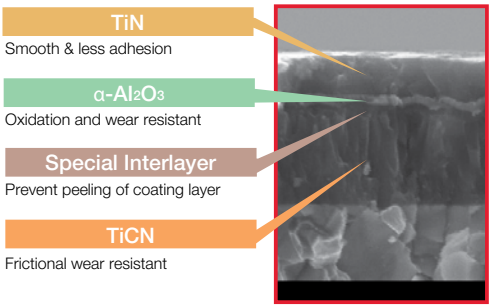
for Ni-base Heat Resistant Alloy and Martensitic Stainless Steel

PR1535 (PVD) NEW

for Titanium Alloy and Precipitation Hardened Stainless Steel

New grades for difficult-to-cut material

- Stable cutting prevents insert fracturing
- Good for high efficiency machining



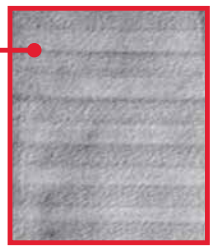
CA6535

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

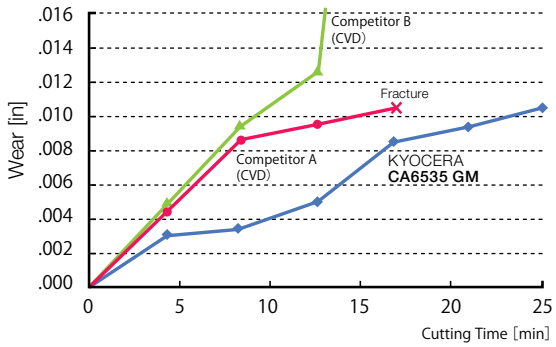
PR1535

- For titanium alloy and precipitation hardened stainless steel
- Stabilized milling operation and long tool life with Kyocera's MEGACOAT NANO coating technology
- Improved stability due to thin film coating technology

MEGACOAT NANO
Layer structure



• Ni-base Heat Resistant Alloy



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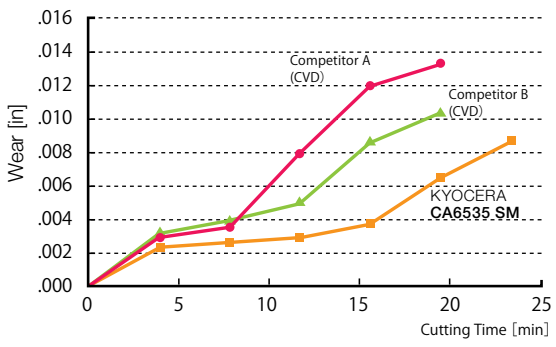
1st recommendation GM chipbreaker

• Martensitic Stainless Steel



< Cutting Condition > Vc=975sfm, ap=0.079", fz=0.008ipt, WET

1st recommendation SM chipbreaker

CERMET

CERMET

KYOCERA is known as the leading manufacturer of cermets. Cermet is a composite material combining Ceramic and Metal. Typical materials used in cermets are TiC, TiN, TiCN and NbC. Designed to provide long tool life and excellent surface finishes, cermets combine toughness with superior wear resistance.

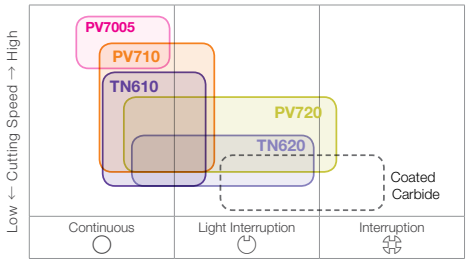
PVD COATED CERMET

PVD Coated Cermet is a cermet substrate with a thin coating offering high wear resistance and high adhesion resistance. The coating is applied 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 & PVD COATED CERMET

Material	Description		Color	Main Component (Coating Composition)	Advantages
P Steel	Cermet	**TN610**	Gray	TiCN	· Inner structure has high toughness and chipping resistance along with thermal shock resistance · Application: Recommended cermet for high wear resistance
		TN620	Gray	TiCN	· Inner structure has high toughness and chipping resistance along with thermal shock resistance · Application: Recommended cermet for stable steel machining and high quality surface finish
		TN6010 (Super Micro-Grain)	Gray	TiCN	· Improved surface cermet with superior wear resistance and toughness · Application: Economical uncoated cermet for steel
		TN60	Gray	TiCN+NbC	· General purpose cermet with superior wear resistance and toughness · Application: Cutting of steel and stainless steel
		TN6020 (Super Micro-Grain)	Gray	TiCN	· Super micro-grain cermet with superior wear resistance and toughness · Application: Steel and stainless steel cutting
		TN100M	Gray	TiCN+NbC	· Tough cermet with improved oxidation resistance and thermal shock resistance · Application: Milling of steel at high speed
		TC40	Gray	TiC+TiN	· Good balance of wear resistance and toughness · Application: Grooving and threading of steel
	MEGACOAT NANO Cermet	**PV710**	Gold	TiCN (MEGACOAT NANO)	· MEGACOAT NANO efficient machining with high quality surface finishes and superior wear and adhesion resistance · Application: Recommended cermet for long tool life and stable machining for high speed continuous cuts
		PV720	Gold	TiCN (MEGACOAT NANO)	· MEGACOAT NANO efficient machining with high quality surface finishes and superior wear and adhesion resistance · Application: Recommended cermet for stable steel machining and high quality surface finish
	MEGACOAT Cermet	**PV7010** (Super Micro-Grain)	Blackish Red	TiCN (MEGACOAT)	· Heat-resistant MEGACOAT on improved surface cermet with excellent wear resistance and toughness · Application: Stable and improved tool life in steel cutting, excellent surface finish
		PV7025 (Super Micro-Grain)	Blackish Red	TiCN (MEGACOAT)	· MEGACOAT on the super micro-grain cermet · Application: High strength and long life given by MEGACOAT
		PV7040	Blackish Red	TiC+TiN (MEGACOAT)	· MEGACOAT on the super micro-grain cermet · Application: Grooving of steel
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



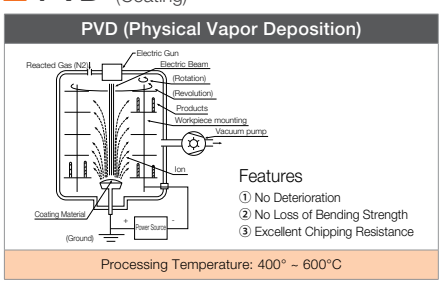
TN-Series (Uncoated Cermet)

TN610: High Wear Resistance
TN620: Chipping Resistance

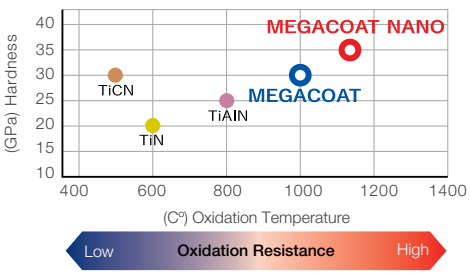
PV-Series (MEGACOAT NANO Cermet)

PV710: Long Tool Life and Stable Machining for High Speed Continuous Cuts
PV720: First Recommendation for Efficiency and High Quality Surface Finish

PVD (Coating)

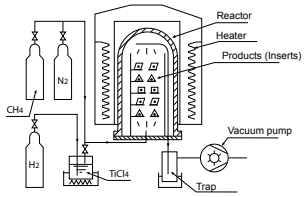


PVD (Properties)



CVD COATED CARBIDE

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

CVD COATED CARBIDE

KYOCERA's CVD coated carbide grades are based on ceramic thin film technology and provide stable, efficient cutting at high speeds or heavily interrupted applications.

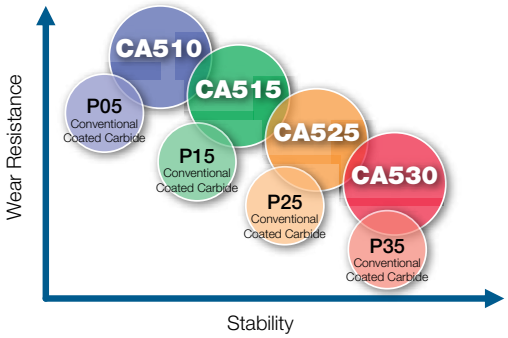
- Applicable from low to high speed cutting and from finishing to roughing
- Stable cutting is achieved due to the superior toughness and crack resistance
- Cutting times are reduced due to good chip control from effective chipbreakers

FEATURES OF CVD COATED CARBIDE

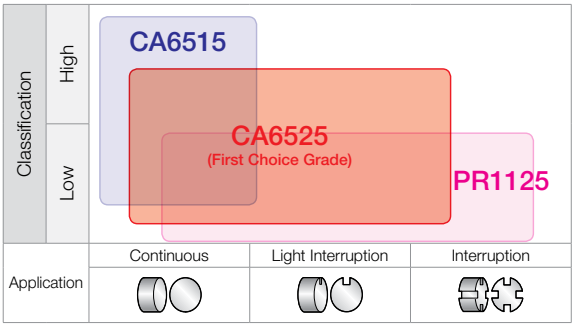
Material	*Description*	*Color*	*Main Component (Coating Composition)*	*Advantages*
P Steel	CA510	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Special substrate with thermal deformation resistance along with a thick and tough film coating for wear resistance · Application: High speed and high efficiency steel machining
	CA515	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Special substrate and tough coating film provides thermal deformation and high wear resistance · Application: Continuous to light interrupted steel machining (general use)
	CA525	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Special substrate and tough coating film provides high wear and fracture resistance · Application: 1st choice for steel machining
	CA530	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Special tough substrate and tough coating film provides high stability and wear resistance · Application: General to heavy interrupted machining (stability oriented)
	CA5505	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Improved wear resistance due to hard carbide substrate and micro columnar structure of coating composition · Application: High speed continuous cutting of steel, continuous to light interrupted cutting of cast iron
	CA5515	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Improved wear resistance and longer tool life due to micro columnar structure of coating composition · Application: High speed cutting of steel, continuous to light interruption
	CA5525	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Improved toughness and wear resistance due to tougher carbide substrate and micro columnar structure of coating composition · Application: First choice for general cutting of steel, roughing to interruption
	CA5535	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Improved toughness due to tougher carbide substrate · Application: Roughing to heavy interrupted cutting 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 cutting of steel
M Stainless Steel	CA6515	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Specialized carbide substrate for stainless steel cutting, excellent wear resistance · Application: Continuous to light interrupted cutting of stainless steel
	CA6525	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Specialized carbide substrate for stainless steel cutting, excellent notching resistance and toughness · Application: First choice for general cutting of stainless steel, from finishing to roughing, continuous to interruption
K Cast Iron	CA4010	Gold	Columnar TiCN+Al_2O_3+TiN	· Excellent high temperature stability due to plastic deformation and oxidation wear resistance · Application: Continuous to light interrupted high speed cutting of cast iron
	CA4115	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Improved wear resistance due to micro columnar structure of coating composition · Application: Nodular cast iron cutting, continuous to light interruption
	CA4120	Gold	Micro Columnar TiCN+Al_2O_3+TiN	· Improved toughness and wear resistance due to tougher carbide substrate and micro columnar structure of coating composition · Application: Roughing to heavy interrupted cutting of nodular cast iron
	CA4505	Blackish gray	Micro Columnar TiCN+Al_2O_3	· Stable, long tool life due to improved bonded force of coating layers and special treatment on the surface of top coated layer · Application: For gray cast iron and nodular cast iron at high speed in continuous to light interrupted cutting
	CA4515	Blackish gray	Micro Columnar TiCN+Al_2O_3	· Stable, long tool life due to improved bonded force of coating layers and special treatment on the surface of top coated layer · Application: First choice for gray cast iron and nodular cast iron in light to heavy interrupted cutting

Application Map

Steel



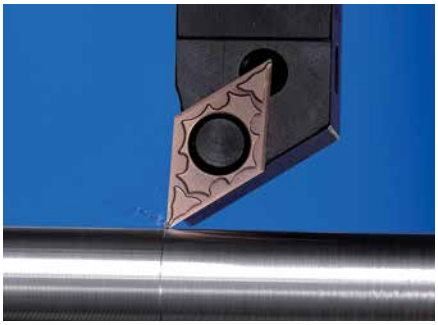
Stainless Steel



PVD COATED CARBIDE FOR TURNING

PVD COATED CARBIDE (MEGACOAT / MEGACOAT NANO)

KYOCERA's PVD coated carbides for turning utilize very tough carbide substrates. The low processing temperature, compared with CVD, leads to improved bending strength, less deterioration of the coating and superior tool life with stable machining.

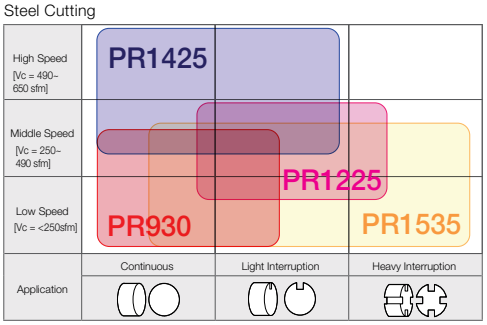


FEATURES OF PVD COATED CARBIDE FOR TURNING

Material	Description	Color	Main Component (Coating Composition)	Advantages
P Steel	**PR915** (Super Micro-Grain)	Bluish Violet	TiAlN	· TiAlN base PVD coated super micro-grain carbide, superior wear and oxidation resistance · Application: Stable and reliable high precision cutting of steel
	PR930 (Super Micro-Grain)	Reddish Gray	TiCN	· Hard TiCN base PVD coated super micro-grain carbide · Application: Low cutting speed, precise cutting with sharp edge
	PR1005	Reddish Gray	TiCN	· TiCN base PVD coated hard micro-grain carbide · Application: Turning of free-cutting steel, long tool life achieved through anti-adhesion performance
	PR1025	Reddish Gray	TiCN	· TiCN base PVD coated micro-grain carbide · Application: General purpose cutting of steel and stainless steel, stable and long tool life
	PR1115	Purple Red	TiAlN	· Hard TiAlN base PVD coated super micro-grain carbide · Application: Superior anti-oxidation performance with well balanced wear resistance and toughness
	PR1215	Blackish Red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application: Superior adhesion-resistant and long tool life for steel and stainless steel cutting
	PR1425	Blackish Red	MEGACOAT NANO	· Nano thin multi-layer coating performs with superior wear resistance and high oxidation resistance. · Application: various applications of steel cutting, High speed stainless steel cutting, 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 cutting of stainless steel
	PR1225	Blackish Red	MEGACOAT	· Superior wear and oxidation resistant MEGACOAT on micro grain carbide substrate · Application: Light interrupted to interrupted cutting of stainless steel
K Cast Iron	**PR905**	Bluish Violet	TiAlN	· Smooth fine surface PVD coated hard carbide with plastic deformation resistance · Application: Suitable for milling of 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 cutting and finishing of heat-resistant alloys
	PR1325	Blackish Red	MEGACOAT	· MEGACOAT on tough carbide · Application: Light interrupted cutting and roughing of heat-resistant alloys
	PR1535	Blackish Red	MEGACOAT NANO	· Stabilized turning operations and long tool life with MEGACOAT NANO coating technology · Application: PVD for titanium alloy and precipitation hardened stainless steel

Application Maps

Steel Cutting



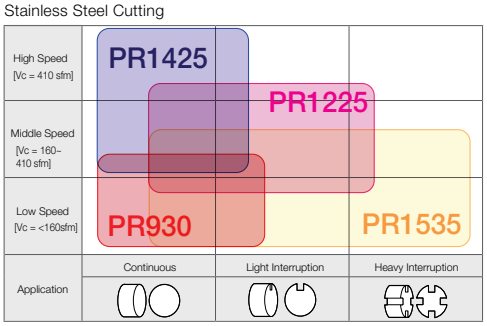
PR1425
1st choice grade

PR1225
High reliability in interrupted cutting

PR1225
Stable cutting at low to middle speed

PR930
Stable cutting at low speed

Stainless Steel Cutting

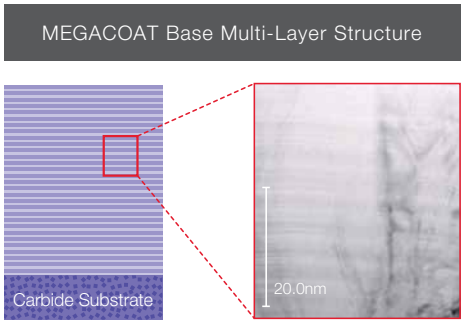


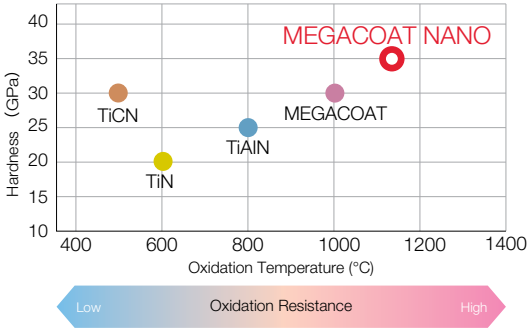
PR1225
1st choice grade

PR1425
Extended tool life in high speed cutting

PR930
Extended tool life in low speed cutting

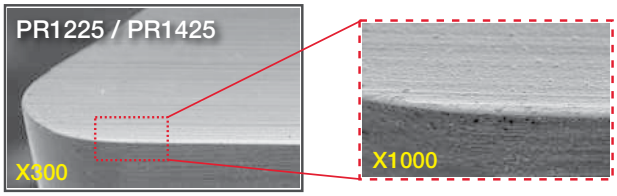
MEGACOAT NANO Grade Properties



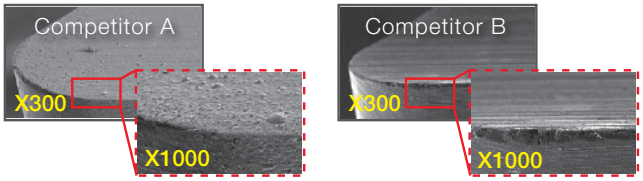


Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C)

Cutting Edge Quality (Sharp Edge Insert)



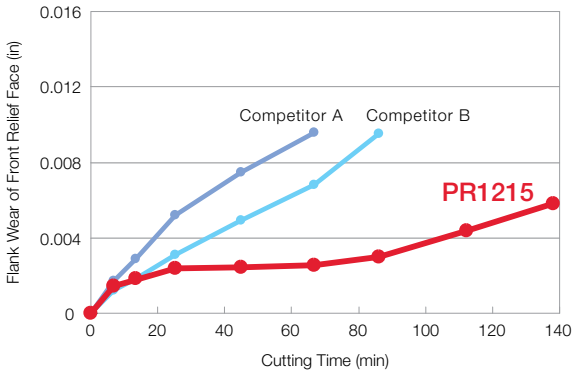
Superior edge-sharpening performance and smooth surface



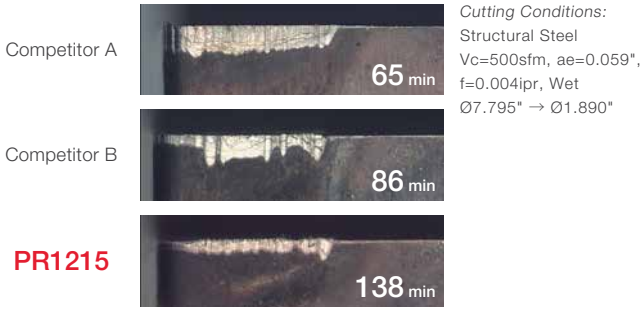
Delamination (coating peeling) and rough surface

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

PR1215 Wear Resistance Comparison
(Off-Centered Grooving)



Flank Wear of Front Relief Face



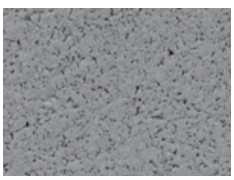
Cutting Conditions:
Structural Steel
Vc=500sfm, ae=0.059",
f=0.004ipr, Wet
Ø7.795" → Ø1.890"

PR13-Series Advantages

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

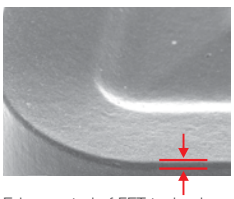
New edge preparation technology (FET: Fine Edge Treatment) controls and minimizes R honing and realizes large tip rake angle, and thus prevents burrs and notching. It provides good surface finishes.

Special Carbide Substrate



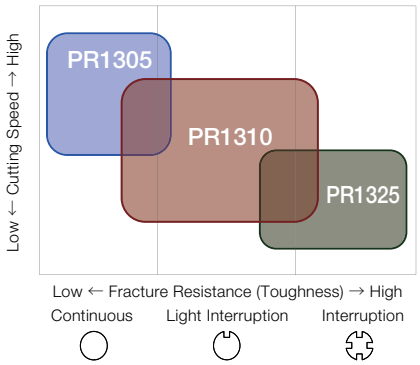
Uniform grain size enables superior thermal shock resistance and constant hardness

New Edge Preparation Technology



Edge control of FET technology (FET: Fine Edge Treatment)

Heat-Resistant Alloys (Ni-based)



CARBIDE

CARBIDE

Due to its superior mechanical features carbide is used in a variety of applications. KYOCERA produces a variety of carbides, including KW10 for non-ferrous materials and micro-grain carbides for precision cutting.

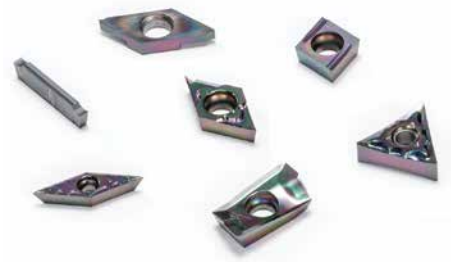
FEATURES

- Tough and hard
- Good thermal conductivity
- Suitable for cutting non-ferrous metals and non-metals
- Stable cutting at low cutting speeds, including milling operations

FEATURES OF CARBIDE

Material	Description	Color	Main Component (Coating Composition)	Advantages
N Non-Ferrous Materials	**KW10**	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant) · Application: Stable cutting of cast iron, non-ferrous materials, non-metals, and titanium alloys
	GW15	Gray	WC+Co	· ISO identification symbol K carbide (equivalent to K10), tough micro-grain carbide · Application: High wear resistance and toughness for non-ferrous materials, and non-metals, and titanium alloys
	GW25	Gray	WC+Co	· ISO identification symbol K carbide (K30 relevant) · Application: Stable wear resistance and anti-chipping performance for milling operations of aluminum
S Heat-Resistant Alloys	**SW05**	Gray	WC+Co	· ISO identification symbol K carbide (K05 relevant) · Application: Continuous cutting and finishing of titanium alloys maintaining superior wear resistance
	SW10 (Made to Order)	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant) · Application: Continuous and light interrupted cutting of titanium alloys maintaining superior wear resistance and stable result
	SW25 (Made to Order)	Gray	WC+Co	· ISO identification symbol K carbide (K25 relevant) · Application: Interrupted and light interrupted cutting of titanium alloys maintaining stable result

DLC COATING



DLC COATING

High quality and long tool life machining of aluminum. Achieves long tool life with hardness close to that of diamond and maintains an excellent surface finish with aluminum welding resistance.

FEATURES

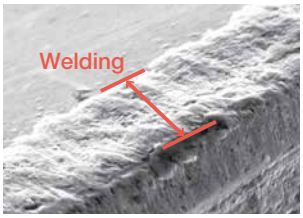
- Excellent surface finish
- Stable machining with excellent peeling resistance
- Improved chip evacuation due to high lubrication

FEATURES OF CARBIDE

Material	Description	Color	Main Component (Coating Composition)	Advantages
N Non-Ferrous Materials	**PDL025**	Iridescent	C	· Hydrogen free DLC coating for high hardness close to that of diamond · Application: Stable cutting of aluminum with turning, milling, and cut-off operations

Welding Resistance Comparison

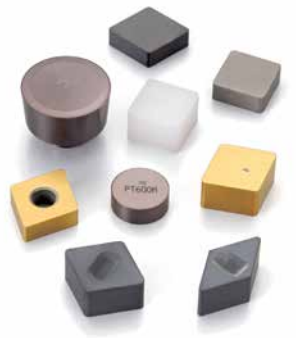
PDL025



Competitor A

Cutting Conditions: Vc = 2630 sfm, fz = 0.004 ipt, ap × ae = 0.118" × 0.197", Dry
Cutter Dia. ø1.000" Workpiece: 5052 Cutting Length: 57 m

CERAMIC



CERAMIC

Ceramic inserts are capable of running at high speeds, thus reducing expensive machining time. Hard turning of 38HRC to 64HRC hardened steel, or rough to finish turning of cast iron are recommended applications for ceramic inserts.

KYOCERA's ceramic grades are designed to resist oxidation and maintain hardness at elevated temperatures.

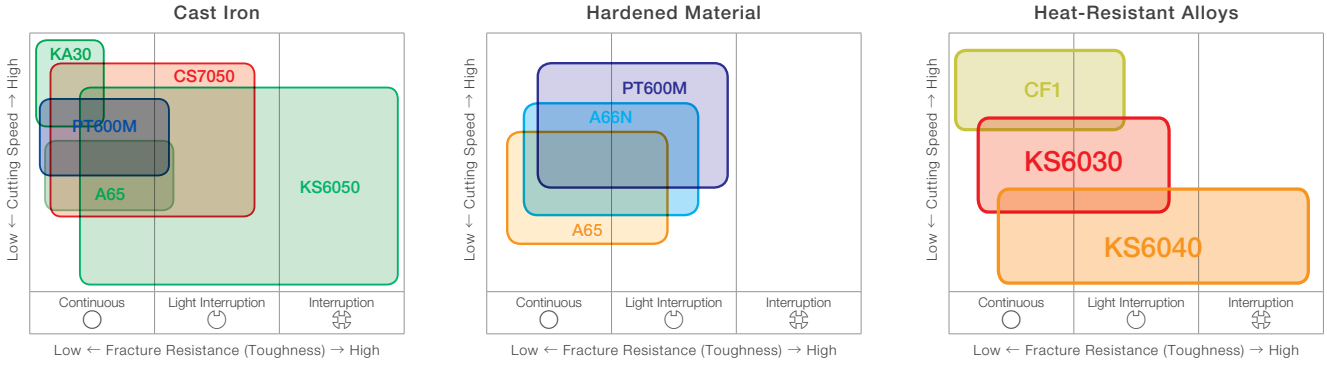
FEATURES

- Excellent wear resistance for high cutting speeds
- Ceramic maintains good surface finishes due to the low affinity to workpiece materials
- Silicon nitride ceramic has improved thermal shock resistance allowing cast iron cutting using coolants

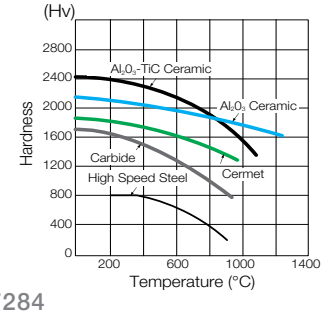
FEATURES OF CERAMIC

Material	Description	Color	Main Component (Coating Composition)	Coating Layer	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m½)	Transverse Strength (MPa)	Advantages
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
	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)
	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	A65	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 steel, cast iron, and hard materials
H Hardened 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+TiC) · Application: Semi-roughing to finishing of 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
	KS6040	Brown	SiAlON	-	16.7	7 .0	900	· High stability SiAlON ceramic with wear resistance and fracture resistance · Application: Roughing of heat-resistant alloys

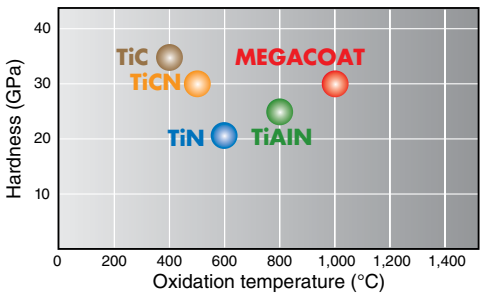
Application Maps



High Temperature Hardness



PVD Coating Properties



CBN

CBN

KYOCERA CBN is second only to diamond in hardness. CBN (Cubic Boron Nitride) is a synthetically produced material with high thermal conductivity which provides stable cutting.

FEATURES

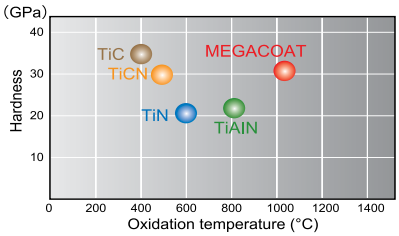
- Superior wear resistance when cutting hardened materials
- Suitable for high speed cutting of cast iron and sintered steel
- High thermal conductivity provides stable cutting

FEATURES OF CBN

Material	Description	Color	Av. Grain Size (μm)	Hardness of Substrate (GPa)	Transverse Strength (MPa)	Advantages
H Hardened Materials	**KBN510**	Black	2	28	1,000	· Excellent wear resistance and crack resistance, non-coated CBN · Application: Finishing and continuous cutting of hardened die steel
	KBN525	Black	1 and Under	25	1,250	· Good balance of toughness and wear resistance, non-coated CBN · Application: General grade for hardened steel, high stability at high speed and high feed cutting
	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	· Heat-resistant MEGACOAT on CBN with hard binder phase, superior anti-crater wear resistance · 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 cutting of hardened steel at high speed
	KBN30M (MEGACOAT)	Blackish Red	1-4	30	1,350	· Heat-resistant MEGACOAT on tougher CBN · Application: Stable cutting of hardened steel for continuous to interrupted cutting
Sintered Steel	**KBN65B**	Black	2	32	1,150	· Excellent wear resistance due to CBN with heat-resistant binder phase, non-coated CBN · Application: Stable cutting 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 cutting of sintered steel (ferrous sintered alloy) at low speed
	KBN70M (MEGACOAT)	Blackish Red	2-4	34	1,350	· Heat-resistant MEGACOAT on CBN rich substrate · Application: General cutting of sintered steel (ferrous sintered alloy) at high speed
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	1,050	· TiN coated solid CBN · Application: Heavy duty, interrupted cutting and finishing of hardened steel, hardened roll steel and cast iron

MEGACOAT CBN

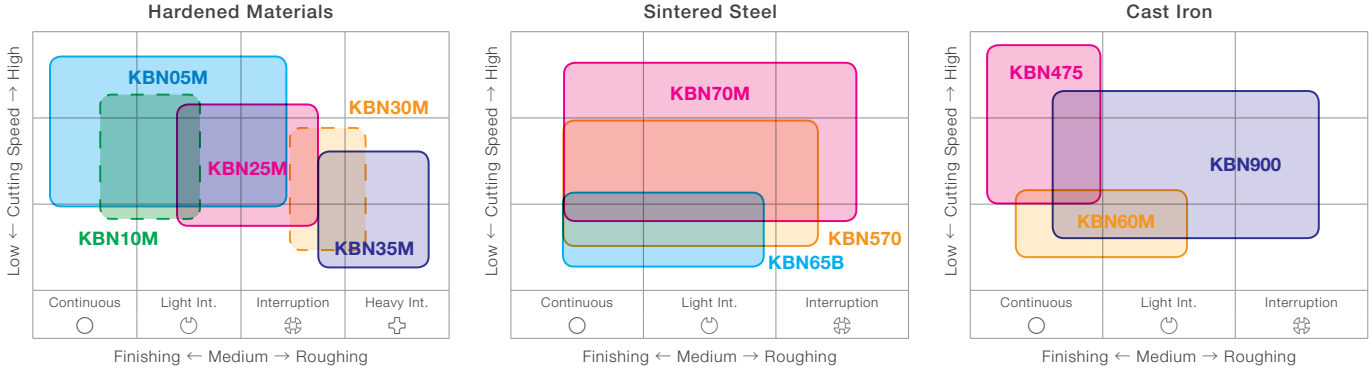
Properties of PVD Coated Layer



Advantages of MEGACOAT

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

Application Map



PCD

PCD (Polycrystalline Diamond)

KYOCERA diamond material is a synthetic diamond sintered under high temperatures and pressures. PCD (Polycrystalline diamond) is ideal for non-ferrous metals and non-metals.

FEATURES

- Applicable for non-ferrous metals, non-metals turning, milling and other various type of cutting
- Long tool life due to extreme hardness
- Capable of high cutting speeds which increases cutting productivity
- Reduced edge build-up allows for high precision cutting
- Diversified applications for cutting of non-ferrous materials and non-metals
- Finished surface will be rainbow colored.
  (a mirror-like finished surface will not be obtained when single crystal diamond is used.)

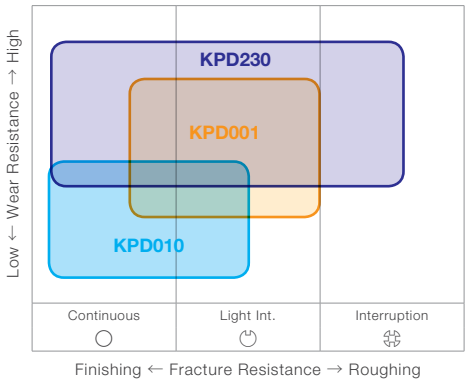
FEATURES OF PCD

Material	Description	Av. Grain Size (μm)	Advantages
N Non-Ferrous Materials	**KPD001**	0.5	· Super Micro-Grain PCD features cutting edge strength, wear resistance, fracture resistance, good edge-sharpening performance and long, stable tool life. · Application: High speed cutting of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, fiberglass, carbide and ceramics.
	KPD010	10	· Good wear resistance and toughness, good grindability · Application: General purpose, high speed cutting of aluminum alloys, non-ferrous metals and non-metals including plastics, fiberglass, carbide and ceramics.
	KPD230	2-30	· Superior abrasive wear resistance and toughness due to high density PCD with mixed rough and fine grains · Application: High speed milling of aluminum alloys, non-ferrous metals, plastics and fiberglass

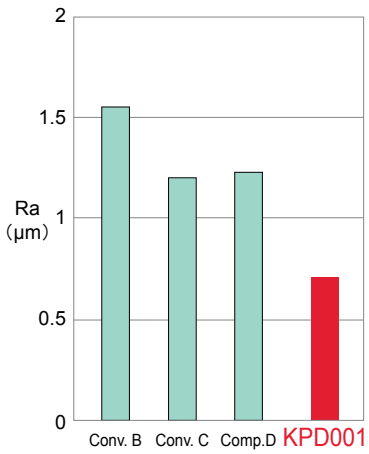
Applications

Workpiece Material		Non-ferrous materials (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							

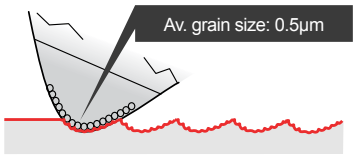
Application Map



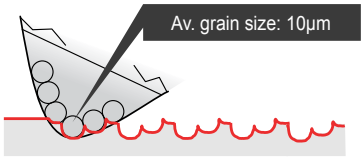
Surface Finish Roughness Comparison of Aluminum Cutting



Excellent surface finish provided by Super Micro-Grain KPD001



Surface finish of conventional PCD

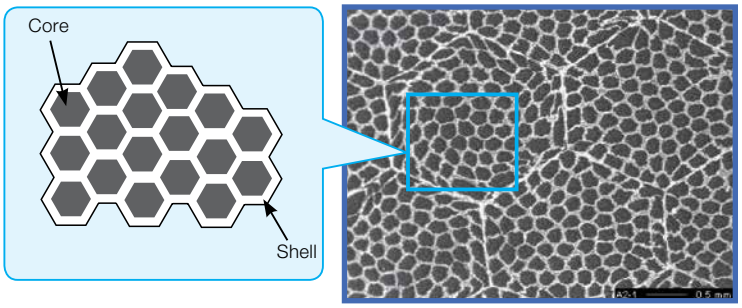


(Grain size affects surface finish quality)

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

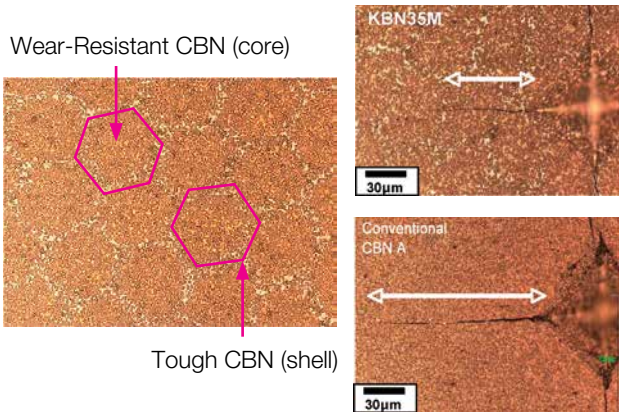
- Cell Fibers combine a hard, wear-resistant core and a tough shell into one insert.
- The tough shell stops cracks that form in the core.
- CBN is good for interrupted machining of exceptionally hard material and ceramic is good for heat-resistant alloys

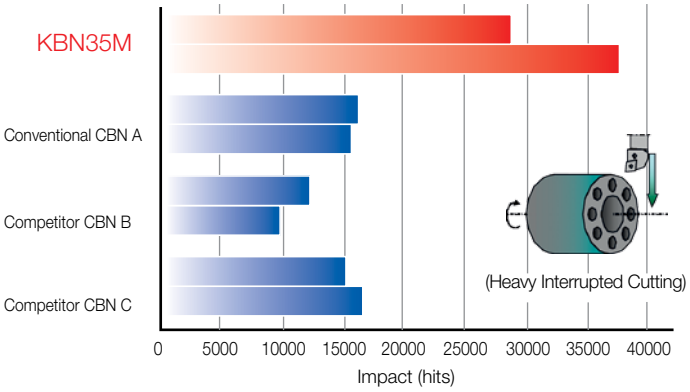
FEATURES OF CBN

Material	*Description*	*Color*	*Main Component (Coating Composition)*	*Advantages*
H Hardened 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

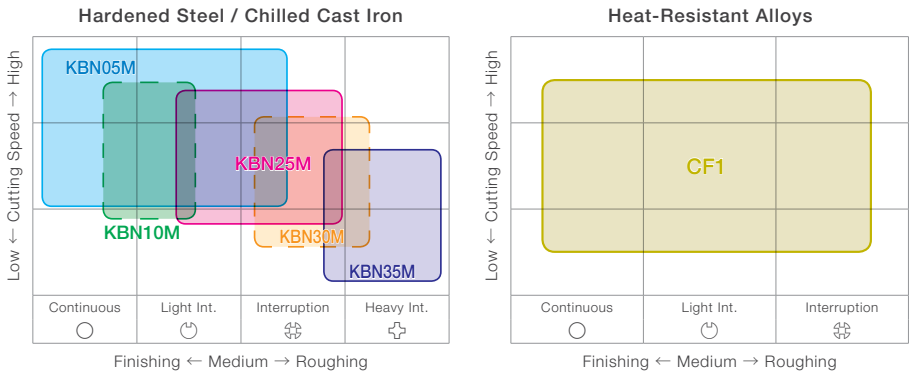
KBN35M (MEGACOAT Honeycomb Structure CBN)

Tough CBN (Shell) Prevents Crack Growth



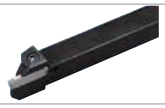


Application Map



Grade Name	Color	Main Component	Coating Layer	Density	Hardness of Substrate (HV)	Hardness of Substrate (GPa)	Fracture Toughness ($MPam^{1/2}$)	Flexural Toughness (MPa)
Cermet								
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
TC40	Gray	TiC+TiN	-	6.0	1,650	16.2	9.0	1,570
TC60	Gray	NbC	-	8.1	1,500	14.7	10.5	1,670
PVD Coated Cermet								
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								
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	1,670	16.4	10.0	3,000
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	14.9	1,780	17.4	9.5	2,350
CA4515	Blackish Gray	Micro columnar TiCN+Al_2O_3	Thick Coating	14.9	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								
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	12.0	2,250
PR730	Gold	TiAlN+TiN	Thin Coating	13.7	1,450	14.2	12.0	2,250
PR830	Gold	TiAlN+TiN	Thin Coating	13.7	1,450	14.2	12.0	2,250
PR905	Bluish Violet	TiAlN	Thin Coating	14.8	1,670	16.4	10.0	3,000
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	1,670	16.4	10.0	3,000
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	12.0	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	1,670	16.4	10.0	3,000
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	Blackish Red	MEGACOAT NANO	Thin Coating	14.8	1,720	16.8	9.0	2,450
PR1525	Blackish Red	MEGACOAT NANO	Thin Coating	14.5	1,600	15.8	13.0	3,400
PR1535	Blackish Red	MEGACOAT NANO	Thin Coating	14.3	1,320	12.9	16.0	3,700
Carbide								
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	1,670	16.4	10.0	3,000
SW25	Gray	WC+Co	-	14.7	1,370	13.4	16.0	3,100
DLC Coating								
PDL025	Iridescent	C	Thin Coating	14.5	1,600	15.8	13.0	3,400

Insert Material Selection Table

Applications		Cutting Range	P	M	K		N	S		H	Powdered Metal
			Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-Ferrous Metals	Heat-Resistant Alloys	Titanium Alloys	Hardened Materials	
Milling		Finishing ↑	TN100M	CA6535			KPD230	CA6535	KPD230	-	-
			PR1225	PR1225	PR1210	PR1210	KPD001	PR1225	KPD001		
			PR1230	PR1525	PR1510	PR1510	KPD010	PR1535	KW10		
			PR1525	PR830	KW10	KW10	PDL025		PR905		
		↓ Roughing	PR830	PR1535			KW10		PR1210		
							GW25		PR1535		
Turning		Finishing ↑	TN610		KBN475					KT66	
			TN6010		KBN60M			CF1		A66N	TN6010
			TN620	TN620	KA30	TN60		KS6040		PT600M	TN60
			TN60	TN60	PV7005	PV7005	KPD001	KW10		KBN05M	
			PV710	PV720	CA5505	CA5505	KPD010	CA6515	KPD001	KBN10M	KBN570
			PV7010	CA6515	CA4505	CA4505	PDL025	CA6525	KPD010	KBN25M	KBN70M
			PV720	CA6525	CA4515	CA4515	KW10	PR1305	SW05	KBN30M	
			CA510	PR1125				PR1310	SW10	KBN35M	
			CA515	PR1535				PR1325	SW25	KBN900	
		↓ Roughing	CA525					PR1535			
			CA530								
Small Tools		Finishing ↑	TN610								
			TN6010								
			TN620								TN610
			PV710	TN620							TN60
			PV7010	PV720	CA4505	CA4505	KPD001	CA6515	KPD001	KBN05M	
			PV720	PR930	CA4515	CA4515	KPD010	PR1125	KPD010	KBN10M	KBN570
			PR930	PR1025	KW10	KW10	KW10	PR1225	KW10	KBN25M	KBN70M
			PR1005	PR1225						KBN30M	
			PR1025	PR1535							
			PR1425								
		↓ Roughing	PR1535								
Boring		Large ↑ Bore Dia. ↓ Small	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								
			PR1535								
General Cut-Off		Large ↑ Cutting Dia. ↓ Small	CR9025	CR9025							
			PR930	PR930							
			PR915	PR915	KW10	KW10	PDL025	KW10	KW10	-	-
			PR1215	PR1215	PR1215	PR1215	KW10	PR1225			
			PR1225	PR1225				PR660			
			PR1535	PR1535							
			PR660	PR660							
Small Dia. Cut-Off		Depends on Workpiece Material	PR1025	PR1025	KW10	KW10	PDL025	KW10	KW10	-	-
			PR1225	PR1225			KW10	PR1025			
			PR1535	PR1535				PR1225			
Grooving		Glossy Finish ↑ Stable	TC40	TC40							
			TN620	TN620							
			TN90	TN90	PR905	PR905	KPD001	PR915	KPD001	KBN510	TC40
			PV7040	PV7040	PR1215	PR1215	PDL025	KW10	KW10	KBN525	
			PR930	PR930	KW10	KW10	KW10	PR1215		PT600M	KBN570
			PR1115	PR1115	GW15	GW15	GW15	PR1225			
			PR1215	PR1215							
			PR1225	PR1225							
Threading		Glossy Finish ↑ Stable	TC60M	TC60M	KW10	KW10	KW10	KW10	KW10	-	PR1115
			PR1115	PR1115	GW15	GW15	GW15	GW15	GW15		
			PR930	PR930							
Drilling		Wear Resistance ↑ Toughness						PR660			
			PR1225	PR1225	PR1210	PR1210	KW10	PR1225	KW10	-	-
			PR1230	PR830	KW10	KW10	GW15	KW10			
			PR830	PR660				GW15			
			PR660								

· Highlighted Items are Recommended Choice.

PRODUCT LINEUP & INSERTS

B

B1 - B26

45° / 70° / 75° Lead Angles

Lead Angle	Shape / Applications	Facing	Chamfering
45°	**MFPN45**  C2	• 10-edge pentagonal inserts • Double-sided pentagonal insert Economical with 10-edge insert • Low cutting force due to helical cutting-edge design • Fractures suppressed with double-edge position	
	MOF45  C14	• Octagonal insert with 8 cutting edges • Insert sizes are available in 05 and 07 • Silver coated	
	MOFX45  C16	• The insert is fixed by top clamp • Excellent surface roughness by easy edge height adjustment • High cost performance provided by 8-edge insert • Cutter designed with high axial rake angle and double positive angle on chipbreaker provide low cutting forces • SH Chipbreakers (for general purpose / low cutting force) and GT chipbreakers (Tough Edge)	
	MSE45 (Standard / Multi-Edge)  C18	• The insert is fixed by the top clamp • Silver coated • Standard edge type and Multi-edge type	
	MSE45-SF (Easy Edge Adjustment)  C19	• Easy edge adjustment • Silver coated	
	MSO45  C22	• Use insert with 13.494mm/C • Insert max. external dia. matches cutter external dia.	
20°	**MFK**  C8	• High efficiency multi-edge cutter for cast iron • Economical double-sided 10-edge inserts • Low cutting forces due to helical cutting-edge design • Improved surface finish, minimizing chattering and prevents burr formation • Dual cutting edge design (high toughness)	

Lead Angle	Shape / Applications	Facing	Chamfering
45°	**MFPN45**  C4	• 10-edge pentagonal inserts • Double-sided pentagonal insert Economical with 10-edge insert • Low cutting force due to helical cutting-edge design • Fractures suppressed with double-edge position • With weldon or cylindrical shank	
	MSO45-S-09  C23	• Screw clamp system and 09 size inserts • Smaller insert for MSO45 series	
	MSO45-S  C22	• High efficiency machining of stainless steel • Stronger edge with insert thickness 0.156"	
15°	**MSRS15**  D4	• For heavy cutting • Max D.O.C. 0.472" • Metal removal rate is increased drastically	
	MSP15  D8	• Facing • Medium to roughing of steel / cast iron	
	MSE15  D8	• Low cutting force • For thin workpiece milling of Steel / Cast Iron • Good anti-chatter performance	

90° Lead Angles (Double-sided Insert)

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MEW End Mill**  E4	• Economical 4-edge Insert • Obtuse edge increases cutting edge toughness • Smooth surface wall due to low cutting forces • Good anti-chatter performance		
	MEW Face Mill  E6			
	MEW Modular  E8			

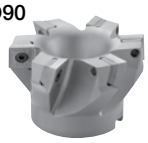
Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MFWN Face Mill**  E42	• Economical 6-edge Insert • Superior fracture resistance due to thick edge design • Dynamic slant design reduces shock when cutting edge enters the workpiece • Low cutting forces • End mills have weldon or cylindrical shanks		
	MFWN End Mill  E45			

90° Lead Angles (Heavy Milling)

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0° (Long Cutting Edge)	**MEWH**  E29	• Low cutting force and sharp cutting performance • Excellent surface finish quality • Economical double-sided 4-edge inserts • High quality and stable machining during heavy milling applications		
	MEWH Shell Mill  E30	• MEWH shell mill		
	MSR  E59	• Low cutting force and resistance to chattering with notched insert • Chipbreaker design with specialized notches improves chip evacuation • Chipbreaker achieves stabilized cutting for heavy roughing applications		
	MSR-BT50  E61	• Highly rigid, BT50 Arbor		

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0° (Long Cutting Edge)	**MECH**  E32	• Notched insert promotes higher productivity • Large depth of cut provides high efficiency cutting • MECH is the best solution for problems with heavy milling		
	MECH Shell Mill  E33	• MECH shell mill type		
	MECH-BT50 **MECH-BT50SA**  E33	• Highly rigid, integral BT50 arbor • Head exchangeable type is available (MECH-BT50SA)		
	MAP  E74	• Cutting dia. 1.000" • Low cutting force, good chip evacuation • High-efficiency machining		
	CEM  E75	• Cutting dia. 0.375" to 1.500" • For small milling machines		

90° Lead Angles

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MEC**  E15	• The twisted cutting edge improves cutting performance • Smooth surface of shoulder Wall • True 90° Corners • The silver coating prevents chip wear on the tool body • Available with coolant holes		
	MECX  E25	• 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 • Available with coolant holes		
	MSO90  E50	• Highly efficient multiple insert design • Safe design with shim • Lower weight with slim design		

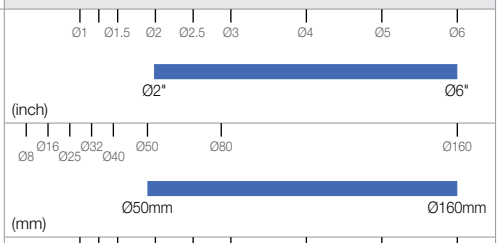
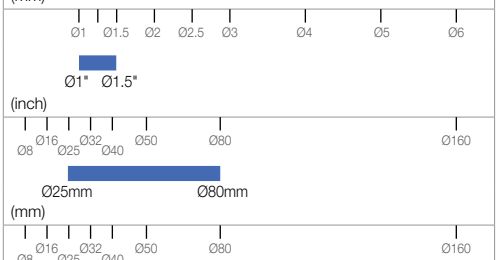
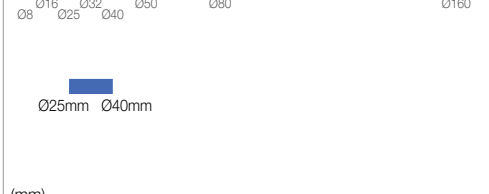
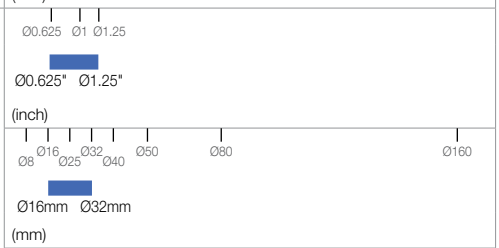
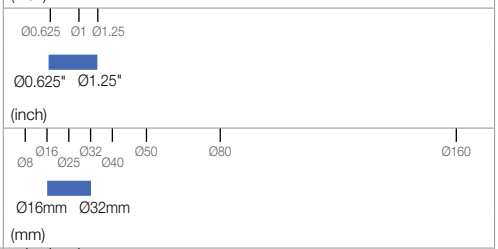
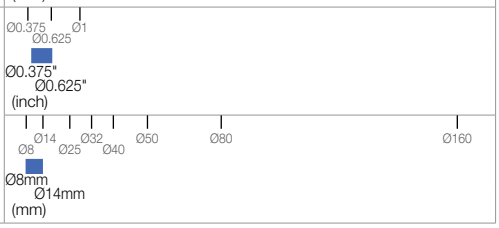
Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MSRS90**  E54	• Notched insert reduces cutting forces • Stable cutting without chatter • Neutral insert allows the possibility of various custom-ordered cutters		
	MTE90-SF (Easy Edge Adjustment)  E48	• A simplified adjusting mechanism eases the task of correcting cutting edge fluctuation • Silver coated		

90° Lead Angles

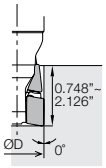
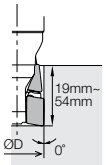
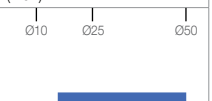
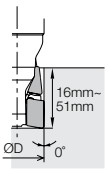
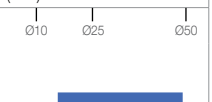
Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MEC**  E12	• High squareness • Low cutting force • The silver coating prevents chip wear on the tool body • With air hole (Over Ø16)		
	MEC Modular  E17			
	MECX  E24	• Good squareness • Small size Insert with multi-edge specification • Low cutting force • The silver coating prevents chip wear on the tool body • With air hole		
	EM  E70	• Extended length end mills		
	EM-LE  E71	• Long edge end mill		
	FM-90  E72	• Fixed pocket face mills		
	FM-AL  E73	• Aluminum cutting face mills • Fixed pocket		
	EM-AL  E73			

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MSO90-S**  E51	• Screw clamping & 4-edge insert reduces cost • Good chip evacuation • Low cutting force		
	MTE90  E49	• Low cutting force • For shouldering of Cast iron, Non-ferrous metals		
	MTP90  E49	• Medium to roughing of steel / cast iron • For small machines and M/C		
	DMC  E65	• For small milling machine, M/C		
	DMC-H  E67	• High rake type • For small milling machine, M/C		
	DMC-SX  E66	• For small milling machine, M/C		
	MTPS / MTES  E69	• For small dia., Low cutting force type		
	MEAL  E68	• For aluminum alloys • With air hole		

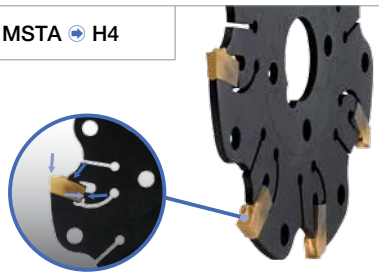
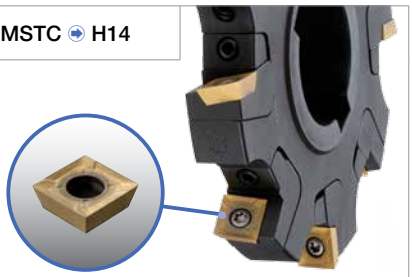
High Feed Cutters

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting	Pocketing	Cutting Dia. ØD
0°	**MFH Face Mill**  F4	• Various applications with 3 insert types  GM (General Milling)  LD (Large D.O.C.) MAX D.O.C. = 0.197" Available for Scale Removal  FL (Wiper Edge) Available for both Roughing and Finishing • Convex cutting edge reduces chatter and chip biting • Multi-functional cutter for ramping, helical milling, plunging etc. (GM type)				
	MFH End Mill  F7					
	MFH Modular  F10					
	MFH-Mini End Mill  F14	• Economical double-sided 4-edge insert  GM • High efficiency and high feed small diameter machining				
	MFH-Mini Face Mill  F16					
	MFH-Mini Modular  F17					
	MFH Micro  F22	• Smallest diameters in the MFH high feed milling series  GM				

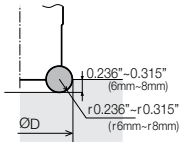
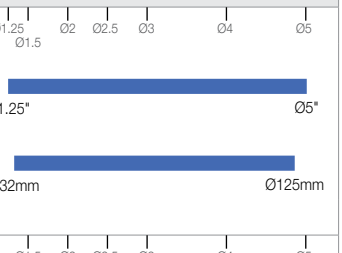
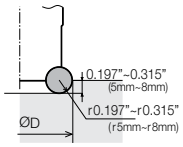
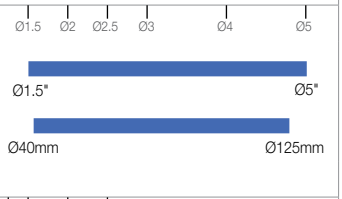
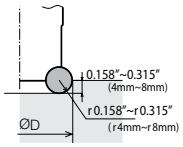
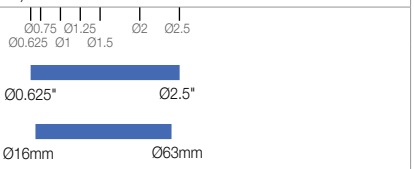
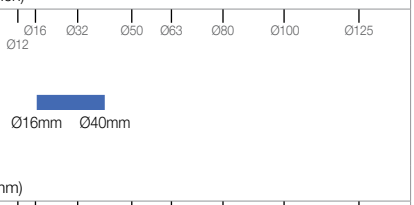
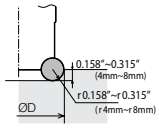
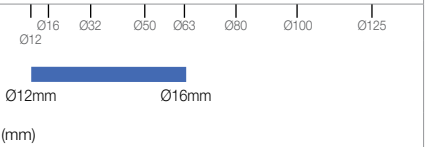
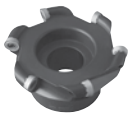
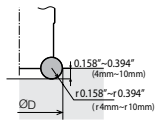
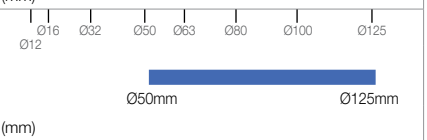
Multi-Function End Mills

Shape \ Applications	Facing	Shouldering	Slotting	Deep Slotting	Pocketing	Drilling	Lead Angle and MAX D.O.C.	Cutting Dia. ØD
MEY  G2	• Ultra drill mill • Multi-function cutting (drilling / ramping / shouldering / grooving) • High-efficiency mold cutting • 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		 (inch)  (mm)	 (inch)  (mm)
MEZ-G  G6	• Silver drill mill • Multi-function cutting • High-efficiency mold cutting • Low cutting force, Good chip evacuation		• The silver coating prevents chip wear on the tool body • The clearance groove prevents chip welding				 (mm)	 (mm)

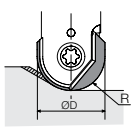
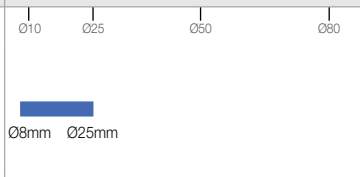
MST Slot Mills

MSTA H4	MSTB H8	MSTC H14
		
• Self-clamping system • Remove insert with appropriate wrench	• Easy screw on tangential clamped insert	• Adjustable slotting width due to unique cam adjustment structure

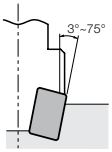
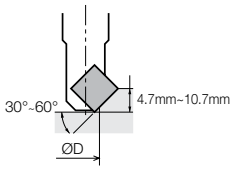
Radius Cutters

Shape \ Applications	Facing	Shouldering	Pocketing	Lead Angle and MAX D.O.C.	Cutting Dia. ØD
MRW (RAD-8)  J6	• High efficiency radius cutter with multiple-edge inserts • Combines sharpness and cutting edge strength (A.R. Max. +12°) • Prevents insert rotation during machining with flat lock structure • Wide application range from steel to heat-resistant alloys				
MRX (RAD-6) Face Mill  J13	• Low cutting force and high performance radius cutter • Low cutting force due to helical cutting-edge design (A.R. Max. +10°) • Prevents insert rotation during machining with flat lock structure • Wide application range including facing, grooving, pocketing and plunging • Wide application range from steel to heat-resistant alloys				
MRX (RAD-6) End Mill  J15					
MRX (RAD-6) Modular  J17					
MRP-S  J22	• For mold cutting • Recommended for various types of machining (contouring, helical milling, ramping, etc.) • Firm insert seat due to to new ratchet design				
MRP  J23					

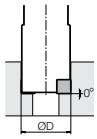
Ball-Nose End Mills

Shape \ Applications	Contouring / Profiling	Pocketing	Lead Angle and MAX D.O.C.	Cutting Dia. ØD
MRF  J2	• For high quality mold finishing • High R-accuracy (insert's R-accuracy: under ±0.01mm) • The bushing ensures insert installation accuracy			
MRFW  J2	• Carbide • For high quality mold finishing • High R-accuracy (Insert's R-accuracy: Under ±0.01mm) • The bushing ensures insert installation accuracy • Anti-vibration, and stable cutting is possible with long overhang length without chattering			

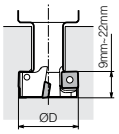
Chamfering

Applications / Shape	Chamfering	Countersinking	Back Chamfering	V Shape Slotting	Lead Angle and MAX D.O.C.
CM / CM-AL  K5	• Chamfering angles 3°-75° • CM-AL for aluminum cutting				
MCSE  K6	• Chamfering angles for 30°, 45°, 60° • Economical 4-sided insert • Available for back chamfering				

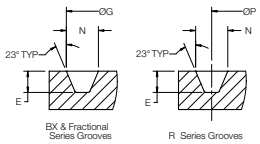
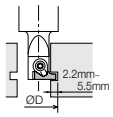
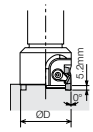
Counterboring

Applications / Shape	Bolt Counterboring	Facing	Shouldering	Lead Angle and MAX D.O.C.
MEF  K8	• Counterboring for hexagon socket bolt (M6~M30) • Economical S-type insert (4-Edge)			

T-Slotting

Applications / Shape	T-Slotting	Back Side Milling	Lead Angle and MAX D.O.C.
METS  K10	• T-Slotting • Recommended for high feed cutting with 2 flute design • Economical square insert (4 cutting edges)		

Grooving

Applications / Shape	Internal Grooving	Ring Grooving	API Ring Grooving	Lead Angle and MAX D.O.C.
API  K2			• The most economical and reliable tool to produce API ring grooves for the oil, gas, and petrochemical industries	
MGI  K12	• Edge Width 1.0~4.0mm • Grooving for machining centers			
MVG  K14		• Cutting dia.Ø30~Ø75mm • Edge width: 4.0~4.9mm • O-Ring grooving (G Series)		

Symbol	Shape
H	Hexagon
O	Octagon
P	Pentagon
S	Square
T	Triangle
C	80° Diamond
D	55° Diamond
E	75° Diamond
F	50° Diamond
M	86° Diamond
V	35° Diamond
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					
	Corner Height		Thickness		I.C. Size	
	ANSI (±inch)	ISO (±mm)	ANSI (±inch)	ISO (±mm)	ANSI (±inch)	ISO (±mm)
A	0.0002	0.005	0.0010	0.025	0.0010	0.025
F					0.0005	0.013
C	0.0005	0.013			0.0010	0.025
H					0.0005	0.013
E	0.0010	0.025	0.0010	0.025	0.0010	0.025
G			0.0050	0.130		
J	0.0002	0.005	0.0010	0.025	0.002~0.006	0.05~0.15
K*	0.0005	0.013				
L*	0.0010	0.025				
M*	0.003~0.007	0.080~0.180	0.0050	0.130		
N*			0.0010	0.025		
U*	0.005~0.015	0.130~0.380	0.0050	0.130	0.003~0.009	0.08~0.25
R	Blank with grind stock on all surfaces					
S	Blank with grind stock on top and bottom surface only					

Insert's periphery is as fired.
* Tolerance difference depends on size and shape of insert

③ Tolerance

I.C. Size (inch)	Symbol
5/32	1.2
3/16	1.5
7/32	1.8
1/4	2
5/16	2.5
3/8	3
7/16	3.5
1/2	4
9/16	4.5
5/8	5
11/16	5.5
3/4	6
7/8	7
1	8
1-1/4	10

⑤ I.C. Size (ANSI)

Inserts with Radius			
0	Sharp Corner	4	1/16" Radius
1	1/64" Radius	6	3/32" Radius
2	1/32" Radius	8	1/8" Radius
3	3/64" Radius		
Insert with Wiper Flats			
A	Square Insert 45° Chamfer		
D	Square Insert 30° Chamfer		
E	Square Insert 15° Chamfer		
F	Square Insert 3° Chamfer		
K	Square Insert 30° Double Chamfer		
L	Square Insert 15° Double Chamfer		
M	Square Insert 3° Double Chamfer		
N	Truncated Triangle Insert		
P	Flatted Corner Triangle		
X	Triangle Insert 15° Double Chamfer		

⑦ Cutting Point

Symbol	Insert
F	Sharp Edge
E	R-honed
T	Chamfered
S	Chamfered + R-honed

⑨ Edge Preparation

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
ANSI (inch)	S	E	K	N	4	2	A	F	T	N	
ISO (metric)	S	E	K	N	12	03	A	F	T	N	

④ Hole / Chipbreaker

Symbol	Insert
W	No Chipbreaker with Hole
T	Single-sided Chipbreaker with Hole
F	Double-sided Chipbreaker without Hole
N	No Chipbreaker without Hole
R	Single-sided Chipbreaker without Hole
M	Single-sided Chipbreaker with Hole
A	No Chipbreaker with Hole

⑤ Edge Length Symbol (ISO)

S, T, R, A, N, O, P, W

⑥ Thickness

ISO		ANSI	
Thickness (mm)	Symbol	Thickness (inch)	Symbol
1.59	01	1/16	1
1.98	T1	5/64	1.2
2.38	02	3/32	1.5
2.78	T2	-	-
3.18	03	1/8	2
3.97	T3	5/32	2.5
4.76	04	3/16	3
5.56	05	7/32	3.5
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 Cutting Edge Angle

Symbol	Cutting Edge 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 Tool Hand

R	Right-hand
L	Left-hand
N	Neutral

⑪ Manufacturer's Option

Chipbreaker, etc.

⑦⑧ Corner-R(rε)

ISO		ANSI	
Symbol	Corner-R(rε) (mm)	Symbol	Corner-R(rε) (inch)
04	0.40	1	1/64
08	0.80	2	1/32
12	1.20	3	3/64
16	1.60	4	1/16
20	2.00	5	5/64

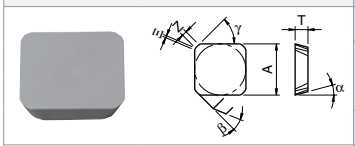
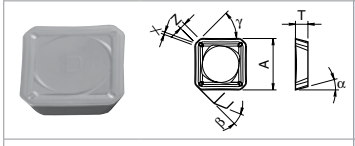
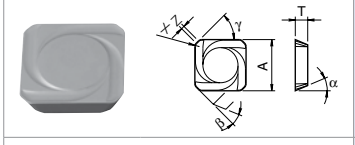
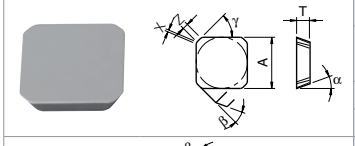
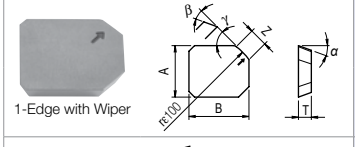
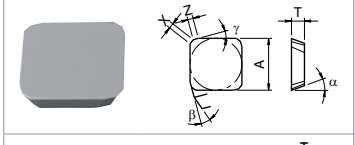
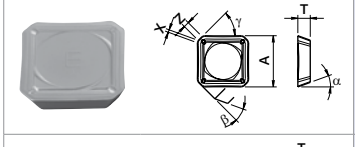
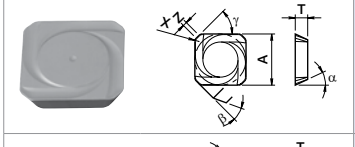
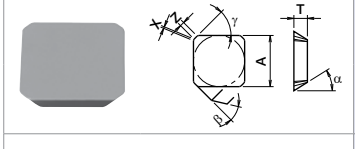
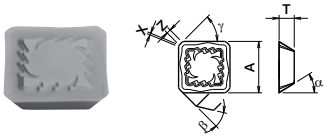
Milling Inserts

without Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN60	TN100M	TC60	CA6535	CA420M	PR1535	PR1225	PR1210	PR830	KW10
P	Free-Cutting Steel		■					★		★	
P	Carbon/Alloy Steel		■					★		★	
M	Stainless Steel							★			
K	Gray Cast Iron								★		☆
K	Nodular Cast Iron								★		
N	Non-ferrous Metals										★
S	Heat-Resistant Alloys							★			
S	Titanium Alloy								★		☆
H	Hard Materials							■		□	

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	Dimensions (in) A	T	X	Z	rε	Angle (°) α	β	γ	Cermet TN60	TN100M	TC60	CVD Coated Carbide CA6535	CA420M	MN* PR1535	MEGA COAT PR1225	PR1210	PVD* PR830	Carbide KW10	Toolholder Page
	SDCN 42AUTN	SDCN 1203AUTN	0.500	0.125	0.020	0.047	-	15°	23°	45°		○									-
	SDKN 42AUTN	SDKN 1203AUTN										○					○	○			
	42AUFN	1203AUFN																		○	
	(Use ISO Part Number)	SDKN 1504AUTN	0.625	0.187													○				
	SDKR 42AUEN-S	SDKR 1203AUEN-S	0.500	0.125	0.020	0.067	-	15°	23°	45°		○					○				-
	SDMR 42AUER-H	SDMR 1203AUER-H	0.500	0.125	0.039	0.031	-	15°	23°	45°							○				
	SEEN 42AFTN	SEEN 1203AFTN	0.500	0.125	0.020	0.055	-	20°	25°	45°		○									C18 C19
	SEKN 42AFTN	SEKN 1203AFTN										●	●				●	●	○		
	42AFFN	1203AFFN																		●	
	SEKN 43AFTN	SEKN 1204AFTN		0.187													●				-
	SEKN 53AFTN	SEKN 1504AFTN	0.625									●					●				
 1-Edge with Wiper	SEEN 42AFTR-W	SEEN 1203AFTR-W	0.500	0.125	-	0.138	B= 0.573	20°	25°	45°		○									C19
	42AFFR-W	1203AFFR-W																		○	
	SEKN 42EFTR	SEKN 1203EFTR	0.500	0.125	0.047	0.055	-	20°	25°	15°		○									D8
	SEKR 42AFEN-S	SEKR 1203AFEN-S	0.500	0.125	0.020	0.067	-	20°	25°	45°		●	○				●		○		C18 C19
	SEMR 42AFER-H	SEMR 1203AFER-H	0.500	0.125	R 0.039	0.039	-	20°	25°	45°									○		
	(Use ISO Part Number)	SOKN 13T3AXTN	0.531	0.156	0.020	0.043	-	27°	32°	45°		○					○	○			C22
		13T3AXFN																		○	
	(Use ISO Part Number)	SOKR 13T3AXEN-J	0.531	0.156	0.020	0.043	-	27°	32°	45°		○					○			○	

*MN: MEGACOAT NANO
*PVD: PVD Coated Carbide

SEEN-W inserts sold in 5 piece boxes.

Inserts sold in 10 piece boxes.

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

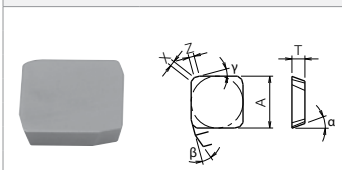
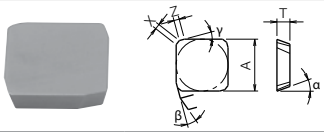
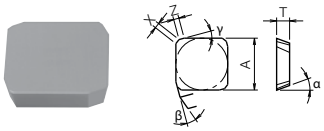
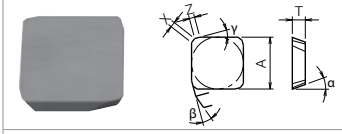
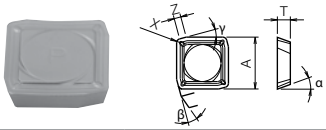
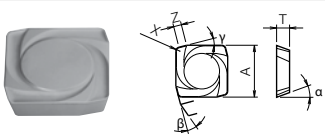
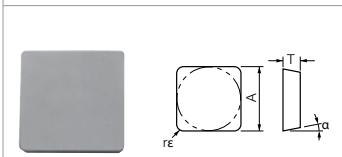
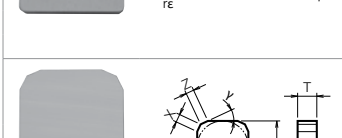
Milling Inserts

without Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN60	TN100M	TC60	CA6535	CA420M	PR1535	PR1225	PR1210	PR830	KW10
P	Free-Cutting Steel		■					★			
	Carbon/Alloy Steel		■					★			
M	Stainless Steel							★			
K	Gray Cast Iron					★			☆		☆
	Nodular Cast Iron					★			☆		
N	Non-ferrous Metals										★
S	Heat-Resistant Alloys							★			
	Titanium Alloy								★		☆
H	Hard Materials							■			

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	Dimensions (in) A	T	X	Z	rε	Angle (°) α	β	γ	TN60	TN100M	TC60	CA6535	CA420M	PR1535	PR1225	PR1210	PR830	KW10	Toolholder Page
	SPCN 42EDTR	SPCN 1203EDTR	0.500	0.125	R0.039	0.079	-	11°	15°	15°		○									
	SPKN 42EDTR	SPKN 1203EDTR			0.039							○					●				D8
	42EDTL	1203EDTL			R0.039													○				-
	42EDER	1203EDER				0.063						○									
	42EDFR	1203EDFR			0.039															○	D8
	SPKN 53EDTR	SPKN 1504EDTR	0.625	0.187		0.087						○					○	○			
	53EDFR	1504EDFR																		○	-
	SPEN 42EEER	SPEN 1203EEER	0.500	0.125	0.039	0.055	-	11°	20°	15°					○						
	42EESR	1203EESR																○			-
	SPCN 42XPTR	SPCN 1203XPTR	0.500	0.125	R0.039	0.079	-	11°	11°	25°		○									
	SPKN 42XPTR	SPKN 1203XPTR										○									
	42XPFR	1203XPFR			0.039															○	-
	SPKN 53XETR	SPKN 1504XETR	0.625	0.187					20°			○									
	SPCN 63EETR1	SPCN 1904EETR1	0.750	0.187	0.028	0.047	-	11°	20°	15°		○									-
	SPKR 42EDER-S	SPKR 1203EDER-S	0.500	0.125	R0.039	0.079	-	11°	15°	15°		○					○				D8
	SPMR 42EDER-H	SPMR 1203EDER-H	0.500	0.125	R0.039	0.079	-	11°	15°	15°							○				
	SPM 422	SPMN 120308	0.500	0.125	-	-	0.031	11°	-	-	○	○								○	
	423	120312					0.047				○	○									
	SPM 432	SPMN 120408		0.187			0.031								○			○			
	433	120412					0.047								○						-
	SPG 321	SPGN 090304	0.375	0.125			0.016													○	
	322	090308					0.031													○	
	SPG 421	SPGN 120304	0.500				0.016													○	
	422	120308					0.031				●		●							●	
	SNCN 43XNTN	SNCN 1204XNTN	0.500	0.187	0.079	0.079	-	-	-	25°		○									
	SNKN 43XNTN	SNKN 1204XNTN										○									-
	SNMF 43XNTN	SNMF 1204XNTN	0.500	0.187	0.079	0.079	-	-	-	25°		○									-
	SNM 432	SNMN 120408	0.500	0.187	-	-	0.031	-	-	-								○			
	433	120412					0.047								○			●			-
	436	120424					0.094								○						

*MN: MEGACOAT NANO
*PVD: PVD Coated Carbide

● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

Inserts sold in 10 piece boxes.

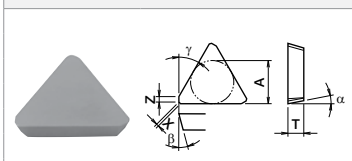
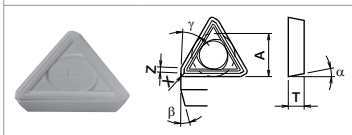
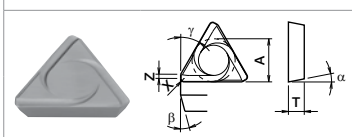
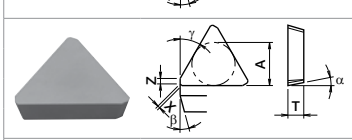
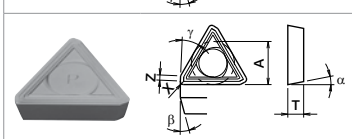
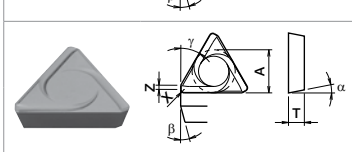
Milling Inserts

without Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN60	TN100M	TC60	CA6535	CA420M	PR1535	PR1225	PR1210	PR830	KW10
P	Free-Cutting Steel		■					★		★	
P	Carbon/Alloy Steel		■					★		★	
M	Stainless Steel							★			
K	Gray Cast Iron								★		☆
K	Nodular Cast Iron								★		
N	Non-ferrous Metals										★
S	Heat-Resistant Alloys							★			
S	Titanium Alloy								★		☆
H	Hard Materials							■		□	

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	A	T	X	Z	rε	α	β	γ	TN60	TN100M	TC60	CA6535	CA420M	PR1535	PR1225	PR1210	PR830	KW10	Toolholder Page
	TEKN 32PTTR	TEKN 1603PTTR	0.375	0.125	R0.031	0.039	-	20°	22°	30°		○					○				E69
					0.028	0.055												○			
	32PTFR	1603PTFR	0.375	0.125	0.028	0.055	-	20°	22°	30°										○	
	TEEN 43PTTR	TEEN 2204PTTR	0.500	0.187	R0.039							○									E48 E49
	TEKN 43PTTR	TEKN 2204PTTR	0.500	0.187	R0.039	0.055	-	20°	22°	30°		○					○		○		
					0.028													○			
	43PTFR	2204PTFR	0.500	0.187	0.028	0.055	-	20°	22°	30°										○	
	TEKR 43PTER-S	TEKR 2204PTER-S	0.500	0.187	R0.039	0.055	-	20°	22°	30°		○					○		○		E48 E49
	TEMR 32PTER-H	TEMR 1603PTER-H	0.375	0.125	R0.031	0.047	-	20°	22°	30°							○				E69
	TEMR 43PTER-H	TEMR 2204PTER-H	0.500	0.187	R0.039	0.055											○		○		E48 E49
	TPK 32PDTR	TPKN 1603PDTR	0.375	0.125	0.028	0.047	-	11°	15°	30°		○					○	○			E49
	32PDFR	1603PDFR																		●	
	TPK 43PDTR	TPKN 2204PDTR	0.500	0.187	0.028	0.063						○	●				○	○			
	43PDFR	2204PDFR																		○	
	TPKR 43PDER-S	TPKR 2204PDER-S	0.500	0.187	R0.039	0.055	-	11°	15°	30°		○					○				E49
	TPMR 32PDER-H	TPMR 1603PDER-H	0.375	0.125	R0.031	0.047	-	11°	15°	30°							○				E49
	TPMR 43PDER-H	TPMR 2204PDER-H	0.500	0.187	R0.039	0.055											○				
	TPM 221	TPMN 110304	0.250	0.125	-	-	0.016	11°	-	-										○	E49
	222	110308					0.031													○	E69
	321	160304	0.375				0.016					○								●	
	322	160308					0.031					○	●							○	E49
	323	160312					0.047					○	●								
	432	220408	0.500	0.187			0.031					○	●								-
	TPG 181505	TPGN 090202	0.219	0.094			0.008				○									○	
	18151	090204					0.016				●									○	-
	18152	090208					0.031				○										
	2205	110302	0.250	0.125			0.008				●									○	
	221	110304					0.016				●									○	E49 E69
	222	110308					0.031				●									○	
	321	160304	0.375				0.016				●									●	
	322	160308					0.031				●	●	●							●	E49
	323	160312					0.047				●		●							○	

Cutting Range	Chipbreaker		Features
Finishing-Roughing	S		S chipbreaker for general-purpose machining. Low cutting resistance due to 13° chipbreaker rake angle. Recommended for various depths of cut with 3-step chipbreaker design. Ground wiper edge enables good surface finishes.
Medium-Finishing	H		H chipbreaker for general-purpose machining. Smooth chip evacuation due to the chipbreaker's smooth rake face. 20% less cutting force than flat-top inserts due to a 25° rake angle chipbreaker.

Inserts sold in 10 piece boxes.

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

Milling Inserts

with Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		Cermet	CVD Coated Carbide		MEGACOAT NANO			MEGA COAT		DLC*	Carbide
		TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	PDL025	GW25
P	Free-Cutting Steel					★					
	Carbon/Alloy Steel					★					
M	Austenitic Stainless Steel				★	☆					
	Martensitic Stainless Steel		★		☆						
	Precipitation Hardened Stainless Steel				★						
K	Gray Cast Iron						★				
	Nodular Cast Iron						★				
N	Non-ferrous Metals									★	☆
S	Heat-Resistant Alloys		★		☆						
	Titanium Alloy				★						
H	Hard Materials					■					

Insert (Right-hand Shown)	Part Number	A	T	Ød	W (X)	Z	rε	α	β	γ	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	PDL025	GW25	Toolholder Page
 General Purpose	LOGU 030310ER-GM	0.244	0.156	0.136	0.469	-	0.039	-	-	-		●		●	●	●					F14 F15 F16 F17
 General Purpose	LOMU 100404ER-GM	0.260	0.157	0.134	0.429	0.083	0.016	-	-	-		●		●	●	●					E4 E5 E6 E7 E8 E29
	100408ER-GM					0.067	0.031					●		●	●	●					
	100412ER-GM					0.051	0.047					○		●	●	●					
	100416ER-GM					0.039	0.063					●		●	●	●					
	100420ER-GM					0.039	0.079					○		●	●	●					
	LOMU 150504ER-GM	0.362	0.220	0.189	0.618	0.087	0.016	-	-	-		●		●	●	○					
	150508ER-GM					0.071	0.031					●		●	●	●					
	150510ER-GM					0.063	0.039								●						
	150512ER-GM					0.055	0.047					○		●	●	●					
	150516ER-GM					0.039	0.063					●		●	●	●					
	150520ER-GM					0.024	0.079					○		●	●	●					
 Low Cutting Force	LOMU 100408ER-SM	0.260	0.157	0.134	0.429	0.067	0.031	-	-	-		○		●	●	●					
	LOMU 150508ER-SM	0.362	0.220	0.189	0.618	0.071	0.031					○		●	●	●					
 Tough Edge (Heavy Milling)	LOMU 100408ER-GH	0.260	0.157	0.134	0.429	0.067	0.031	-	-	-		○		●	●	●					
	LOMU 150508ER-GH	0.362	0.220	0.189	0.618	0.071	0.031					○		●	●	●					
 Aluminum / Non-Ferous Metals (2-Edge)	LOGT 100408FR-AM	0.268	0.157	0.142	0.437	0.110	0.031	-	-	-									●	●	E4 E5 E6 E7 E8
	150508FR-AM	0.350	0.220	0.193	0.626	0.110	0.031												●	●	
 General Purpose	LPGT 010210ER-GM	0.165	0.086	0.083	0.247	-	0.039	-	-	-		●		●	●						F22

*DLC: DLC Coated Carbide

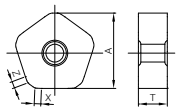
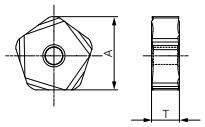
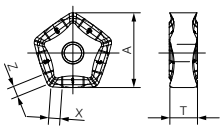
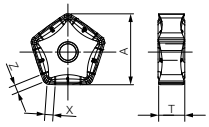
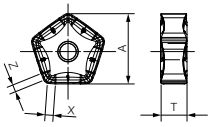
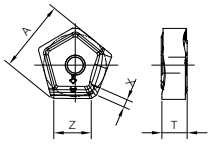
● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

Inserts sold in 10 piece boxes.

Milling Inserts
with Hole

Usage Classification
★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050
P	Free-Cutting Steel										
	Carbon/Alloy Steel										
M	Austenitic Stainless Steel										
	Martensitic Stainless Steel										
	Precipitation Hardened Stainless Steel										
K	Gray Cast Iron			★		■	☆			★	☆
	Nodular Cast Iron			★		■	☆			☆	★
N	Non-ferrous Metals										
S	Heat-Resistant Alloys										
	Titanium Alloy										
H	Hard Materials										

Insert (Right-hand Shown)		Part Number	Dimensions (in)						Angle (°)			Cermet	CVD Coated Carbide		MEGACOAT NANO			MEGA COAT		SNC*	CVD SNC*	Toolholder Page
			A	T	Ød	W (X)	Z	rε	α	β	γ	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050	
 High Speed		**PNEA 1106XNTN-T01020**	0.667	0.256	-	0.059	0.059	-	-	-	-									●	●	
 High Speed (with Chipbreaker)		**PNEG 1106XNTR-T00515**	0.672	0.250	-	-	-	-	-	-	-									●	●	
 Surface Finish Oriented		**PNEG 1106XNEN-GL**	0.676	0.250	-	0.102	0.102							●		●	●					C10 C11
 General Purpose		**PNMG1106XNEN-GM**	0.678	0.250	-	0.079	0.079	-	-	-	-			●		●	●					
 Tough Edge		**PNMG1106XNEN-GH**												●		○	●					
 Wiper Insert (2-edge)		**PNEG 1106XNER-W**	0.709	0.250	-	0.079	0.394							●		●	●					

*SNC: Silicon Nitride Ceramic
*CVD SNC: CVD Coated Silicon Nitride Ceramic

PNEG-W inserts sold in 5 piece boxes.
Inserts sold in 10 piece boxes.

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

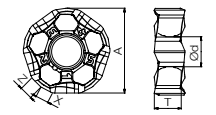
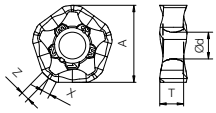
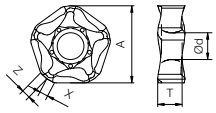
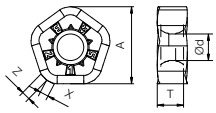
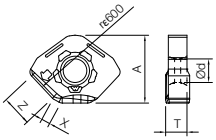
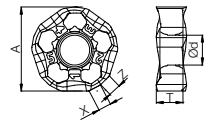
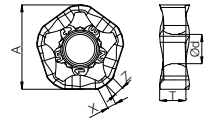
Milling Inserts

with Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		Cermet	CVD Coated Carbide		MEGACOAT NANO			MEGA COAT		SNC*	CVD SNC*
		TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050
P	Free-Cutting Steel	■				★		☆			
	Carbon/Alloy Steel	■				★		☆			
M	Austenitic Stainless Steel				★	☆		☆			
	Martensitic Stainless Steel		★		☆						
	Precipitation Hardened Stainless Steel				★						
K	Gray Cast Iron						★		☆		
	Nodular Cast Iron						★		☆		
N	Non-ferrous Metals										
S	Heat-Resistant Alloys		★		☆			☆			
	Titanium Alloy				★				☆		
H	Hard Materials					■					

Insert (Right-hand Shown)		Part Number	Dimensions (in) A	T	Ød	W (X)	Z	rε	Angle (°) α	β	γ	Toolholder Page
 Ground Edge High Precision (Finishing)		**PNEU 1205ANER-GL**	0.689	0.219	0.244	0.106	0.106	-	-	-	-	C2 C3 C4
 General Purpose		**PNMU1205ANER-GM**	0.704	0.219	0.244	0.079	0.079	-	-	-	-	
 Low Cutting Force		**PNMU1205ANER-SM**										
 Tough Edge (Heavy Milling)		**PNMU1205ANER-GH**	0.708	0.243	0.244	0.079	0.079	-	-	-	-	
 Wiper Insert (2-edge)		**PNEU 1205ANER-W**	0.703	0.219	0.244	0.091	0.319	-	-	-	-	
 Ground Edge High Precision (Finishing)		**PNEU 1205ANEL-GL**	0.689	0.219	0.244	0.106	0.106	-	-	-	-	C3
 General Purpose		**PNMU1205ANEL-GM**	0.704	0.219	0.244	0.079	0.079	-	-	-	-	

*SNC: Silicon Nitride Ceramic
*CVD SNC: CVD Coated Silicon Nitride Ceramic

● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

PNEU-W inserts sold in 5 piece boxes.
Inserts sold in 10 piece boxes.

Milling Inserts

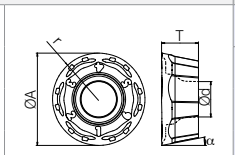
with Hole

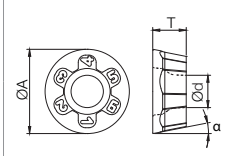
Usage Classification

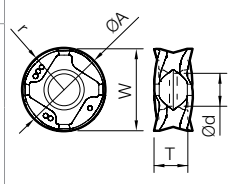
★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050
P	Free-Cutting Steel					★					
	Carbon/Alloy Steel					★					
M	Austenitic Stainless Steel				★	☆					
	Martensitic Stainless Steel		★		☆						
	Precipitation Hardened Stainless Steel				★						
K	Gray Cast Iron						★				
	Nodular Cast Iron						★				
N	Non-ferrous Metals										
S	Heat-Resistant Alloys		★		☆						
	Titanium Alloy				★						
H	Hard Materials					■					

Insert (Right-hand Shown)	Part Number	A	T	Ød	W (X)	Z	rε	α	β	γ	Toolholder Page
 General Purpose (G-Class)	RDGT 0803M0ER-GM	0.315	0.125	0.118	-	-	0.157	15°	-	-	J15~J17
	RPGT 10T3M0ER-GM	0.394	0.156	0.138			0.197				
	1204M0ER-GM	0.472	0.187	0.181			0.236	11°			J13 ~ J17
	1605M0ER-GM	0.630	0.219	0.228			0.315				
 General Purpose (M-Class)	RDMT 0803M0ER-GM	0.315	0.125	0.118	-	-	0.157	15°	-	-	J15~J17
	RPMT 10T3M0ER-GM	0.394	0.156	0.138			0.197				
	1204M0ER-GM	0.472	0.187	0.181			0.236	11°			J13 ~ J17
	1605M0ER-GM	0.630	0.219	0.228			0.315				
 For Stainless Steel / Low Cutting Force	RDGT 0803M0ER-SM	0.315	0.125	0.118	-	-	0.157	15°	-	-	J15~J17
	RPGT 10T3M0ER-SM	0.394	0.156	0.138			0.197				
	1204M0ER-SM	0.472	0.187	0.181			0.236	11°			J13 ~ J17
	1605M0ER-SM	0.630	0.219	0.228			0.315				
 Tough Edge (Heavy Milling)	RDMT 0803M0EN-GH	0.315	0.125	0.118	-	-	0.157	15°	-	-	J15~J17
	RPMT 10T3M0EN-GH	0.394	0.156	0.138			0.197				
	1204M0EN-GH	0.472	0.187	0.181			0.236	11°			J13 ~ J17
	1605M0EN-GH	0.630	0.219	0.228			0.315				
 Flat Top (Heavy Milling)	RPMW 1204M0TN	0.472	0.187	0.181	-	-	0.236	11°	-	-	J13 ~ J17
	1605M0TN	0.630	0.219	0.228			0.315				
 General Purpose	ROMU 1204M0ER-GM	0.472	0.187	0.181	0.465	-	0.236	-	-	-	J6 ~ J9
	1605M0ER-GM	0.630	0.216	0.244	0.622		0.315				
 Low Cutting Force	ROMU 1204M0ER-SM	0.472	0.187	0.181	0.465		0.236				
	1605M0ER-SM	0.630	0.216	0.244	0.622		0.315				
 Tough Edge (Heavy Milling)	ROMU 1204M0ER-GH	0.472	0.187	0.181	0.465		0.236				
	1605M0ER-GH	0.630	0.216	0.244	0.622		0.315				







*SNC: Silicon Nitride Ceramic
*CVD SNC: CVD Coated Silicon Nitride Ceramic

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

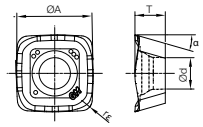
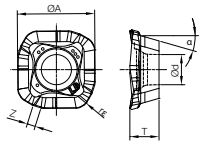
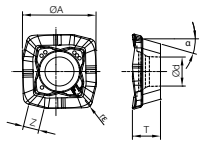
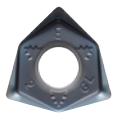
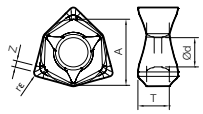
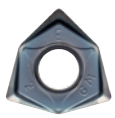
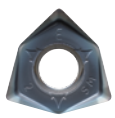
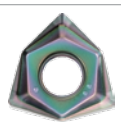
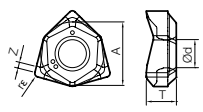
Milling Inserts

with Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050	PDL025	GW25
P	Free-Cutting Steel					★							
	Carbon/Alloy Steel					★							
M	Austenitic Stainless Steel				★	☆							
	Martensitic Stainless Steel		★		☆								
	Precipitation Hardened Stainless Steel				★								
K	Gray Cast Iron						★						
	Nodular Cast Iron						★						
N	Non-ferrous Metals											★	☆
S	Heat-Resistant Alloys		★		☆								
	Titanium Alloy				★								
H	Hard Materials					■							

Insert (Right-hand Shown)		Part Number	A	T	Ød	W (X)	Z	rε	α	Cermet	CVD Coated Carbide		MEGACOAT NANO			MEGA COAT		SNC*	CVD SNC*	DLC*	Carbide	Toolholder Page
										TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050	PDL025	GW25	
 General Purpose		SOMT 100420ER-GM	0.406	0.180	0.181	-	-	0.079	16°		●		●	●	●							F4 F5 F7 F8 F9 F10
		140520ER-GM	0.557	0.219	0.228						●		●	●	●							
 Large D.O.C.		SOMT 100420ER-LD	0.411	0.180	0.181	-	0.035	0.079	16°		●		●	●	●							
		140520ER-LD	0.581	0.219	0.228		0.063				●		●	●	●							
 Wiper Edge		SOMT 100420ER-FL	0.411	0.180	0.181	-	0.055	0.079	16°		●		●	●	●							
		140514ER-FL	0.574	0.219	0.228		0.122	0.055			○		●	●	●							
 Surface Finish Oriented (Ground Tolerance)		WNEU 080608EN-GL	0.552	0.262	0.244	-	0.059	0.031	-		○		●	●	●							E42 E43 E45
 General Purpose		WNMU 080604EN-GM					0.067	0.016			○		●	●	●							
		080608EN-GM					0.051	0.031			○		●	●	●							
 Low Cutting Force		WNMU 080608EN-SM									○		●	●	●							
 Tough Edge (Heavy Milling)		WNMU 080608EN-GH	0.552	0.262	0.244	-	0.051	0.031			○		○	●	●							
 Aluminum / Non-Ferous Metals (3-Edge)		WNGT 080608FN-AM					0.059	0.031												●	●	

*DLC: DLC Coated Carbide
*SNC: Silicon Nitride Ceramic
*CVD SNC: CVD Coated Silicon Nitride Ceramic

● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

Inserts sold in 10 piece boxes.

Milling Inserts

with Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		Cermet	CVD*	MN*	MEGACOAT			PVD*	DLC*	Carbide
		TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	PDL025	GW25
P	Free-Cutting Steel	■			★	★		☆		
	Carbon/Alloy Steel	■			★	★		☆		
M	Austenitic Stainless Steel			★	☆	☆		☆		
	Martensitic Stainless Steel		★	☆						
	Precipitation Hardened Stainless Steel			★						
K	Gray Cast Iron						★			
	Nodular Cast Iron						★			
N	Non-ferrous Metals								★	☆
S	Heat-Resistant Alloys		★	☆	★	★				
	Titanium Alloy			★			★			☆
H	Hard Materials				■			□		

Insert (Right-hand Shown)	Part Number	A	T	Ød	W (X)	rε (Z)	α	β	γ	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	PDL025	GW25	Toolholder Page
	APKT 1003PDER-V	0.265	0.125	0.110	0.413	0.016	11°	15°	-	●			●		○	○			E74
	100308PDER-V					0.031							●		●				
	APKT 1604PDER-V	0.375	0.187	0.177	0.669	0.031				●			●		●	○			
	160416PDER-V					0.063				○									
3-Notch	APMT 250608ER-NB3	0.625	0.250	0.256	0.984	0.031	15°	11°	-					●	●	●			E59
	250616ER-NB3					0.063								●	●	●			E60
	250640ER-NB3					0.157								●	○	○			E61
	APMT 250616EL-NB3					0.063								○		○			-
4-Notch	APMT 250608ER-NB4	0.625	0.250	0.256	0.984	0.031	15°	11°	-					●	●	●			E59
	250616ER-NB4					0.063								●	●	●			E60
	250640ER-NB4					0.157								●	○	○			E61
	APMT 250616EL-NB4					0.063								○		●			-
3-Notch / Low Cutting Force	APMT 250616ER-NB3P	0.625	0.250	0.256	0.984	0.063	15°	11°	-					○	●	○			E59 E60 E61
4-Notch / Low Cutting Force	APMT 250616ER-NB4P	0.625	0.250	0.256	0.984	0.063	15°	11°	-					○	●	○			E59 E60 E61
	BDMT 070302ER-JS	0.181	0.102	0.091	0.264	0.008	16°	15°	-		○	○	●			●			E24
	070304ER-JS					0.016					○	○	●			●			E25
	070308ER-JS					0.031					○	○	●			●			
	BDMT 070302ER-JT					0.008					○	○	●		○	○			
	070304ER-JT					0.016					○	○	●		●	●			
	070308ER-JT					0.031					○	●	●		●	●			
Non-ferrous Metals	BDGT 11T302FR-JA	0.264	0.150	0.110	0.433	0.008	18°	13°	-								○	○	
	11T304FR-JA					0.016											●	●	E12
	11T308FR-JA					0.031											●	●	E13
	BDGT 170404FR-JA	0.378	0.193	0.173	0.669	0.016	18°	13°	-								●	●	E14
	170408FR-JA					0.031											●	●	E15
	170420FR-JA					0.079											●	●	E16
	170431FR-JA					0.122											●	●	E17
Staniless Steel / Low Cutting Force	BDMT 110302ER-JS	0.248	0.118	0.110	0.433	0.008	18°	15°	-		○	○	●			○			E12
	110304ER-JS					0.016					○	○	●			○			E13
	110308ER-JS					0.031					○	○	●			●			E14
	BDMT 11T302ER-JS	0.264	0.150	0.110	0.433	0.008	18°	13°	-		○	○	●			○			E12
	11T304ER-JS					0.016					●	●	●			●			E13
	11T308ER-JS					0.031					●	●	●			●			E14
	BDMT 170404ER-JS	0.378	0.193	0.173	0.669	0.016	18°	13°	-		○	○	●			●			E15
	170408ER-JS					0.031					●	●	●			●			E16 E17

*CVD: CVD Coated Carbide
*MN: MEGACOAT NANO
*PVD: PVD Coated Carbide
*DLC: DLC Coated Carbide

KYOCERA

Inserts sold in 10 piece boxes.

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

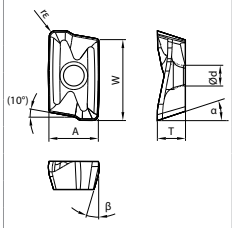
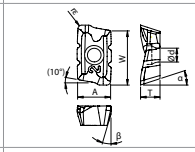
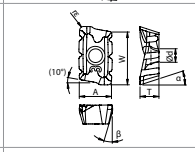
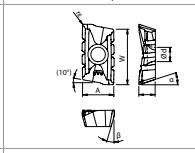
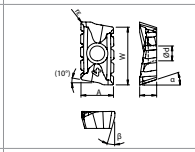
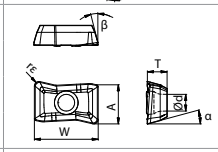
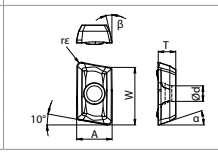
Milling Inserts

with Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		Cermet	CVD*	MN*	MEGACOAT			PVD*	Carbide
		TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	GW25
P	Free-Cutting Steel	■			★	★		☆	
	Carbon/Alloy Steel	■			★	★		☆	
M	Austenitic Stainless Steel			★	☆	☆		☆	
	Martensitic Stainless Steel		★	☆					
	Precipitation Hardened Stainless Steel			★					
K	Gray Cast Iron						★		
	Nodular Cast Iron						★		
N	Non-ferrous Metals								
S	Heat-Resistant Alloys		★	☆	★	★			
	Titanium Alloy			★			★		
H	Hard Materials				■			□	

Insert (Right-hand Shown)	Part Number	Dimensions (in) A	T	Ød	W (X)	rε (Z)	Angle (°) α	β	γ	Toolholder Page
 	BDMT 110302ER-JT	0.248	0.118	0.110	0.433	0.008	18°	15°	-	E12
	BDMT 110304ER-JT					0.016				E13
	BDMT 110308ER-JT					0.031				E14
	BDMT 11T302ER-JT	0.264	0.150	0.110	0.433	0.008	18°	13°	-	
	BDMT 11T304ER-JT					0.016				
	BDMT 11T308ER-JT					0.031				
	BDMT 11T312ER-JT					0.047				
	BDMT 11T316ER-JT					0.063				
	BDMT 11T320ER-JT					0.079				
	BDMT 11T324ER-JT					0.094				
	BDMT 11T331ER-JT					0.122				
	BDMT 170404ER-JT	0.378	0.193	0.173	0.669	0.016	18°	13°	-	
	BDMT 170408ER-JT					0.031				
	BDMT 170412ER-JT					0.047				
	BDMT 170416ER-JT					0.063				
	BDMT 170420ER-JT					0.079				
	BDMT 170424ER-JT					0.094				
	BDMT 170431ER-JT					0.122				
	BDMT 170440ER-JT					0.157				
 2-Notch	 BDMT 11T308ER-N2	0.264	0.150	0.110	0.433	0.031	18°	13°	-	
 3-Notch	 BDMT 11T308ER-N3	0.264	0.150	0.110	0.433	0.031	18°	13°	-	E32 E33 E34 E35
 3-Notch	 BDMT 170408ER-N3	0.378	0.193	0.173	0.669	0.031	18°	13°	-	
 4-Notch	 BDMT 170408ER-N4	0.378	0.193	0.173	0.669	0.031	18°	13°	-	
	 GOMT 08T208ER-D	0.205	0.109	0.091	0.343	0.031	13°	17°	-	G2
	100308ER-D	0.258	0.130	0.110	0.421					
	13T308ER-D	0.329	0.152	0.134	0.520					
	160408ER-D	0.395	0.187	0.173	0.657					
	 JOMT 08T208ER-D	0.202	0.109	0.091	0.335	0.031	17°	13°	-	
	100308ER-D	0.252	0.125	0.110	0.402					
	13T308ER-D	0.318	0.146	0.134	0.520					
	160408ER-D	0.383	0.177	0.173	0.657					

*CVD: CVD Coated Carbide *PVD: PVD Coated Carbide
*MN: MEGACOAT NANO

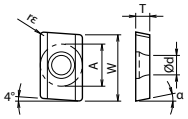
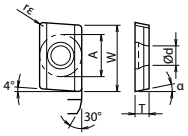
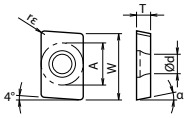
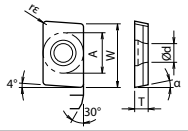
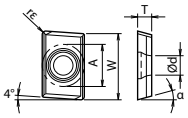
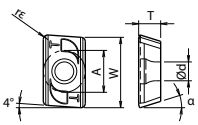
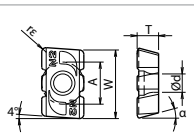
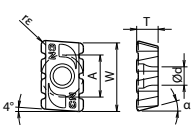
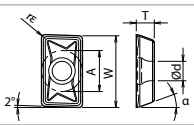
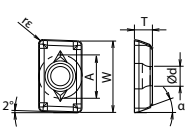
● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

Inserts sold in 10 piece boxes.

Milling Inserts
with Hole

Usage Classification
★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN100M	TC60	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10
P	Free-Cutting Steel	■				★			☆	
	Carbon/Alloy Steel	■				★			☆	
M	Stainless Steel					★				
K	Gray Cast Iron							★		☆
	Nodular Cast Iron							★		
N	Non-ferrous Metals									★
S	Heat-Resistant Alloys					★				
	Titanium Alloy							★		☆
H	Hard Materials					■			□	

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	A	T	Ød	W (X)	rε (Z)	α	β	γ	TN100M	TC60	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10	Toolholder Page
 	NDCT 831R-B	NDCT 090204R-B	0.250	0.094	0.110	0.374	0.016	15°	-	-	●	●								E75
	NDCT 831TR	NDCT 090204TR									○									E65
	NDCT 831FR	NDCT 090204FR																	○	E75
	NDCT 832R-B	NDCT 090208R-B					0.031				●	●								E75
	NDCT 032TR	NDCT 120208TR	0.313	0.094	0.134	0.500	0.031	15°	-	-	○									E65
	NDCT 032FR	NDCT 120208FR																	○	E75
	NDCT 322FR-B	NDCT 150308FR-B	0.375	0.125	0.177	0.591	0.031	15°	-	-									●	E75
	NDCT 322FR	NDCT 150308FR																	○	E66 E75
 	NDCT 322TRX	NDCT 150308TRX	0.375	0.125	0.173	0.591	0.031	15°	-	-	○									E66 E67
 	NDCW 032TR	NDCW 120208TR	0.313	0.094	0.134	0.500	0.031	15°	-	-	○	●								E75
	NDCW 3205TR	NDCW 150302TR	0.375	0.125	0.177	0.591	0.008	15°	-	-	○									E66
	NDCW 321TR	NDCW 150304TR					0.016				●	●								
	NDCW 322TR	NDCW 150308TR					0.031				●	●								
	NDCW 325TR	NDCW 150320TR					0.079				○									
	NDCW 3275TR	NDCW 150330TR					0.118				○									
	NDCW 3210TR	NDCW 150340TR					0.157				○									
 	NDCW 322TRX	NDCW 150308TRX	0.375	0.125	0.173	0.591	0.031	15°	-	-	○									E66 E67
	322FRX	150308FRX																	○	E75
 	NDMM 831ER-SP	NDMM 090204ER-SP	0.250	0.094	0.110	0.374	0.016	15°	-	-	●	●								E65
	NDMM 031ER-SP	NDMM 120204ER-SP	0.313	0.094	0.134	0.500	0.016				○									E75
	032ER-SP	120208ER-SP					0.031				○									
	NDMM 321ER-SP	NDMM 150304ER-SP	0.375	0.125	0.173	0.591	0.016				○									E66
	322ER-SP	150308ER-SP					0.031				○									E67 E75
 	(Use ISO Part Number)	NDMM 12T308ER-T	0.298	0.156	0.134	0.500	0.031	15°	-	-	○							○	●	
 2-Notch 	(Use ISO Part Number)	NDMM 12T308ER-N2	0.307	0.156	0.134	0.500	0.031	15°	-	-	○								○	-
 3-Notch 	(Use ISO Part Number)	NDMM 12T308ER-N3	0.307	0.156	0.134	0.500	0.031	15°	-	-	○								○	
 	(Use ISO Part Number)	NDMT 080208ER-D	0.200	0.094	0.087	0.335	0.031	15°	-	-	○				○		○		○	G6
		NDMT 10T208ER-D	0.247	0.109	0.110	0.402					○				○		○		●	
		NEMT 120308ER-D	0.302	0.125	0.134	0.500	0.031	20°	-	-	○				○		○		●	
		NEMT 16T308ER-D	0.364	0.156	0.173	0.638					○				○		●		●	
 Tough Edge 	(Use ISO Part Number)	NDMT 080208ER-DH	0.200	0.094	0.087	0.335	0.031	15°	-	-	○				○		○			
		NDMT 10T208ER-DH	0.247	0.109	0.110	0.402					○				○		○		○	
		NEMT 120308ER-DH	0.302	0.125	0.134	0.500	0.031	20°	-	-	○				○		○		○	
		NEMT 16T308ER-DH	0.364	0.156	0.173	0.638					○				○		○		○	

*CVD: CVD Coated Carbide *PVD: PVD Coated Carbide
*MN: MEGACOAT NANO

KYOCERA

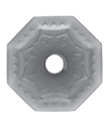
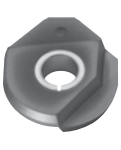
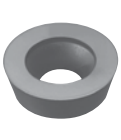
Inserts sold in 10 piece boxes.

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

Milling Inserts
with Hole

Usage Classification
★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		Cermet	CVD*	MN*	MEGACOAT			PVD Coated Carbide		Carbide
		TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	PR915	KW10
P	Free-Cutting Steel	■			★	★		☆		
P	Carbon/Alloy Steel	■			★	★		☆		
M	Stainless Steel				★	★				
K	Gray Cast Iron						★			☆
K	Nodular Cast Iron						★			
N	Non-ferrous Metals									★
S	Heat-Resistant Alloys				★	★				
S	Titanium Alloy						★			☆
H	Hard Materials				■	■		□		

Insert (Right-hand Shown)	Part Number	A	T	Ød	W (X)	rε (Z)	α	β	γ	Toolholder Page
	OFMR 070405EN-SH	0.708	0.194	-	-	Z= 0.047	26°	26°	45°	C16
	OFMR 070408EN-GT	0.703	0.202	-	-	Z= 0.043				
	OFMT 050405EN-GT	0.526	0.190	0.181	X= 0.020	Z= 0.055	26°	26°	45°	C14
	070408EN-GT	0.703	0.202	0.232	X= 0.031	Z= 0.047				
	OFMT 050405ER-SH	0.530	0.187	0.173	X= 0.020	Z= 0.067	26°	22°	45°	
	070405EN-SH	0.708	0.192	0.228		-		26°		
	RDFG 08FR	0.260	0.083	0.122	0.315	0.157	15°	-	-	J2
	10FR	0.315	0.106	0.142	0.394	0.197				
	12FR	0.370	0.126	0.161	0.472	0.236				
	16FR	0.445	0.165	0.201	0.630	0.315	10°	-	-	
	20FR	0.555	0.205	0.240	0.787	0.394				
	25FR	0.610	0.244	0.240	0.984	0.492				
	RDHX 0702M0T	0.276	0.094	0.110	-	-	15°	-	-	-
	1003M0T	0.394	0.125	0.150						
	12T3M0T	0.472	0.156							
 Tough Edge	RDMT 08T2M0-H	0.315	0.109	0.134	-	-	15°	-	-	J22 J23
 Low Cutting Force	RPMT 10T3M0	0.394	0.156	0.134	-	-	11°	-	-	
	1204M0	0.472	0.187	0.173						
 Tough Edge	RPMT 1204M0-H	0.472	0.187	0.173	-	-	11°	-	-	
	1606M0-H	0.630	0.250	0.217						
	2006M0-H	0.787	0.250	0.256						J23

*CVD: CVD Coated Carbide
*MN: MEGACOAT NANO

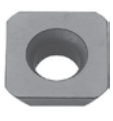
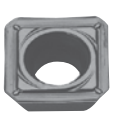
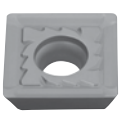
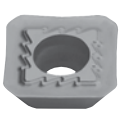
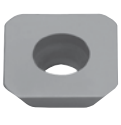
● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

RDFG inserts sold in 2 piece boxes.
Inserts sold in 10 piece boxes.

Milling Inserts
with Hole

Usage Classification
★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		Cermet	CVD*	MN*	MEGACOAT			PVD*	Carbide
		TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10
P	Free-Cutting Steel	■			★	★		☆	
P	Carbon/Alloy Steel	■			★	★		☆	
M	Stainless Steel				★	★			
K	Gray Cast Iron						★		☆
K	Nodular Cast Iron						★		
N	Non-ferrous Metals								★
S	Heat-Resistant Alloys				★	★			
S	Titanium Alloy						★		☆
H	Hard Materials				■			□	

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	Dimensions (in) A	T	Ød	W (X)	rε (Z)	Angle (°) α	β	γ	Toolholder Page
	(Use ISO Part Number)	SDKW 09T204TN	0.375	0.109	0.134	-	0.016	15°	-	-	K6
		SDKW 09T204FN									
	SEKW 421TN	SEKW 120304TN	0.500	0.125	0.217	-	0.016	20°	-	-	
	SEKW 421FN	SEKW 120304FN									
	SEKW 422TN	SEKW 120308TN					0.031				
	SEKW 422FN	SEKW 120308FN									
	(Use ISO Part Number)	SDKW 1204AESN	0.500	0.187	0.217	X= R0.039	Z= 0.059	15°	20°	45°	-
		1204AETN									
	SEKW 43AFTN	SEKW 1204AFTN				X= R0.020	Z= 0.067	20°	25°		-
	(Use ISO Part Number)	SDMT 1204AESR-H	0.500	0.187	0.217	X= R0.039	Z= 0.031	15°	20°	45°	-
 Low Cutting Force	SDMT 31.81C	SDMT 09T204C	0.375	0.109	0.134	-	0.016	15°	-	-	K6
	SEMT 421C	SEMT 120304C	0.500	0.125	0.217	-	0.016	20°	-	-	
	SDMT 221E-K	SDMT 060304E-K	0.250	0.125	0.110	-	0.016	15°	-	-	K10
	(Use ISO Part Number)	SDMT 080308E-K	0.315		0.134		0.031				
	SDMT 432E-K	SDMT 120408E-K	0.500	0.187	0.173						
	SEKT 43AFEN-S	SEKT 1204AFEN-S	0.500	0.187	0.217	X= 0.020	Z= 0.067	20°	25°	45°	
	(Use ISO Part Number)	SEMM 09T308PESR	0.375	0.156	0.134	-	0.031	20°	-	-	E51
		150408PESR	0.625	0.187	0.217						E50 E51
	(Use ISO Part Number)	SOMT 0903AXEN-J	0.375	0.125	0.134	X= 0.020	Z= 0.043	27°	32°	45°	C23
	(Use ISO Part Number)	SOMW 0903AXTN	0.375	0.125	0.134	X= 0.020	Z= 0.043	27°	32°	45°	
		0903AXFN									

*CVD: CVD Coated Carbide *PVD: PVD Coated Carbide
*MN: MEGACOAT NANO

Inserts sold in 10 piece boxes.

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

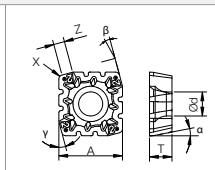
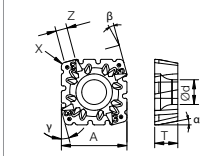
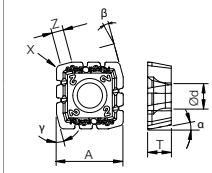
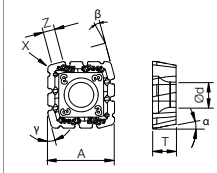
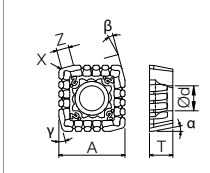
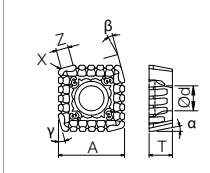
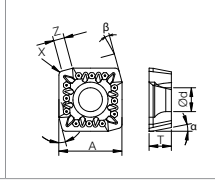
Milling Inserts

with Hole

Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		Cermet	CVD*	MN*	MEGACOAT			PVD*	Carbide
		TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10
P	Free-Cutting Steel				★	★		☆	
	Carbon/Alloy Steel				★	★		☆	
M	Stainless Steel				★	★			
K	Gray Cast Iron						★		
	Nodular Cast Iron						★		
N	Non-ferrous Metals								
S	Heat-Resistant Alloys				★	★			
	Titanium Alloy						★		
H	Hard Materials				■	■		□	

Insert (Right-hand Shown)		Part Number	Dimensions (in) A	T	Ød	W (X)	rε (Z)	Angle (°) α	β	γ	Toolholder Page
2-Notch / General Purpose		SPMT 1806EDER-NB2	0.709	0.250	0.268	X= R0.047	Z= 0.122	11°	15°	15°	D4 D5
3-Notch / General Purpose		SPMT 1806EDER-NB3	0.709	0.250	0.268	X= R0.047	Z= 0.122	11°	15°	15°	
2-Notch / Tough Edge		SPMT 1806EDSR-NB2T	0.709	0.250	0.268	X= R0.047	Z= 0.122	11°	15°	15°	D4 D5
		SPMT 1806EDSL-NB2T									-
3-Notch / Tough Edge		SPMT 1806EDSR-NB3T	0.709	0.250	0.268	X= R0.047	Z= 0.122	11°	15°	15°	D4 D5
		SPMT 1806EDSL-NB3T									-
4-Notch / Low Cutting Force		SPMT 1806EDER-NB2P	0.709	0.250	0.268	X= R0.047	Z= 0.122	11°	15°	15°	D4 D5
5-Notch / Low Cutting Force		SPMT 1806EDER-NB3P	0.709	0.250	0.268	X= R0.047	Z= 0.122	11°	15°	15°	
Without Notches		SPMT 1806EDER-V	0.709	0.250	0.268	X= R0.047	Z= 0.122	11°	15°	15°	

*CVD: CVD Coated Carbide *PVD: PVD Coated Carbide
*MN: MEGACOAT NANO

● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

Inserts sold in 10 piece boxes.

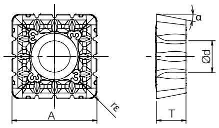
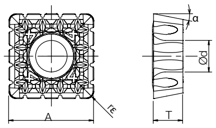
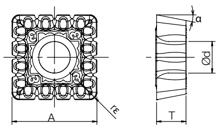
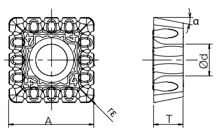
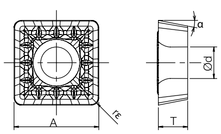
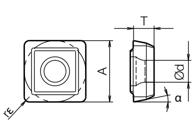
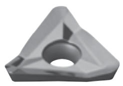
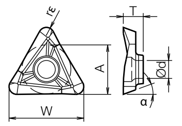
Milling Inserts
with Hole

Usage Classification

- ★ Roughing / 1st Choice
- ☆ Roughing / 2nd Choice
- ■ Finishing / 1st Choice
- □ Finishing / 2nd Choice

(Hardness Under 45HRC)

		TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PR830	KW10
P	Free-Cutting Steel				★	★			
	Carbon/Alloy Steel				★	★			
M	Stainless Steel				★	★			
K	Gray Cast Iron						★		☆
	Nodular Cast Iron						★		
N	Non-ferrous Metals								★
S	Heat-Resistant Alloys				★	★			
	Titanium Alloy						★		☆
H	Hard Materials				■	■			

Insert (Right-hand Shown)		Part Number	Dimensions (in) A	T	Ød	W (X)	rε (Z)	Angle (°) α	β	γ	Cermet TN100M	CVD* CA6535	MN* PR1535	MEGACOAT PR1225	MEGACOAT PR1230	MEGACOAT PR1210	PVD* PR830	Carbide KW10	Toolholder Page
 3-Notch		SPMT 180616EN-NB3	0.709	0.250	0.268	-	0.063	11°	-	-					●	●			E54 E55
 4-Notch		SPMT 180616EN-NB4	0.709	0.250	0.268	-	0.063	11°	-	-					●	●			
 3-Notch / Low Cutting Force		SPMT 180616EN-NB3P	0.709	0.250	0.268	-	0.063	11°	-	-					○	○			
 4-Notch / Low Cutting Force		SPMT 180616EN-NB4P	0.709	0.250	0.268	-	0.063	11°	-	-					●	○			
 Without Notch		SPMT 180616EN-V	0.709	0.250	0.268	-	0.063	11°	-	-					●	●			
		SPMT 060204E-Z	0.250	0.094	0.098	-	0.016	11°	-	-				●		○		○	K8
		060208E-Z					0.031							○		○		○	
		SPMT 090304E-Z	0.375	0.125	0.134	-	0.016	11°	-	-				●		○		○	
		090308E-Z					0.031							●		●		○	
		TEMT 250624-AQ	0.625	0.250	0.217	0.906	0.094	20°	-	-								○	E68

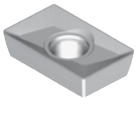
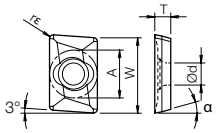
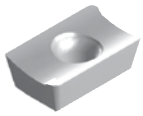
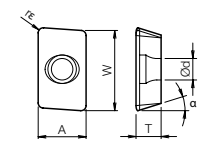
*CVD: CVD Coated Carbide *PVD: PVD Coated Carbide
*MN: MEGACOAT NANO

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

Milling Inserts
with Hole

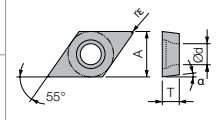
Usage Classification
★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

		TN100M	TC60	PR1525	PR930	PR905	PR830	KW10
P	Free-Cutting Steel	■	□				★	
	Carbon/Alloy Steel	■	□				★	
M	Stainless Steel						★	
K	Gray Cast Iron					★		
	Nodular Cast Iron					★		
N	Non-ferrous Metals							★
S	Heat-Resistant Alloys			★			☆	
	Titanium Alloy					★		
H	Hard Materials					■		

Insert (Right-hand Shown)	Part Number	A	T	Ød	W	rε	α	Cermet TN100M	Cermet TC60	MN* PR1525	PVD Coated Carbide PR930	PVD Coated Carbide PR905	PVD Coated Carbide PR830	Carbide KW10	Toolholder Page
	XPMT 090208	1/4	0.094	0.110	0.375	0.031	15°	●	●	●		●		●	E70 E71 E72 K5
	XPMT 15T304	3/8	0.156	0.157	0.607	0.016	15°		●			●	●	●	
	15T308					0.031		●	●		●	●	●	●	
	15T316					0.063			●			●	●	●	
	15T324					0.094			●				●	●	
	15T331					0.122			●			●	●	●	
	15T364					0.250			●				●	●	
	APET 1604PDFR	3/8	0.188	0.157	0.630	0.039	11°							●	K5
	160416					0.062								●	
	160431					0.125								●	

*MN: MEGACOAT NANO

API Inserts
with Hole

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	I.C. (A)	T	Ød	rε	α	CVD Coated Carbide CA525	CVD Coated Carbide CA5525	CVD Coated Carbide CA6525	MEGACOAT Coated Carbide PR1225	MEGACOAT Coated Carbide PR1425	PVD Coated Carbide PR660	Toolholder Page
	DCMT 3252HQ	DCMT 11T308HQ	3/8	5/32	0.173	1/32	7°	●	●	●		●	●	K3
	DCMT 3253CQ	DCMT 11T312CQ	3/8	5/32	0.173	3/64	7°		●	●			●	
	VCMT 222HQ	VCMT 110308HQ	1/4	1/8	0.110	1/32	7°				●			
	VCMT 332HQ	VCMT 160408HQ	3/8	3/16	0.173	1/32	7°	●	●	●			●	
	333HQ	160412HQ	3/8	3/16	0.173	3/64	7°				●			

● : U.S. Stock
○ : World Express (Shipping - 10 Business Days)

Inserts sold in 10 piece boxes.

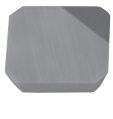
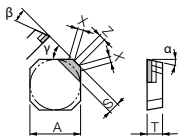
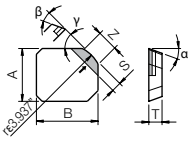
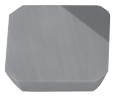
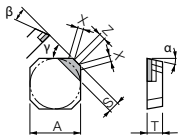
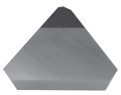
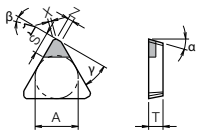
Milling Inserts

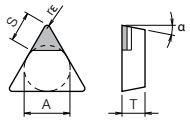
P C D

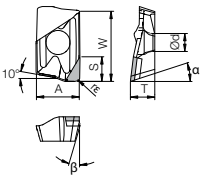
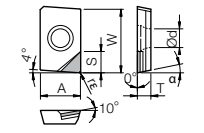
Usage Classification

★ Roughing / 1st Choice
☆ Roughing / 2nd Choice
■ Finishing / 1st Choice
□ Finishing / 2nd Choice
(Hardness Under 45HRC)

P	Free-Cutting Steel			
	Carbon/Alloy Steel			
M	Stainless Steel			
K	Gray Cast Iron			
	Nodular Cast Iron			
N	Non-ferrous Metals	□		■
S	Heat-Resistant Alloys			
	Titanium Alloy	□		■
H	Hard Materials			

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	Dimensions (in) A	T	X	Z	S	B	Angle (°) α	β	γ	PCD KPD001	KPD010	KPD230	Toolholder Page
 	SEEN 42AFFN	SEEN 1203AFFN	0.500	0.125	0.020	0.055	0.138	-	20°	25°	45°	○	●		C18 C19
 With Wiper Edge 	SEEN 42AFFR-W	SEEN 1203AFFR-W	0.492	0.125	-	0.138	0.067	0.573	20°	25°	45°	○			C19
 	(Use ISO Part Number)	SOKN 13T3AXFN-NE	0.531	0.156	0.016	0.043	0.118	-	27°	32°	45°			○	C22
 	TEEN 32PTFR-NE 32PTFR	TEEN 1603PTFR-NE 1603PTFR	0.375	0.125	0.024	0.055	0.161 0.185	-	20°	22°	30°	 ○	 ●	○ 	E69
	TEKN 43PTFR-NE 43PTFR	TEKN 2204PTFR-NE 2204PTFR	0.500	0.187	0.028	0.071	0.165 0.189	-	20°	22°	30°	 ○	 ○	○ 	E48 E49

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	Dimensions (in) A	T	rε	S	-	-	Angle (°) α	-	-	PCD KPD001	KPD010	KPD230	Toolholder Page
 	TPG 2205	TPGN 110302	0.250	0.125	0.008	0.154	-	-	11°	-	-	○	○		E49
	221	110304			0.016	0.146						○	○		
	222	110308			0.031	0.134							○		

Insert (Right-hand Shown)	Part Number (ANSI)	Part Number (ISO)	Dimensions (in) A	T	Ød	W	rε	S	Angle (°) α	β	-	PCD KPD001	KPD010	KPD230	Toolholder Page
 	(Use ISO Part Number)	BDMT 11T302FR	0.264	0.150	0.110	0.433	0.008	0.142	18°	13°	-	●		○	E12 E13 E14 E15 E16 E17
		11T304FR					0.016					●		○	
	(Use ISO Part Number)	BDMT 170402FR	0.378	0.193	0.173	0.669	0.008	0.173	18°	13°	-	●		○	
		170404FR					0.016					●		○	
 	NDCW 3205FRX-NE	NDCW 150302FRX-NE	0.375	0.125	0.173	0.591	0.008	0.201	15°	-	-			○	E67
	3205FRX	150302FRX						0.224				○	○		

U.S. Stock : ●
World Express (Shipping - 10 Business Days) : ○

45°/70° LEAD ANGLE

C1 - C23

MFPN45 Face Mill (Inch Size)

Rake Angles (°)	A.R.	R.R.	
	Max +10°	ØD = 2.50-3.00 : -10°	ØD = 4.00-10.00 : -6°

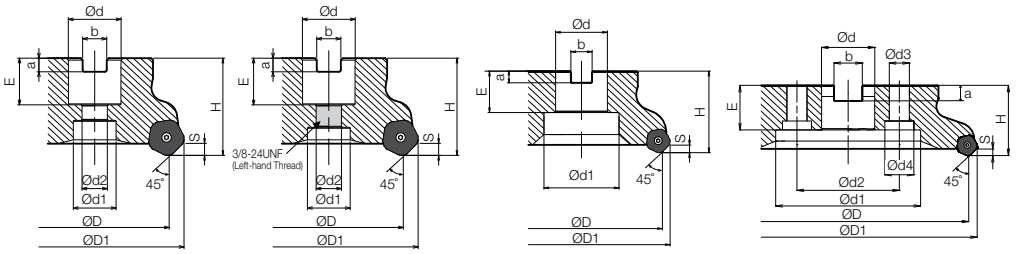


Fig.1 Fig.2 Fig.3 Fig.4

Toolholder Dimensions

		Part Number	Stock	No. of Inserts	Dimensions (in) ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	Ød3	Ød4	Drawing	Weight (kg)	Shim
Inch Bore Dia.	Coarse Pitch	MFPN 452500R-4T	●	4	2.500	3.012	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.1	0.5	Yes
		453000R-5T	●	5	3.000	3.512	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.1	1.1	
		454000R-6T	●	6	4.000	4.512	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.4	
		455000R-7T	●	7	5.000	5.512	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	
		456000R-8T	●	8	6.000	6.512	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.8	
		458000R-10T	●	10	8.000	8.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
		4510000R-12T	●	12	10.000	10.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	9.3	
	Fine Pitch	NEW MFPN 452000R-4T	●	4	2.000	2.31	0.750	-	3/8-24UNF	1.969	0.83	0.187	0.313	-	-	Fig.2	0.3	No
		452500R-5T	●	5	2.500	3.012	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.1	0.5	
		453000R-6T	●	6	3.000	3.512	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.1	1.1	
		454000R-8T	●	8	4.000	4.512	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.3	
		455000R-10T	●	10	5.000	5.512	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	
		456000R-12T	●	12	6.000	6.512	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.9	
		458000R-14T	●	14	8.000	8.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
		4510000R-16T	●	16	10.000	10.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	9.3	
	Extra Fine Pitch	MFPN 452500R-6T	●	6	2.500	3.012	0.750	0.669	0.433	1.575	0.750	0.187	0.313	-	-	Fig.1	0.5	
		453000R-8T	●	8	3.000	3.512	1.000	0.866	0.551	1.969	1.063	0.236	0.375	-	-	Fig.1	1.1	
		454000R-10T	●	10	4.000	4.512	1.500	2.047	-	1.969	1.142	0.394	0.625	-	-	Fig.3	1.3	
		455000R-13T	●	13	5.000	5.512	1.500	2.283	-	2.480	1.417	0.394	0.625	-	-	Fig.3	2.6	
		456000R-16T	●	16	6.000	6.512	2.000	2.835	-	2.480	1.496	0.433	0.750	-	-	Fig.3	3.9	
		458000R-18T	●	18	8.000	8.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	6.6	
		4510000R-20T	●	20	10.000	10.512	2.500	3.937	4.000	2.480	1.575	0.551	1.000	0.709	1.024	Fig.4	9.3	

*Dimension S is 0.236" for GM/SM/GH chipbreaker and 0.197" for GL chipbreaker

Spare Parts (Inch / Inch Bore)

	Part Number	Spare Parts: Clamp Screw	Wrench: TT	Wrench: DTM	Shim	Shim Screw	Wrench	Anti-seize Compound	Arbor Bolt	Mounting Screw
										
Coarse Pitch	MFPN 452500R-4T	SB-50140TR	TT-15	-	MFPN-45	SPW-7050	LW-5	MP-1	HH3/8-1.25	-
	453000R-5T								HH1/2-1.25	-
	454000R-6T ~ 4510000R-12T	Recommended Torque for Insert Screw 4.2N · m			Recommended Torque for Shim Screw 6.0N · m				-	-
Fine Pitch	MFPN 452000R-4T	SB-50140TR	TT-15	-	-	-	-	MP-1	-	XNS610*2
	452500R-5T								HH3/8-1.25	-
	453000R-6T								HH1/2-1.25	-
	454000R-8T ~ 4510000R-16T	Recommended Torque for Insert Screw 4.2N · m							-	-
Extra Fine Pitch	MFPN 452500R-6T	SB-40140TRN	-	DTM-15	-	-	-	MP-1	HH3/8-1.25	-
	453000R-8T								HH1/2-1.25	-
	454000R-10T ~ 4510000R-20T	Recommended Torque for Insert Screw 3.5N · m							-	-

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

*2 Differential screw (3/8-24UNF)

Recommended Cutting Conditions ➔ C6
Applicable Inserts ➔ C4

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(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Facing | Chamfering

MFPN45 Face Mill (Metric Size)

Rake Angles (°)	A.R.	R.R.	
	Max +10°	ØD = 63 : -10°	ØD = 100-315 : -6°
		ØD = 80 : -8°	

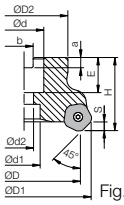

Fig.1

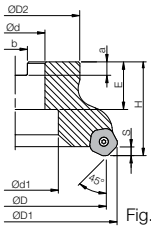

Fig.2

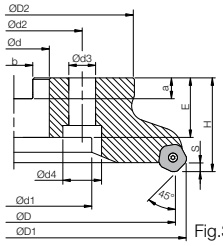

Fig.3

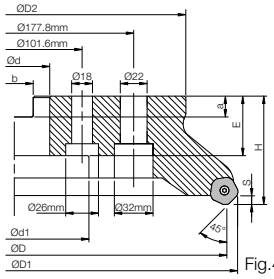

Fig.4

Toolholder Dimensions

		Part Number	Stock R	Stock L	No. of Inserts	Dimensions (mm) ØD	ØD1	ØD2	Ød	Ød1	Ød2	H	E	a	b	Ød3	Ød4	Drawing	Weight (kg)	Shim
Inch Bore Dia.	Coarse Pitch	MFPN 45080R/L-5T	○	○	5	80	93	60	1.000"	22	13.0	50	1.063"	0.236"	0.375"	-	-	Fig.1	1.1	Yes
		45100R/L-6T	○	○	6	100	113	70	1.250"	48	-	63	1.260"	0.315"	0.500"			Fig.2	1.4	
		45125R/L-7T	○	○	7	125	138	87	1.500"	58			1.417"	0.394"	0.625"				2.6	
		45160R/L-8T	○	○	8	160	173	102	2.000"	72			1.496"	0.433"	0.750"				4.0	
		45200R-10T	○		10	200	213	142	1.875"	110	4.000"		1.575"	0.551"	1.000"	18	26	Fig.3	6.7	
		45250R-12T	○		12	250	263												9.4	
	Fine Pitch	MFPN 45080R-6T	○		6	80	93	60	1.000"	22	13.0	50	1.063"	0.236"	0.375"	-	-	Fig.1	1.1	No
		45100R-8T	○		8	100	113	70	1.250"	48	-	63	1.260"	0.315"	0.500"			Fig.2	1.4	
		45125R-10T	○		10	125	138	87	1.500"	58			1.417"	0.394"	0.625"				2.7	
		45160R-12T	●		12	160	173	102	2.000"	72			1.496"	0.433"	0.750"				4.0	
		45200R-14T	○		14	200	213	142	1.875"	110	4.000"		1.575"	0.551"	1.000"	18	26	Fig.3	6.9	
		45250R-16T	○		16	250	263												9.6	
	Extra Fine Pitch	MFPN 45080R-8T	○		8	80	93	60	1.000"	22	13.0	50	1.063"	0.236"	0.375"	-	-	Fig.1	1.1	No
		45100R-10T	○		10	100	113	70	1.250"	48	-	63	1.260"	0.315"	0.500"			Fig.2	1.3	
		45125R-13T	○		13	125	138	87	1.500"	58			1.417"	0.394"	0.625"				2.7	
		45160R-16T	○		16	160	173	102	2.000"	72			1.496"	0.433"	0.750"				4.0	
		45200R-18T	○		18	200	213	142	1.875"	110	4.000"	63	1.575"	0.551"	1.000"	18	26	Fig.3	6.9	
		45250R-20T	○		20	250	263													
Metric Bore Dia.	Coarse Pitch	MFPN 45063R-4T-M	○		4	63	76	47	22	19	11.0	40	21	6.3	10.4	-	-	Fig.1	0.5	Yes
		45080R-5T-M	○		5	80	93	60	27	22	13.0	50	24	7.0	12.4				1.1	
		45100R-6T-M	○		6	100	113	70	32	48	-	50	30	8.0	14.4			Fig.2	1.4	
		45125R-7T-M	○		7	125	138	87	40	58		63	32	9.0	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	14.0	25.7	18	26		6.4	
		45250R-12T-M	○		12	250	263												9.1	
		45315R-14T-M	□		14	315	328	220			-	80				-	-	Fig.4	21.3	
	Fine Pitch	MFPN 45063R-5T-M	●		5	63	76	47	22	19	11.0	40	21	6.3	10.4	-	-	Fig.1	0.5	No
		45080R-6T-M	○		6	80	93	60	27	22	13.0	50	24	7.0	12.4				1.0	
		45100R-8T-M	○		8	100	113	70	32	48	-		30	8.0	14.4			Fig.2	1.4	
		45125R-10T-M	○		10	125	138	87	40	58		63	32	9.0	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	14.0	25.7	18	26		6.5	
		45250R-16T-M	○		16	250	263												9.1	
	Extra Fine Pitch	MFPN 45063R-6T-M	○		6	63	76	47	22	19	11.0	40	21	6.3	10.4	-	-	Fig.1	0.5	No
		45080R-8T-M	○		8	80	93	60	27	22	13.0	50	24	7.0	12.4				1.1	
		45100R-10T-M	○		10	100	113	70	32	48	-		30	8.0	14.4			Fig.2	1.3	
		45125R-13T-M	○		13	125	138	87	40	58		63	32	9.0	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	14.0	25.7	18	26		6.6	
		45250R-20T-M	○		20	250	263												9.3	

*Dimension S is 6mm for GM, SM, GH Chipbreakers, 5mm for GL Chipbreaker and, 3mm for W Chipbreaker: PR15 series

Recommended Cutting Conditions ➔ C6

Spare Parts & Applicable Inserts ➔ C4

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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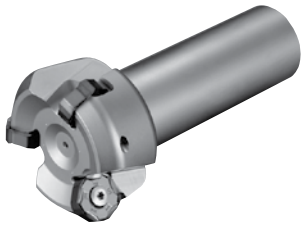
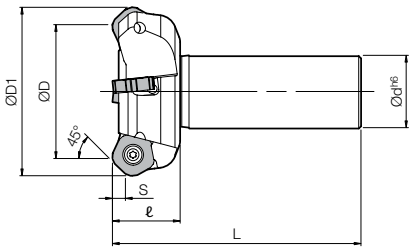
● Spare Parts (Metric Size / Inch Bore & Metric Size / Metric Bore)

Part Number		Spare Parts							
		Clamp Screw	Wrench		Shim	Shim Screw	Wrench	Anti-seize Compound	Arbor Bolt
			TT	DTM					
Coarse Pitch	MFPN 45063R-4T-M	SB-50140TR	TT-15	-	MFPN-45	SPW-7050	LW-5	MP-1	HH10x30
	45080℄-5T(-M)								HH12x35
	45100℄-6T(-M) ~ 45315R-14T(-M)	Recommended Torque for Insert Screw 4.2N · m			Recommended Torque for Shim Screw 6.0N · m				-
Fine Pitch	MFPN 45063R-5T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10x30
	45080R-6T(-M)								HH12x35
	45100R-8T(-M) ~ 45315R-18T(-M)	Recommended Torque for Insert Screw 4.2N · m							-
Extra Fine Pitch	MFPN 45063R-6T-M	SB-40140TRN	-	DTM-15	-	-	-	MP-1	HH10x30
	45080R-8T(-M)								HH12x35
	45100R-10T(-M) ~ 45250R-20T(-M)	Recommended Torque for Insert Screw 3.5N · m							-

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.

MFPN45 End Mill





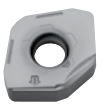
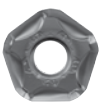
● Toolholder Dimensions

Part Number		Stock	No. of Inserts	Unit	Dimensions						Rake Angles		Shank Type	Spare Parts		
					ØD	ØD1	Ød	L	ℓ	S	A.R. (Max)	R.R.		Clamp Screw	Wrench	Anti-seize Compound
Weldon Shank	MFPN 452000R-W125-3T	●	3	Inch	2.00	2.31	1.25	3.60	1.18	0.23 *(0.19)	+10°	-12°	Weldon	SB-50140TR	TT-15	MP-1
	452500R-W125-4T	●	4		2.50	2.81	1.25	3.60	1.18		+10°	-10°				
	453000R-W125-5T	●	5		3.00	3.31	1.25	3.60	1.18		+10°	-8°				
Cylindrical Shank	MFPN 45050R-S32-3T	○	3	mm	50	63	32	110	30	6 (5)	+10°	- 12°	Cylindrical	SB-50140TR	TT-15	MP-1
	45063R-S32-4T	○	4		63	76	32	110	30		+10°	- 10°		Recommended Tightening Torque 4.2N · m		
	45080R-S32-5T	○	5		80	93	32	110	30		+10°	- 8°				

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.

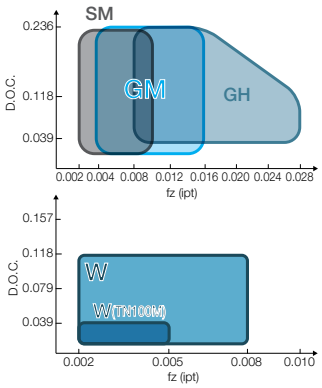
*Dimension S is 0.236" for GM, SM, GH Chipbreakers, 0.197" for GL Chipbreaker and, 0.118" for W Chipbreaker: PR15 series

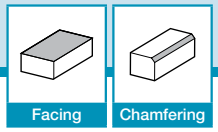
● Applicable Inserts (Face Mill and End Mill)

Part Number	Applicable Inserts ➡ B15						
							
MFPN 45...R-...	PNMU 1205ANER-GM	PNMU 1205ANER-SM	PNMU 1205ANER-GH	PNEU 1205ANER-GL	PNEU 1205ANER-W	-	-
MFPN 45...L-...	-	-	-	-	-	PNMU 1205ANEL-GM	PNEU 1205ANEL-GL

Recommended Cutting Conditions ➡ C6

● Applicable Chipbreaker Range





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 (to prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (high metal removal rate) (D.O.C. ≥ 0.1575", fz ≥ 0.0138 ipt)	●					●		
Focusing on finishing quality	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (to prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (for high feed rates and high efficiency)			●	●				
Cast iron (D.O.C. ≥ 0.1575", fz ≥ 0.0138 ipt)	●					●		
Improved surface finish in high-efficiency milling		●	●					●

How to Use Wiper Insert

1) Please use one wiper insert per cutter.
(If you use more than 2 inserts on one cutter, the workpiece surface may have galling.)

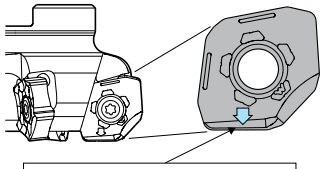
2) Combination of Wiper Insert with Other Chipbreakers

Chipbreaker / Combination	GM	SM	W
Recommended Combination	●		●
Recommended Combination		●	●

GH+W and GL+W insert chipbreaker combinations are not recommended.

3) For checking the protrusion amount of the wiper insert, use tool presetter. (Appropriate protrusion: 0.0039")

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.

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (ipt)	Recommended Insert Grades (Cutting Speed Vc : sfm)			
			MEGACOAT NANO (MEGACOAT)			CVD Coated Carbide
			PR1535	PR1525 (PR1225)	PR1510 (PR1210)	CA6535
GM	Carbon Steel	0.0039 ~ **0.0079** ~ 0.0157	☆ 390 ~ **590** ~ 820	★ 390 ~ **590** ~ 820	-	-
	Alloy Steel	0.0039 ~ **0.0079** ~ 0.0157	☆ 330 ~ **520** ~ 720	★ 330 ~ **520** ~ 720	-	-
	Mold Steel	0.0039 ~ **0.0079** ~ 0.0138	☆ 260 ~ **460** ~ 590	★ 260 ~ **460** ~ 590	-	-
	Austinitic Stainless Steel	0.0039 ~ **0.0079** ~ 0.0157	☆ 330 ~ **520** ~ 660	☆ 330 ~ **520** ~ 660	-	-
	Martensitic Stainless Steel	0.0039 ~ **0.0079** ~ 0.0157	☆ 490 ~ **660** ~ 820	-	-	☆ 590 ~ **790** ~ 980
	Precipitation Hardened Stainless Steel	0.0039 ~ **0.0079** ~ 0.0118	★ 300 ~ **390** ~ 490	-	-	-
	Gray Cast Iron	0.0039 ~ **0.0079** ~ 0.0157	-	-	★ 390 ~ **590** ~ 820	-
	Nodular Cast Iron	0.0039 ~ **0.0079** ~ 0.0138	-	-	★ 330 ~ **490** ~ 660	-
	Ni-base Heat Resistant Alloys	0.0039 ~ **0.0047** ~ 0.0079	☆ 70 ~ **100** ~ 160	-	-	★ 70 ~ **100** ~ 160
SM *1(GL)	Carbon Steel	0.0024 ~ **0.0047** ~ 0.0098	☆ 390 ~ **590** ~ 820	☆ 390 ~ **590** ~ 820	-	-
	Alloy Steel	0.0024 ~ **0.0047** ~ 0.0098	☆ 330 ~ **520** ~ 720	☆ 330 ~ **520** ~ 720	-	-
	Mold Steel	0.0024 ~ **0.0039** ~ 0.0079	☆ 260 ~ **460** ~ 590	☆ 260 ~ **460** ~ 590	-	-
	Austinitic Stainless Steel	0.0024 ~ **0.0047** ~ 0.0098	★ 330 ~ **520** ~ 660	☆ 330 ~ **520** ~ 660	-	-
	Martensitic Stainless Steel	0.0024 ~ **0.0047** ~ 0.0098	☆ 490 ~ **660** ~ 820	-	-	★ 590 ~ **790** ~ 980
	Precipitation Hardened Stainless Steel	0.0024 ~ **0.0047** ~ 0.0098	☆ 300 ~ **390** ~ 490	-	-	-
	Gray Cast Iron	0.0024 ~ **0.0047** ~ 0.0098	-	-	☆ 390 ~ **590** ~ 820	-
	Nodular Cast Iron	0.0024 ~ **0.0039** ~ 0.0079	-	-	☆ 330 ~ **490** ~ 660	-
	Ni-base Heat Resistant Alloys	0.0024 ~ **0.0039** ~ 0.0059	☆ 70 ~ **100** ~ 160	-	-	☆ 70 ~ **100** ~ 160
	Titanium Alloys	0.0024 ~ **0.0031** ~ 0.0059	★ 130 ~ **200** ~ 260	-	-	-
*2GH	Carbon Steel	0.0079 ~ **0.0157** ~ 0.0276	☆ 390 ~ **590** ~ 820	☆ 390 ~ **590** ~ 820	-	-
	Alloy Steel	0.0079 ~ **0.0157** ~ 0.0236	☆ 330 ~ **520** ~ 720	☆ 330 ~ **520** ~ 720	-	-
	Mold Steel	0.0079 ~ **0.0138** ~ 0.0197	☆ 260 ~ **460** ~ 590	☆ 260 ~ **460** ~ 590	-	-
	Austinitic Stainless Steel	0.0079 ~ **0.0118** ~ 0.0157	☆ 330 ~ **520** ~ 660	☆ 330 ~ **520** ~ 660	-	-
	Martensitic Stainless Steel	0.0079 ~ **0.0118** ~ 0.0157	☆ 490 ~ **660** ~ 820	-	-	☆ 590 ~ **790** ~ 980
	Precipitation Hardened Stainless Steel	0.0079 ~ **0.0118** ~ 0.0157	☆ 300 ~ **390** ~ 490	-	-	-
	Gray Cast Iron	0.0079 ~ **0.0157** ~ 0.0276	-	-	☆ 390 ~ **590** ~ 820	-
	Nodular Cast Iron	0.0079 ~ **0.0138** ~ 0.0197	-	-	☆ 330 ~ **490** ~ 660	-
	Ni-base Heat Resistant Alloys	0.0079 ~ **0.0118** ~ 0.0157	☆ 70 ~ **100** ~ 160	-	-	☆ 70 ~ **100** ~ 160

★: 1st Recommendation ☆: 2nd Recommendation

- Values in bold indicate starting value of recommended 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.

*1. GL Chipbreaker is recommended for surface finish oriented milling.
2. GH Chipbreaker : Fine Pitch ➡ fz ≤ 0.0157 ipt
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 = 0.0157 ipt)
Extra Fine Pitch (without shim)	○	○	Not recommended

■ Usage Precautions (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 pocket wall 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.

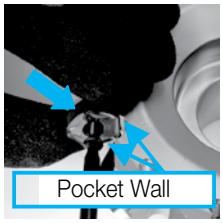


Fig.1

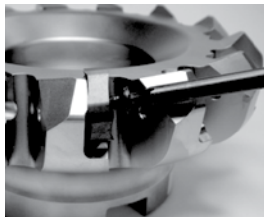


Fig.2

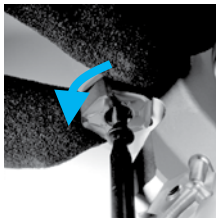


Fig.3

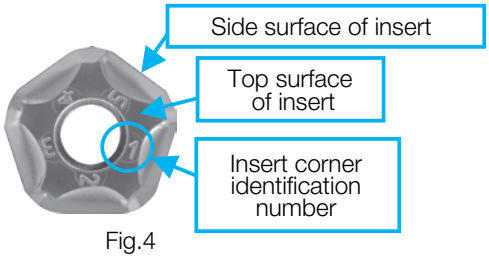


Fig.4

■ How to Replace the Shim (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 pocket wall (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 6.0N·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.

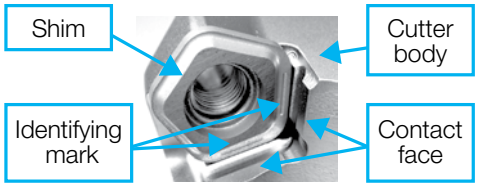


Fig.5

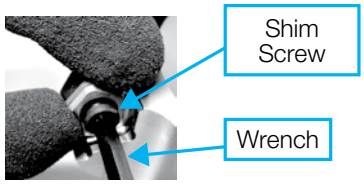


Fig.6

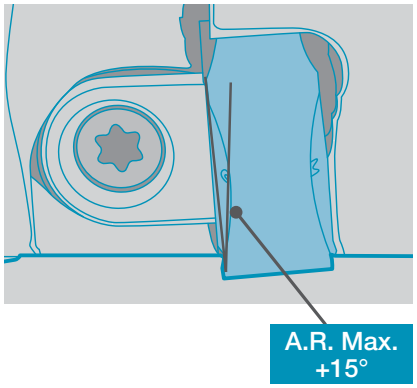
MFK

Milling Cutter for Cast Iron

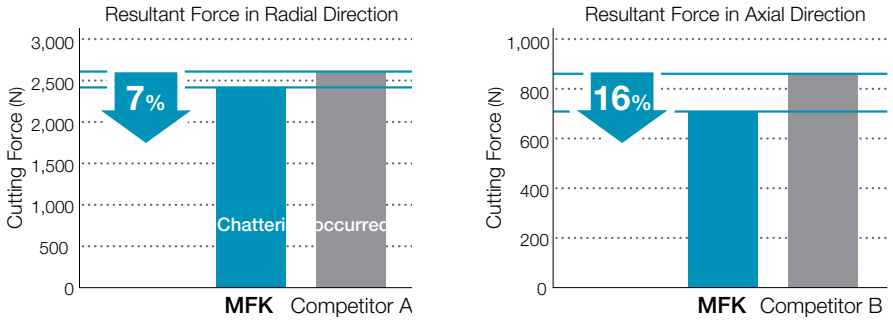
Tough edge with low cutting forces enable stable machining.
Uses 10-edge inserts for economical machining.

1 Low Cutting Forces Prevent Chattering

Low Cutting Forces with Helical Cutting Edge Design



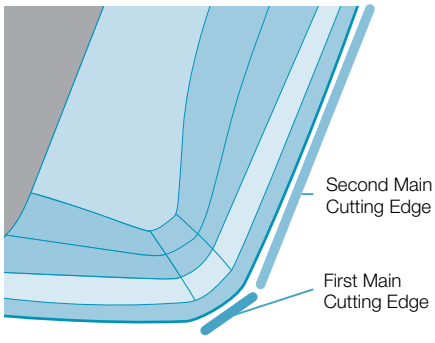
Cutting Force Comparison (Internal Evaluation)



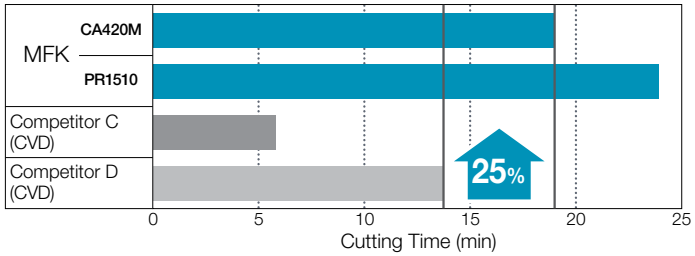
Cutting Conditions: Vc = 590 sfm, fz = 0.012 ipt, D.O.C. × ae = 0.118" × 2.441", Dry Workpiece: Nodular Cast Iron (80-60-03), Ø5.000"

2 Tough and Reliable Insert Construction Prevents Fracturing

Tough and Reliable Dual Angle Edge Design

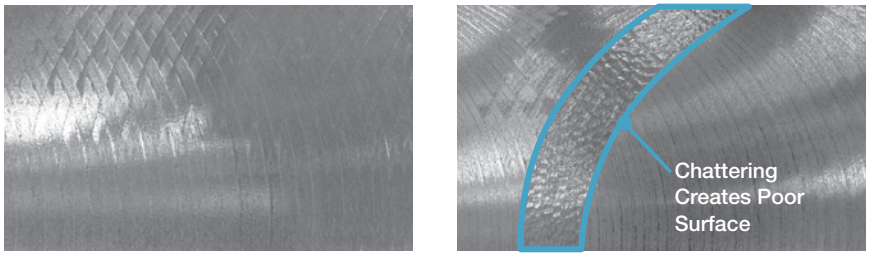


Fracture Resistance Comparison (Internal Evaluation)



Cutting Conditions: Vc = 980 sfm, fz = 0.020 ipt, ap = 0.079", Wet Workpiece: Nodular Cast Iron (65-45-12) with 4 Bores

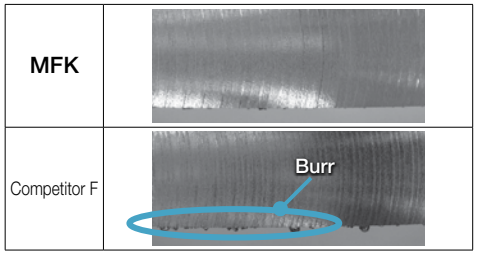
Surface Finish Comparison (Internal Evaluation)



MFK Competitor E

Burr Comparison

Sharp Cutting Prevents Burr Formation



Cutting Conditions: Vc = 590 sfm, fz = 0.012 ipt, ap × ae = 0.118" × 3.071", Dry Workpiece: Nodular Cast Iron (80-60-03)

3 Toolholder Lineup for Various Applications

Fine and Extra Fine Pitch Types Available.

Fine Pitch
(Example: 5000R-11-12T = 12 Inserts)

- Recommended for Unstable Setups
- General Purpose for Wide Application Ranges

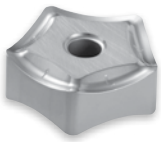
Extra Fine Pitch
(Example: 5000R-11-18T = 18 Inserts)

- Recommended for Rigid Setups
- Finer Pitch for Higher Efficiency

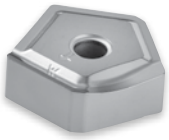
4 Chipbreaker Lineup for Wide Range of Applications

General Purpose:
GM Chipbreaker

Heavy Duty:
GH Chipbreaker



Finishing:
GL Ground
Chipbreaker



Wiper Edge:
W Ground
Wiper Edge

5 Long Tool Life and Stable Machining

CA420M Features Advanced CVD Coating Technology

Longer Tool Life

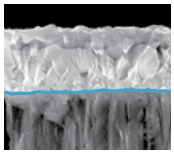
Controlled α-Al_2O_3 crystal growth for improving wear resistance and fracture resistance.

CA420M

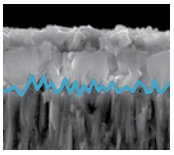
Conventional

Prevents Film Peeling

40 % improved film adhesion by optimized interface.



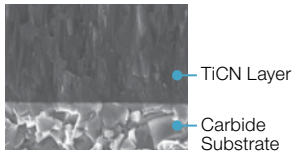
CA420M



Conventional

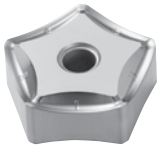
Increased Edge Strength

Higher film strength and fracture resistance with high aspect ratio TiCN.

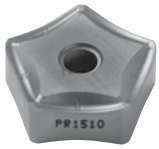


CA420M

Insert Grade Lineup



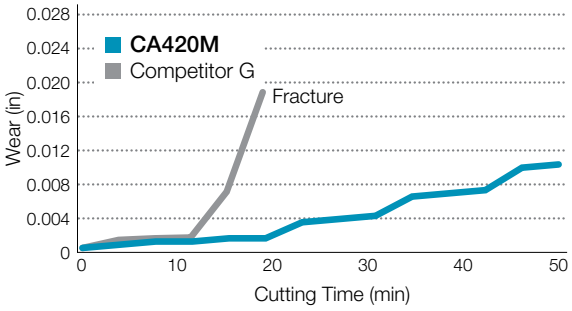
CA420M
Long Tool Life
(1st Recommendation)



PR1510
Stable Machining

PR1525
Fracture Resistance

Wear Resistance Comparison (Internal Evaluation)



Cutting Conditions: Vc = 670 sfm, fz = 0.012 ipt, ap × ae = 0.079" × 3.150", Dry
Workpiece: Nodular Cast Iron (65-45-12)

MFK Face Mill (Inch Size)

Rake Angle (°)		
Description	A.R.	R.R.
MFK3000R...	(MAX.) +15°	-7°
MFK4000R...		-6°
MFK5000R...		-5°
MFK6000R...		

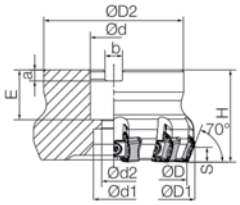


Fig.1

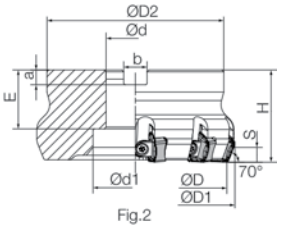


Fig.2

Toolholder Dimensions

Part Number			Stock	No. of Inserts	Dimensions (in)											Drawing	Weight (kg)
					ØD	ØD1	ØD2	Ød	Ød1	Ød2	H	E	a	b	s		
Inch Bore Dia.	Fine Pitch	MFK 3000R-11-8T	●	8	3.000	3.340	2.750	1.000	0.866	0.551	2.480	1.063	0.240	0.375	0.236	Fig.1	1.610
		4000R-11-10T	●	10	4.000	4.340	3.750	1.500	1.299	0.866		1.181	0.390	0.625			2.860
		5000R-11-12T	●	12	5.000	5.340			2.047	-		1.496				Fig.2	3.670
		6000R-11-16T	●	16	6.000	6.340	4.880	2.000	2.835				0.430	0.750			4.940
	Extra Fine Pitch	MFK 3000R-11-10T	●	10	3.000	3.340	2.750	1.000	0.866	0.551	2.480	1.063	0.240	0.375	0.236	Fig.1	1.550
		4000R-11-14T	●	14	4.000	4.340	3.750	1.500	1.299	0.866		1.181	0.390	0.625			2.740
		5000R-11-18T	●	18	5.000	5.340			2.047	-		1.496				Fig.2	3.480
		6000R-11-22T	●	22	6.000	6.340	4.880	2.000	2.835				0.430	0.750			4.760

Spare Parts and Applicable Inserts

Part Number	Spare Parts					Applicable Inserts ➡ B14
	Wedge	Wedge Screw	Wrench	Arbor Bolt	Pre-Set Torque Wrench*	
MFK 3000R-11-8T	C09N	W6X18N	TT-15	HH1/2-1.25	PST-T15	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515
4000R-11-10T	C09N	W6X18N	TT-15	HH3/4-2.3	PST-T15	
5000R-11-12T	C09N	W6X18N	TT-15	-	PST-T15	
6000R-11-16T						
MFK 3000R-11-10T	C09N	W6X18N	TT-15	HH1/2-1.25	PST-T15	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515
4000R-11-14T	C09N	W6X18N	TT-15	HH3/4-2.3	PST-T15	
5000R-11-18T	C09N	W6X18N	TT-15	-	PST-T15	
6000R-11-22T						

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately

MFK Face Mill (Metric Size)

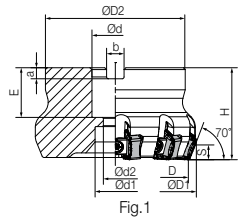


Fig.1

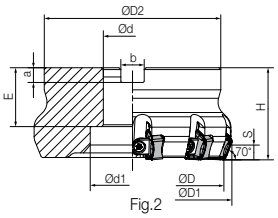


Fig.2

Rake Angle (°)		
Description	A.R.	R.R.
MFK080R-OO	(MAX.) +15°	-7°
MFK100R-OO		-6°
MFK125R-OO … MFK315R-OO		-5°

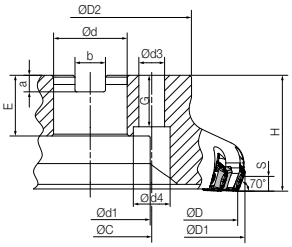


Fig.3

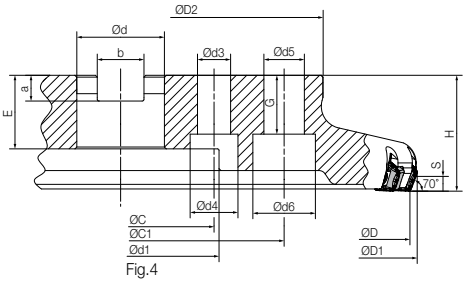


Fig.4

Toolholder Dimensions

		Part Number	Stock	No. of Inserts	Dimensions (mm)																		Drawing	Weight (kg)
					ØD	ØD1	ØD2	Ød	Ød1	Ød2	H	E	a	b	s	Ød3	Ød4	Ød5	Ød6	ØC	ØC1	G		
Inch Bore Dia.	Fine Pitch	MFK 080R-11-8T	○	8	80	89	76	1.250"	26	17	63	1.260"	0.315"	0.500"	6.0	-	-	-	-	-	-	-	Fig.1	1.76
		100R-11-10T	○	10	100	109	96	1.250"	26	17	63	1.260"	0.315"	0.500"	6.0	-	-	-	-	-	-	-	Fig.1	2.98
		125R-11-12T	○	12	125	134	100	1.500"	55	-	63	1.496"	0.394"	0.625"	6.0	-	-	-	-	-	-	-	Fig.2	3.65
		160R-11-16T	○	16	160	169	100	2.000"	70	-	63	1.496"	0.433"	0.750"	6.0	-	-	-	-	-	-	-	Fig.2	4.62
		200R-11-20T	○	20	200	209	142	1.875"	110	-	63	1.575"	0.551"	1.000"	6.0	18	26	-	-	101.6	-	32	Fig.3	7.65
		250R-11-24T	○	24	250	259	142	1.875"	110	-	63	1.575"	0.551"	1.000"	6.0	18	26	-	-	101.6	-	32	Fig.3	10.73
		315R-11-28T	□	28	315	324	220	1.875"	110	-	63	1.575"	0.551"	1.000"	6.0	18	26	22	32	101.6	177.8	32	Fig.4	19.71
	Extra fine Pitch	MFK 080R-11-10T	○	10	80	89	76	1.250"	26	17	63	1.260"	0.315"	0.500"	6.0	-	-	-	-	-	-	-	Fig.1	1.70
		100R-11-14T	○	14	100	109	96	1.250"	26	17	63	1.260"	0.315"	0.500"	6.0	-	-	-	-	-	-	-	Fig.1	2.85
		125R-11-18T	○	18	125	134	100	1.500"	55	-	63	1.496"	0.394"	0.625"	6.0	-	-	-	-	-	-	-	Fig.2	3.44
		160R-11-22T	○	22	160	169	100	2.000"	70	-	63	1.496"	0.433"	0.750"	6.0	-	-	-	-	-	-	-	Fig.2	4.44
		200R-11-28T	○	28	200	209	142	1.875"	110	-	63	1.575"	0.551"	1.000"	6.0	18	26	-	-	101.6	-	32	Fig.3	7.40
		250R-11-36T	○	36	250	259	142	1.875"	110	-	63	1.575"	0.551"	1.000"	6.0	18	26	-	-	101.6	-	32	Fig.3	10.36
		315R-11-44T	□	44	315	324	220	1.875"	110	-	63	1.575"	0.551"	1.000"	6.0	18	26	22	32	101.6	177.8	32	Fig.4	19.21
Metric Bore Dia.	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	63	28	8	14.4	6.0	-	-	-	-	-	-	-	Fig.1	2.99
		125R-11-12T-M	○	12	125	134	100	40	55	-	63	33	9	16.4	6.0	-	-	-	-	-	-	-	Fig.2	3.56
		160R-11-16T-M	○	16	160	169	100	40	70	-	63	33	9	16.4	6.0	14	20	-	-	66.7	-	28	Fig.3	4.51
		200R-11-20T-M	○	20	200	209	142	60	110	-	63	40	14	25.7	6.0	18	26	-	-	101.6	-	32	Fig.3	7.35
		250R-11-24T-M	○	24	250	259	142	60	110	-	63	40	14	25.7	6.0	18	26	-	-	101.6	-	32	Fig.3	10.43
		315R-11-28T-M	□	28	315	324	220	60	110	-	63	40	14	25.7	6.0	18	26	22	32	101.6	177.8	32	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	63	28	8	14.4	6.0	-	-	-	-	-	-	-	Fig.1	2.86
		125R-11-18T-M	○	18	125	134	100	40	55	-	63	33	9	16.4	6.0	-	-	-	-	-	-	-	Fig.2	3.38
		160R-11-22T-M	○	22	160	169	100	40	70	-	63	33	9	16.4	6.0	14	20	-	-	66.7	-	28	Fig.3	4.32
		200R-11-28T-M	○	28	200	209	142	60	110	-	63	40	14	25.7	6.0	18	26	-	-	101.6	-	32	Fig.3	7.10
		250R-11-36T-M	○	36	250	259	142	60	110	-	63	40	14	25.7	6.0	18	26	-	-	101.6	-	32	Fig.3	10.07
		315R-11-44T-M	□	44	315	324	220	60	110	-	63	40	14	25.7	6.0	18	26	22	32	101.6	177.8	32	Fig.4	18.92

Spare Parts & Applicable Inserts ➔ **C12**

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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Spare Parts and Applicable Inserts

Part Number	Spare Parts					Applicable Inserts ➔ B14
	Wedge	Wedge Screw	Wrench	Arbor Bolt	Pre-Set Torque Wrench*	
						
MFK 080R-11-8T-M	C09N	W6X18N	TT-15	HH12X35	PST-T15	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W
080R-11-8T	C09N	W6X18N	TT-15	HH16X40	PST-T15	
100R-11-10T(-M)						
125R-11-12T(-M)	C09N	W6X18N	TT-15	-	PST-T15	
160R-11-16T(-M)						
200R-11-20T(-M)						
250R-11-24T(-M)						
315R-11-28T(-M)						
MFK 080R-11-10T-M	C09N	W6X18N	TT-15	HH12X35	PST-T15	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W
080R-11-10	C09N	W6X18N	TT-15	HH16X40	PST-T15	
100R-11-14T(-M)						
125R-11-18T(-M)	C09N	W6X18N	TT-15	-	PST-T15	
160R-11-22T(-M)						
200R-11-28T(-M)						
250R-11-36T(-M)						
315R-11-44T(-M)						

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately

Applicable Inserts

Part Number	Applicable Inserts ➔ B14					
	 General Purpose	 Tough Edge	 Surface-Finish Oriented	 2-Edge With Wiper Edge	 High Speed Machining	 High Speed Machining (with Chipbreaker)
MFK...-11-...	PNMG1106XNEN-GM	PNMG1106XNEN-GH	PNEG1106XNEN-GL	PNEG1106XNER-W	PNEA1106XNTN-T01020	PNEG1106XNTR-T00515

Recommended Cutting Conditions (Coated Carbide)

Workpiece Material	Insert Grades	Cutting Speed Vc (sfm)	Chipbreaker	fz (ipt) 0.0024 0.0039 0.0079 0.0118 0.0157
Cast Iron	CA420M	560 ~ **750** ~ 980	GM★	0.0098
	PR1510	390 ~ **590** ~ 820	GH☆	0.0118
	PR1525		GL	0.0047
Nodular Cast Iron	CA420M	490 ~ **660** ~ 820	GM★	0.0079
	PR1510	330 ~ **490** ~ 660	GH☆	0.0098
	PR1525		GL	0.0039

★: 1st Recommendation ☆: 2nd Recommendation

Recommended Cutting Conditions (Ceramic)

• Without Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (sfm)	Edge Prep.	fz (ipt) 0.0020 0.0039 0.0079 0.0118 0.0157
Cast Iron	KS6050★	1970 ~ **2950** ~ 3940	0.004 × 20°	0.0039
	CS7050☆			
Nodular Cast Iron	KS6050☆	1310 ~ **1970** ~ 2950		
	CS7050★			

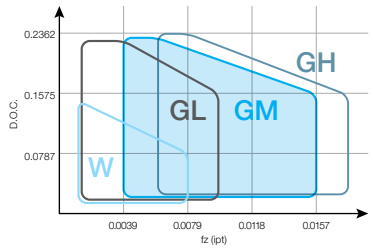
• With Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (sfm)	Edge Prep.	fz (ipt) 0.0020 0.0039 0.0079 0.0118 0.0157
Cast Iron	KS6050★	1970 ~ **2950** ~ 3940	0.002 × 15°	0.0039
	CS7050☆			
Nodular Cast Iron	KS6050☆	1310 ~ **1970** ~ 2950		
	CS7050★			

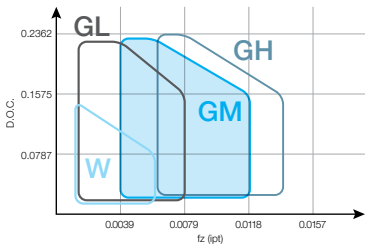
★: 1st Recommendation ☆: 2nd Recommendation

Recommended Application Range

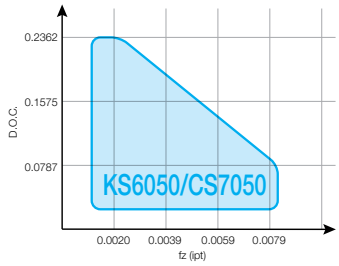
Gray Cast Iron
(Insert Grades : Coated Carbide)



Nodular Cast Iron
(Insert Grades : Coated Carbide)



Gray Cast Iron / Nodular Cast Iron
(Insert Grades : Ceramic)



* Note, when using wiper insert

1. When using W type, please use together with GM or GH.
2. If machining over fz = 0.0079", 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)

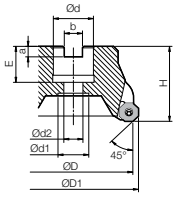


Fig.1

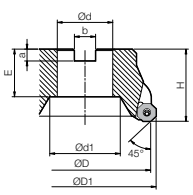


Fig.2

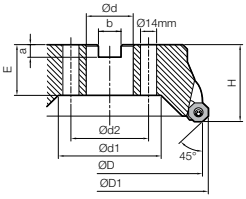


Fig.3

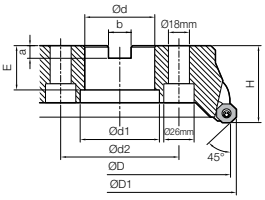


Fig.4

Rake Angle (°)	
A.R.	R.R.
+15°	-5°

Toolholder Dimensions

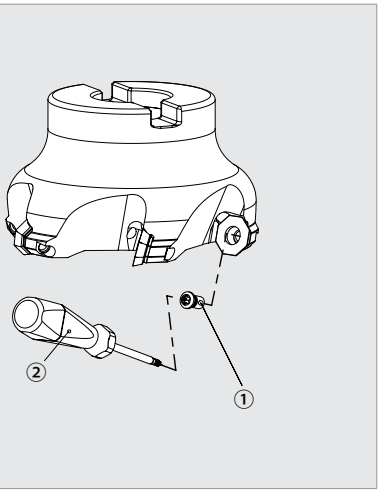
	Part Number		Stock	No. of Inserts	Dimensions (mm)									Drawing	Weight (kg)	Applicable Inserts ➔ B21
					ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b			
Inch Bore Dia.	MOF	45080R-05-6T	○	6	80	89	1.000"	20	13.0	50	1.024"	0.236"	0.375"	Fig.1	1.1	OFMT05 Type
		45100R-05-7T	○	7	100	109	1.250"	45	-	50	1.260"	0.315"	0.500"	Fig.2	1.8	
		45125R-05-8T	○	8	125	134	1.500"	55	-	63	1.496"	0.394"	0.625"	Fig.2	3.7	
		45160R-05-10T	○	10	160	169	2.000"	88	-	63	1.496"	0.433"	0.750"	Fig.2	5.1	
		45200R-05-12T	○	12	200	209	1.875"	68	101.6	63	1.496"	0.551"	1.000"	Fig.4	8.0	
	MOF	45080R-07-5T	○	5	80	92	1.000"	20	13.0	50	1.024"	0.236"	0.375"	Fig.1	1.2	OFMT07 Type
		45100R-07-6T	○	6	100	112	1.250"	45	-	50	1.260"	0.315"	0.500"	Fig.2	1.8	
		45125R-07-8T	○	8	125	137	1.500"	55	-	63	1.496"	0.394"	0.625"	Fig.2	3.7	
		45160R-07-10T	○	10	160	172	2.000"	88	-	63	1.496"	0.433"	0.750"	Fig.2	5.1	
		45200R-07-12T	○	12	200	212	1.875"	68	101.6	63	1.496"	0.551"	1.000"	Fig.4	8.0	
Metric Bore Dia.	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	11.0	40	21	6.3	10.4	Fig.1	0.4	
		45063R-05-5T-M	○	5	63	72	22	17	11.0	40	21	6.3	10.4	Fig.1	0.6	
		45080R-05-6T-M	○	6	80	89	27	20	13.0	50	24	7.0	12.4	Fig.1	1.1	
		45100R-05-7T-M	○	7	100	109	32	45	-	50	32	8.0	14.4	Fig.2	1.8	
		45125R-05-8T-M	○	8	125	134	40	55	-	63	33	9.0	16.4	Fig.2	3.7	
		45160R-05-10T-M	○	10	160	169	40	88	66.7	63	30	9.0	16.4	Fig.3	5.1	
		45200R-05-12T-M	○	12	200	209	60	68	101.6	63	38	14.0	25.7	Fig.4	8.0	
	MOF	45063R-07-4T-M	○	4	63	75	22	17	11.0	40	21	6.3	10.4	Fig.1	0.6	OFMT07 Type
		45080R-07-5T-M	○	5	80	92	27	20	13.0	50	24	7.0	12.4	Fig.1	1.2	
		45100R-07-6T-M	○	6	100	112	32	45	-	50	32	8.0	14.4	Fig.2	1.9	
		45125R-07-8T-M	○	8	125	137	40	55	-	63	33	9.0	16.4	Fig.2	3.7	
		45160R-07-10T-M	○	10	160	172	40	88	66.7	63	30	9.0	16.4	Fig.3	5.1	
		45200R-07-12T-M	○	12	200	212	60	68	101.6	63	38	14.0	25.7	Fig.4	8.0	

Spare Parts

Part Number		Spare Parts		
		① Clamp Screw	② Wrench	Arbor Bolt
MOF	45080R-05-6T	SB-4082TPR	DTP-15	HH12X35M
	45100R-05-7T	SB-4082TPR	DTP-15	-
	45125R-05-8T			
	45160R-05-10T			
	45200R-05-12T			
MOF	45080R-07-5T	SB-50120TRS	DTP-15	HH12X35M
	45100R-07-6T	SB-50120TRS	DTP-15	-
	45125R-07-8T			
	45160R-07-10T			
	45200R-07-12T			
MOF	45040R-05-3T-M	SB-4082TPR	DTP-15	HH8X25
	45050R-05-4T-M	SB-4082TPR	DTP-15	HH10X30M
	45063R-05-5T-M			
	45080R-05-6T-M	SB-4082TPR	DTP-15	HH12X35M
	45100R-05-7T-M	SB-4082TPR	DTP-15	-
	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	SB-50120TRS	DTP-15	HH12X35M
	45100R-07-6T-M	SB-50120TRS	DTP-15	-
	45125R-07-8T-M			
	45160R-07-10T-M			
	45200R-07-12T-M			

Max. D.O.C. and Usable Edges

Usable Edges	Max. D.O.C.	
	OFMT05 Type	OFMT07 Type
4 Edges (using 2 edges at the same time)	0.28"	0.39"
8 Edges (using only 1 edge at a time)	0.10"	0.16"



Recommended Cutting Conditions ➔ C15

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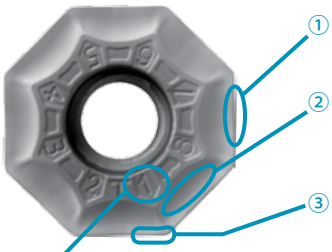
General Purpose “SH Chipbreaker”, Tough Edge Type “GT Chipbreaker”



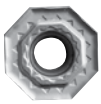
① **High Fracture Resistance**
Large land is applied

② **Low Cutting Force Chipbreaker**
Even at higher feedrates

③ **With Wiper Edge**
Surface finish is greatly improved

GT Chipbreaker

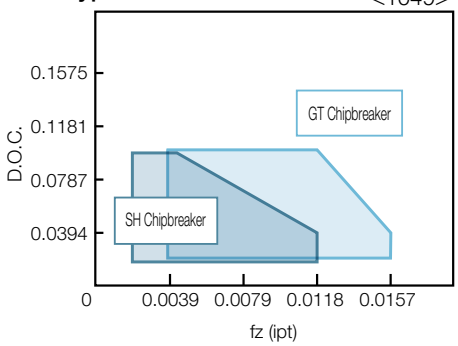
④ **With Corner Identification Mark**

	OFMT05 Type	OFMT07 Type
GT Chipbreaker (Tough Edge Type)		
SH Chipbreaker (General Purpose)		

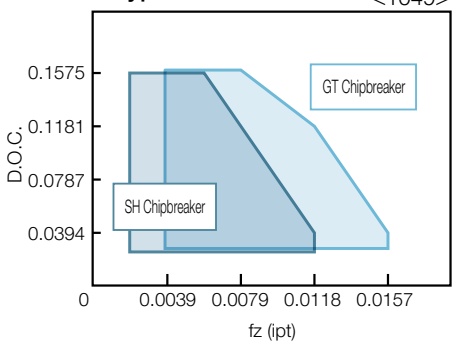
Note 1) OFMT07 type insets cannot be used for MOFX cutters (Ref. to page ➡ **C16**).

Applicable Chipbreaker Range

● **05 Type**



● **07 Type**



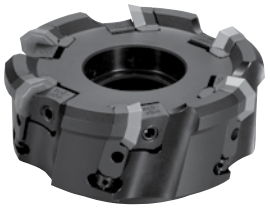
◆ Recommended Cutting Conditions (MOF / MOFX)

Workpiece Material	fz (ipt)		Recommended Insert Grades (Cutting Speed Vc : sfm)		
			MEGACOAT		PVD Coated Carbide
	GT Chipbreaker (Tough Edge type)	SH Chipbreaker (General Purpose)	**PR1225**	**PR1210**	**PR830**
Carbon Steel	0.0024 ~ **0.0047** ~ 0.0098	0.0024 ~ **0.0047** ~ 0.0098	★ 390 ~ **590** ~ 820	-	☆ 390 ~ **490** ~ 660
Alloy Steel	0.0024 ~ **0.0047** ~ 0.0098	0.0024 ~ **0.0047** ~ 0.0098	★ 330 ~ **520** ~ 720	-	☆ 330 ~ **490** ~ 590
Mold Steel	0.0024 ~ **0.0039** ~ 0.0079	0.0024 ~ **0.0039** ~ 0.0079	★ 260 ~ **460** ~ 590	-	☆ 260 ~ **390** ~ 490
Stainless Steel	0.0024 ~ **0.0047** ~ 0.0098	0.0024 ~ **0.0047** ~ 0.0098	★ 390 ~ **520** ~ 720	-	-
Gray Cast Iron	0.0024 ~ **0.0047** ~ 0.0098	0.0024 ~ **0.0047** ~ 0.0098	-	★ 390 ~ **590** ~ 820	-
Nodular Cast Iron	0.0024 ~ **0.0047** ~ 0.0098	0.0024 ~ **0.0047** ~ 0.0098	-	★ 330 ~ **490** ~ 660	-

★: 1st Recommendation ☆: 2nd Recommendation

Facing | Chamfering

MOFX45 Face Mill (Easy Edge Adjustment)



Rake Angle (°)	A.R.	+15°
	R.R.	+5°

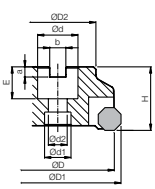


Fig.1

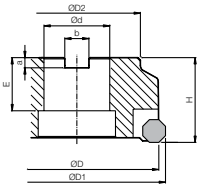


Fig.2

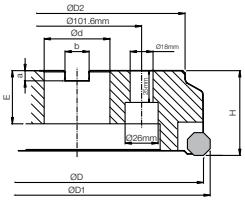


Fig.3

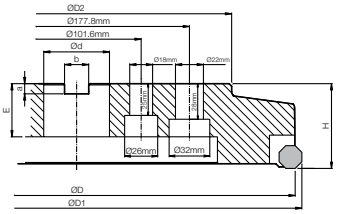


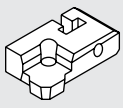
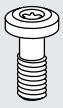
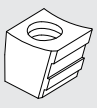
Fig.4

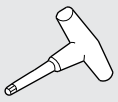
Toolholder Dimensions

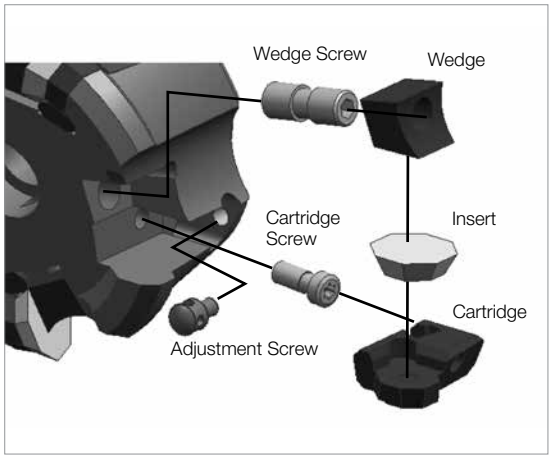
Part Number		Stock	No. of Inserts	Dimensions (mm)										Drawing	Weight (kg)	Applicable Inserts → B21
				ØD	ØD1	ØD2	Ød	Ød1	Ød2	a	b	E	H			
Inch Bore Dia.	MOFX 45080R-07-5T-SF	○	5	80	91	70	1.000"	20	14	0.236"	0.375"	0.984"	50	Fig.1	1.4	
	45100R-07-6T-SF	○	6	100	111	80	1.250"	-	-	0.315"	0.500"	1.260"	50	Fig.2	2.1	
	45125R-07-8T-SF	○	8	125	136	100	1.500"	-	-	0.394"	0.625"	1.496"	63	Fig.2	3.9	
	45160R-07-10T-SF	○	10	160	171	120	2.000"	-	-	0.433"	0.750"	1.496"	63	Fig.2	5.8	OFMR07 Type
	45200R-07-12T-SF	○	12	200	211	130	1.875"	-	-	0.551"	1.000"	1.496"	63	Fig.3	7.6	
	45250R-07-16T-SF	○	16	250	261	180	1.875"	-	-	0.551"	1.000"	1.496"	63	Fig.3	12.9	
	45315R-07-20T-SF	□	20	315	326	240	1.875"	-	-	0.551"	1.000"	1.496"	63	Fig.4	20.7	
Metric Bore Dia.	MOFX 45080R07-5T-MSF	○	5	80	91	70	27	20	14	7	12.4	22	50	Fig.1	1.4	
	45100R07-6T-MSF	○	6	100	111	85	32	-	-	8	14.4	28	50	Fig.2	2.1	
	45125R07-8T-MSF	○	8	125	136	100	40	-	-	9	16.4	30	63	Fig.2	3.9	
	45160R07-10T-MSF	○	10	160	171	120	40	-	-	10	16.4	30	63	Fig.2	6.0	OFMR07 Type
	45200R07-12T-MSF	○	12	200	211	140	60	-	-	15	25.4	38	63	Fig.3	7.4	
	45250R07-16T-MSF	○	16	250	261	180	60	-	-	15	25.4	38	63	Fig.3	12.6	
	45315R07-20T-MSF	□	20	315	326	240	60	-	-	15	25.4	38	63	Fig.4	20.7	

Spare Parts

Recommended Cutting Conditions → C15

Cartridge	Cartridge Screw	Wedge	Wedge Screw	Adjustment Screw
				
LOF07R	SH-50150TR	WOF07R	W8X21	AJ-412

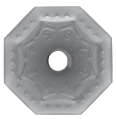
Wrench (for Wedge)	Wrench (for Cartridge)
	
TH-4	TTC-20



Advantages

1) Wedge clamp system
2) Good surface finish (Easy edge adjustment system)
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)

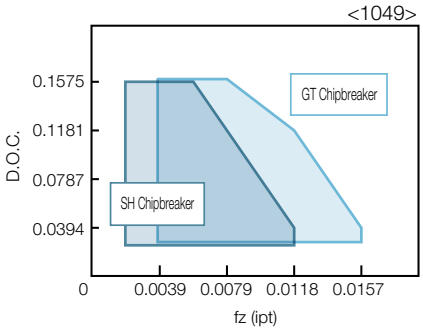
Applicable Inserts

Part Number	Applicable Inserts ➡ B21	
		
MOFX45...-SF	OFMR 070405EN-SH	OFMR 070408EN-GT

Recommended Cutting Conditions ➡ **C15**

Note 1) OFMR0704○○EN-GT / SH is a neutral insert. It can be also used for Left-hand (L) cutter (special order item).
Note 2) Inserts for MOFX type cutter cannot be used for MOF type cutters (Ref. to page ➡ **C15**).

Chipbreaker Range

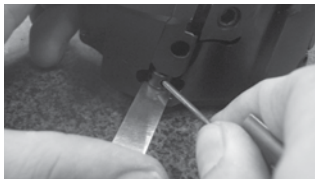


Max D.O.C. and Usable Edges

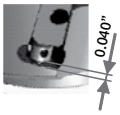
Usable Edges	Max. D.O.C.
	OFMR07 type
4 Edges (using 2 edges at the same time)	0.40"
8 Edges (using only 1 edge at a time)	0.16"

How to Adjust Edge Height

1.Set the edge height adjustment screw



- Set the distance between the bottom of edge height adjustment screw and the cutter body to approximately 0.040".



2. Set the cartridge

- Set the cartridge to the cutter body with the cartridge screw. Recommended torque: 5N·m

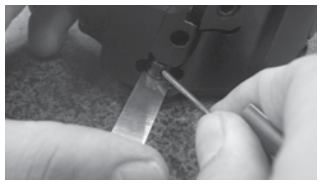
3. Set the wedge

- 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)

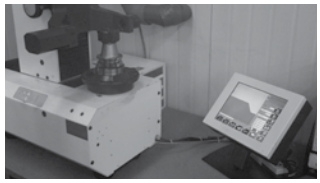
- Loosen the wedge screw by approximately 10°.
- Loosen the cartridge screw by approximately 45°.

5. Correct the edge height



- Measure the front edge height. Using the most protruding insert as the reference, turn the edge height adjustment screw counterclockwise to raise the front edge height to match.

6. Make the final adjustment

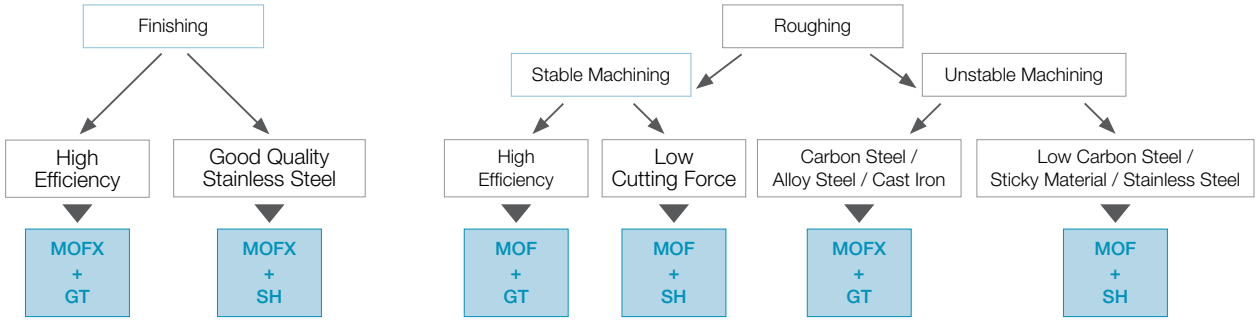


- Tighten the cartridge screw. Recommended torque: 5N·m Tighten the wedge screw. Recommended torque: 6N·m
- Measure the front edge height again.

Outlines of MOFX / MOF Mill

MOFX
High durability of cutter body due to the cartridge design. Best for finishing due to easy edge height adjustment.

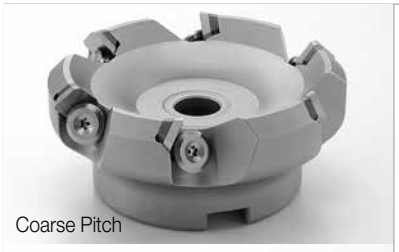
MOF (Ref. page ➡ **C14**)
Excellent chips evacuation when roughing sticky materials such as low carbon steel and stainless steel.



MOFX is great for high precision machining and unstable machining.

Facing | Chamfering

MSE45 Face Mill (Coarse Pitch / Fine Pitch)


Coarse Pitch


Fine Pitch

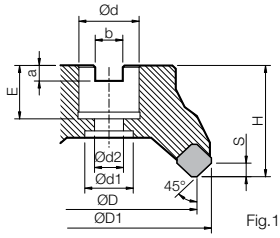


Fig.1

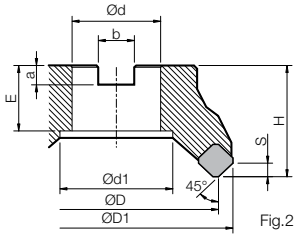


Fig.2

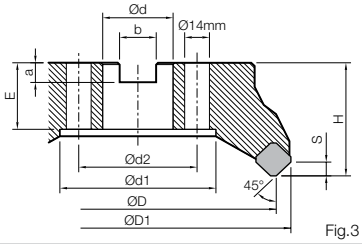


Fig.3

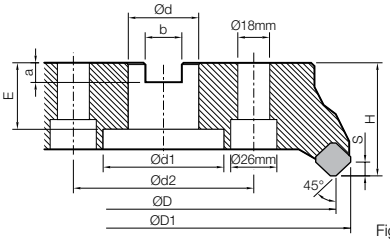


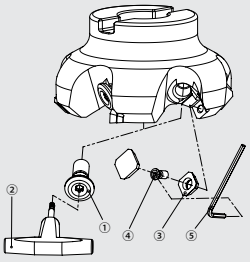
Fig.4

Toolholder Dimensions

Part Number			Stock	No. of Inserts	Dimensions (mm)										Rake Angle (°)		Drawing	Weight (kg)
					ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	s	A.R.	R.R.		
Inch Bore Dia.	Coarse Pitch	MSE 45080R-6T	○	6	80	93	1.000"	20	13.0	50	1.024"	0.236"	0.375"	6	+20°	-8.5°	Fig.1	1.1
		45100R-6T	○	6	100	113	1.250"	46	-	50	1.260"	0.315"	0.500"	6	+20°	-7.5°	Fig.2	1.8
		45125R-7T	○	7	125	138	1.500"	55	-	63	1.496"	0.394"	0.625"	6	+20°	-6.5°	Fig.2	3.4
		45160R-8T	○	8	160	173	2.000"	88	-	63	1.496"	0.433"	0.750"	6	+20°	-5.5°	Fig.2	5.2
		45200R-10T	○	10	200	213	1.875"	68	101.6	63	1.496"	0.551"	1.000"	6	+20°	-5.0°	Fig.4	8.6
	Fine Pitch	MSE 45080R-7T	○	7	80	93	1.000"	20	13.0	50	1.024"	0.236"	0.375"	6	+20°	-8.5°	Fig.1	1.1
		45100R-8T	○	8	100	113	1.250"	46	-	50	1.260"	0.315"	0.500"	6	+20°	-7.5°	Fig.2	1.7
		45125R-9T	○	9	125	138	1.500"	55	-	63	1.496"	0.394"	0.625"	6	+20°	-6.5°	Fig.2	3.3
		45160R-10T	○	10	160	173	2.000"	88	-	63	1.496"	0.433"	0.750"	6	+20°	-5.5°	Fig.2	5.1
		45200R-13T	○	13	200	213	1.875"	68	101.6	63	1.496"	0.551"	1.000"	6	+20°	-5.0°	Fig.4	7.4
Metric Bore Dia.	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	17.0	11.0	48	21	6.3	10.4	6	+20°	-5.0°	Fig.1	0.5
		45063R-5T-M	○	5	63	76	22	17.0	11.0	40	21	6.3	10.4	6	+20°	-10.0°	Fig.1	0.6
		45080R-6T-M	○	6	80	93	27	20.0	13.0	50	24	7.0	12.4	6	+20°	-8.5°	Fig.1	1.1
		45100R-6T-M	○	6	100	113	32	46.0	-	50	32	8.0	14.4	6	+20°	-7.5°	Fig.2	1.8
		45125R-7T-M	○	7	125	138	40	55.0	-	63	33	9.0	16.4	6	+20°	-6.5°	Fig.2	3.4
		45160R-8T-M	○	8	160	173	40	88.0	66.7	63	30	9.0	16.4	6	+20°	-5.5°	Fig.3	5.2
		45200R-10T-M	○	10	200	213	60	68.0	101.6	63	32	14.0	25.7	6	+20°	-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	17.0	11.0	48	21	6.3	10.4	6	+20°	-5.0°	Fig.1	0.5
		45063R-6T-M	○	6	63	76	22	17.0	11.0	40	21	6.3	10.4	6	+20°	-10.0°	Fig.1	0.6
		45080R-7T-M	○	7	80	93	27	20.0	13.0	50	24	7.0	12.4	6	+20°	-8.5°	Fig.1	1.1
		45100R-8T-M	○	8	100	113	32	46.0	-	50	32	8.0	14.4	6	+20°	-7.5°	Fig.2	1.7
		45125R-9T-M	○	9	125	138	40	55.0	-	63	33	9.0	16.4	6	+20°	-6.5°	Fig.2	3.3
		45160R-10T-M	○	10	160	173	40	88.0	66.7	63	30	9.0	16.4	6	+20°	-5.5°	Fig.3	5.1
		45200R-13T-M	○	13	200	213	60	68.0	101.6	63	32	14.0	25.7	6	+20°	-5.0°	Fig.4	7.4

Spare Parts

Part Number	Spare Parts				
	① Clamp Screw	② Wrench	③ Shim	④ Shim Clamp Screw	⑤ Wrench
					
MSE 45040R-○T-M 45050R-○T-M	CP8X15TL (Left-hand screw)	TTC-25	MSE-4245S	SP4X9	LW-2 (for Shim Clamp Screw)
MSE 45080R-○T ~ 45200R-○○T	CP8X23TL (Left-hand screw)				
MSE 45063R-○T-M ~ 45200R-○○T-M					



Clamp Screw ① has a Left-hand thread.
Therefore turn the wrench to the right to remove the insert.

· Arbor Bolt (SP8X35) is included for MSE45040R-OT-M.
· Arbor Bolt (HH10X30S) is included for MSE45050R-OT-M and MSE45063R-OT-M.
· Arbor Bolt (HH12X35M) is included for MSE45080R-OT-M and MSE45080R-OT.

Recommended Cutting Conditions ➡ C19

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
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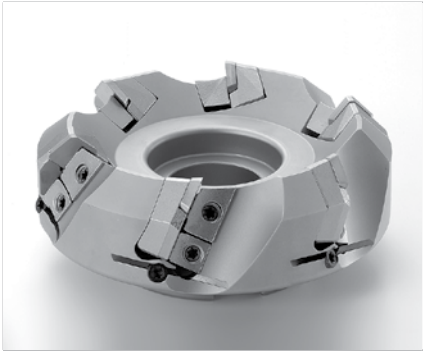
U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Facing | Chamfering

MSE45-SF Face Mill (Easy Edge Adjustment)



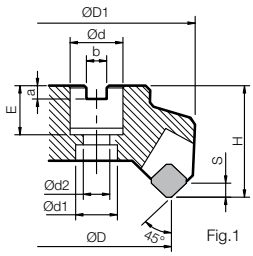


Fig.1

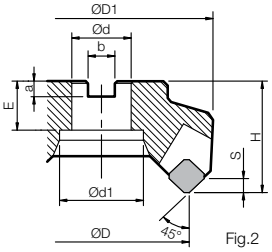


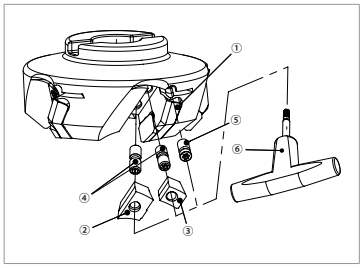
Fig.2

Toolholder Dimensions

	Part Number	Stock	No. of Inserts	Dimensions (mm)										Rake Angle (°)		Drawing	Weight (kg)
				ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	s	A.R.	R.R.		
Inch Bore Dia.	MSE 45080R-5T-SF	○	5	80	101	1.000"	38	-	50	1.024"	0.236"	0.375"	6	+20°	-8.5°	Fig.2	1.5
	45100R-6T-SF	○	6	100	119	1.250"	45	-	50	1.260"	0.315"	0.500"	6	+20°	-7.5°	Fig.2	2.2
	45125R-7T-SF	○	7	125	143	1.500"	55	-	63	1.496"	0.394"	0.625"	6	+20°	-6.5°	Fig.2	4.0
Metric Bore Dia.	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	50	24	7.0	12.4	6	+20°	-8.5°	Fig.1	1.5
	45100R-6T-M-SF	○	6	100	119	32	45	-	50	32	8.0	14.4	6	+20°	-7.5°	Fig.2	2.2
	45125R-7T-M-SF	○	7	125	143	40	55	-	63	30	9.0	16.4	6	+20°	-6.5°	Fig.2	4.0

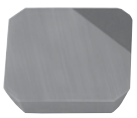
Spare Parts

Part Number	Spare Parts					
	① Cartridge	② Clamp	③ Clamp	④ Clamp Screw	⑤ Adjustment Screw	⑥ Wrench
						
MSE 45○○R-○T-SF MSE 45○○R-○T-M-SF	LSE-445SR	C43R (for Insert)	C44R (for Cartridge)	W6X17	SV-60136TR	TTC-20



· Arbor Bolt (HH10X30S) is included for MSE45063R-4T-M-SF.
· Arbor Bolt (HH12X35M) is included for MSE45080R-5T-M-SF.

Applicable Inserts

Part Number	Applicable Inserts ➡ B10				Applicable PCD Inserts ➡ B26	
				 With Wiper Edge		 With Wiper Edge
MSE45...-SF	SEMR 42AFER-H	SEKR 42AFEN-S	SEEN 42AFTN SEKN 42AFTN 42AFFN	SEEN 42AFTR-W 42AFFR-W	SEEN 42AFFN	SEEN 42AFFR-W
MSE45○○-○○ MSE45○○○R-○T MSE45○○○R-○T-M				-		-

Recommended Cutting Conditions

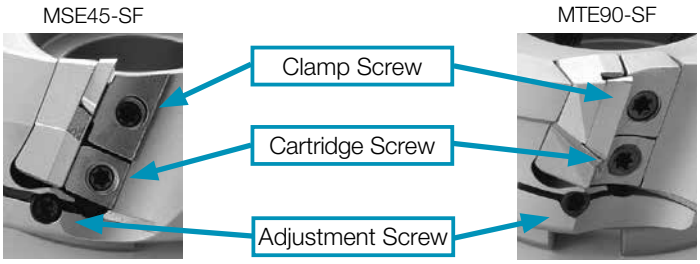
Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)					
		Cermet	MEGACOAT		PVD	Carbide	PCD
		TN100M	PR1225	PR1210	PR830	KW10	KPD001 (KPD010)
Carbon Steel	~0.0118	★ 390 ~ 660	★ 390 ~ 820	-	☆ 390 ~ 660	-	-
Alloy Steel	~0.0118	★ 330 ~ 590	★ 330 ~ 720	-	☆ 330 ~ 590	-	-
Mold Steel	~0.0098	★ 330 ~ 590	★ 260 ~ 590	-	☆ 260 ~ 490	-	-
Stainless Steel	~0.0098	☆ 390 ~ 660	★ 390 ~ 720	-	☆ 390 ~ 660	-	-
Cast Iron	~0.0118	-	-	★ 330 ~ 720	-	☆ 260 ~ 490	-
Non-ferrous Metals	~0.0079	-	-	-	-	★ 330~980	★ 980~2620

★: 1st Recommendation ☆: 2nd Recommendation

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

How to Adjust Cutting Edge Height

Screw Names



* For the explanations below, refer to the screw names indicated above.

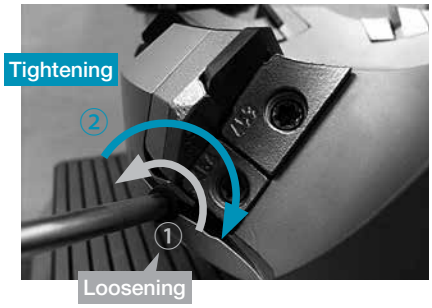
Adjustable Height for the Cutting Edge

- For model MSE45-SF: Approx. 0.02mm
- For model MTE90-SF: Approx. 0.05mm

(The difference in adjustable height varies because of the difference in corner angles.)

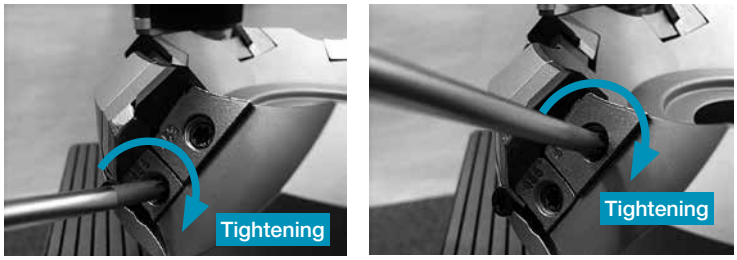
1) Partial Adjustment of the Adjustment Screw

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

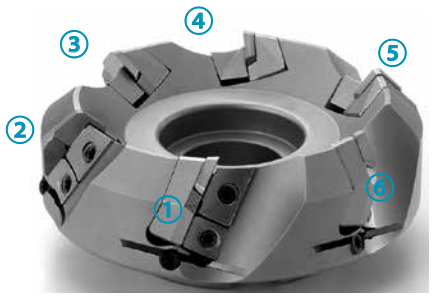
① Partial tighten the cartridge screw. ② Partial tighten the clamp screw.



* 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



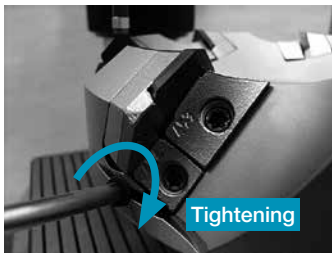
No.	Measurement Results	Results	Edge Fluctuation
①	0.263mm		-0.006mm
②	0.258mm		-0.011mm
③	0.254mm		-0.015mm
④	0.269mm	Max.	0mm
⑤	0.261mm		-0.008mm
⑥	0.250mm	Min.	-0.019mm

Current fluctuation:19μm
(Number ①~⑥ are not indicated on Milling Cutter)

* With each of these screws partialy tightened: cartridge screw, clamp screw, adjustment screw, measure the cutting edge fluctuation.

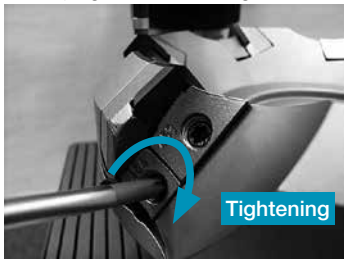
4) Correcting the Fluctuation

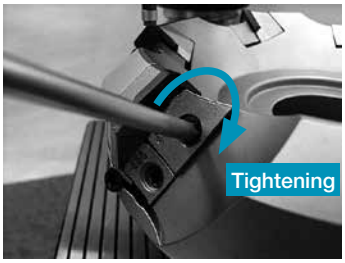
Based on the measurement results, correct the fluctuation.



5) Firm Tightening of the Cartridge and Insert

① Fully tighten the cartridge screw.





Using the measured amount of fluctuation, adjust so that the fluctuation is corrected at the highest corner of the cutting edge, then fully tighten the adjusting screw.

SEEN Wiper Insert

Wiper Insert Features

By installing one wiper insert on the cutter that also has a standard inserts attached, the surface roughness can be improved.
The edge geometry of the wiper insert is an arc style and overhang is slightly prominent to the axis direction when cutter is installed.
Finishing with a wiper insert enables better surface quality.

Recommended Cutting Conditions

1) Vc, fz should be within recommended cutting conditions
2) D.O.C. ≤ 0.0197"

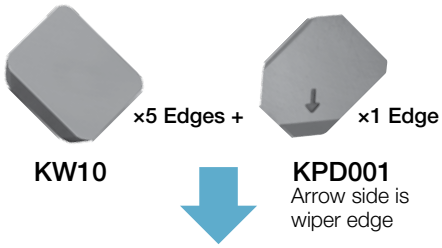
Mounting Wiper Insert

1) Install only one wiper insert along with standard inserts.
2) As only one edge of the wiper insert is used, make sure insert arrow mark " ↓ " faces the workpiece cutting surface.
3) Check overhang amount of wiper insert using MSE45-SF type so that you can obtain stable surface roughness.

Setup Overhang for Wiper Edge

1) **Please adjust wiper insert overhang within 0.0012" to 0.0039" from the largest overhang of the standard inserts.** If overhang is larger than this, the life of the wiper insert will be lower.
2) **0.0020" overhang is recommended for the wiper insert.**

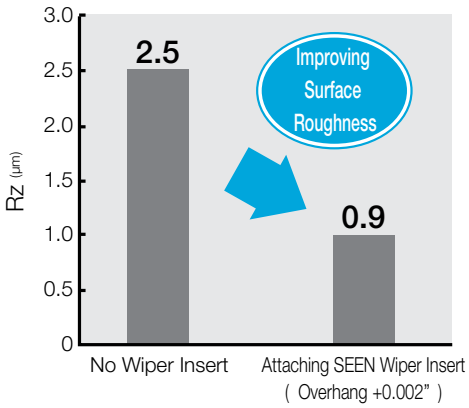
Example when Finishing Aluminum with Ø125mm…



Lower Costs & Good Surface Finish

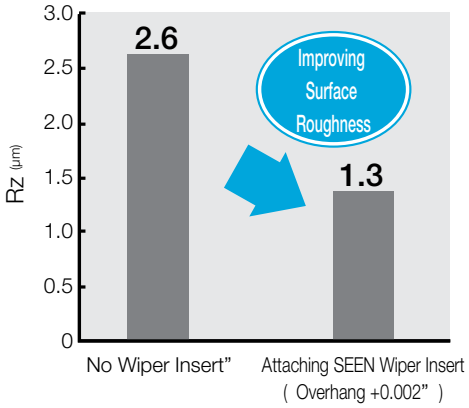
Case Studies

For Aluminum (5052)



Cutting Conditions
·MSE45100R-6T-SF
·Vc = 980 sfm
·D.O.C. = 0.0079"
·fz = 0.0079 ipt
·Wet
·No Wiper Insert
SEKN42AFFN (KW10)
6 Inserts
·With Wiper Insert
SEKN42AFFN (KW10)
5 Inserts
SEEN42AFFR-W (KPD001)
1 Insert

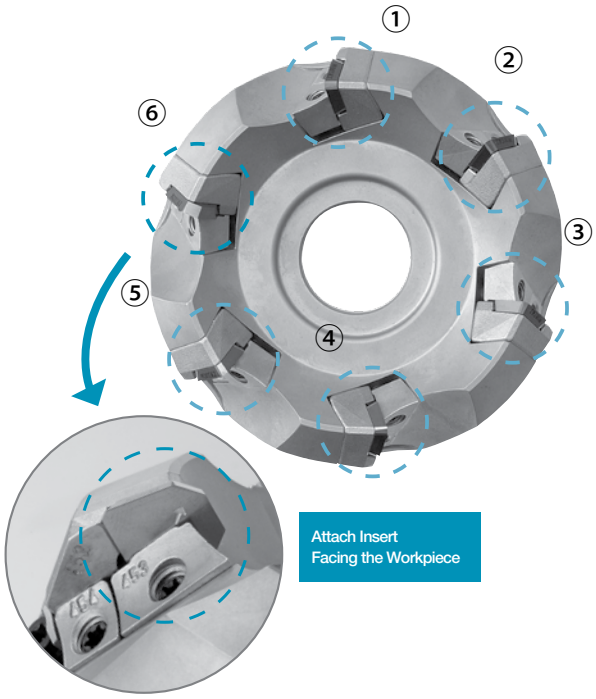
For Steel (1049)



Cutting Conditions
·MSE45100R-6T-SF
·Vc = 660 sfm
·D.O.C. = 0.0079"
·fz = 0.0039 ipt
·Dry
·No Wiper Insert
SEKN42AFTN (TN100M)
6 Inserts
·With Wiper Insert
SEKN42AFTN (TN100M)
5 Inserts
SEEN42AFTR-W (TN100M)
1 Insert

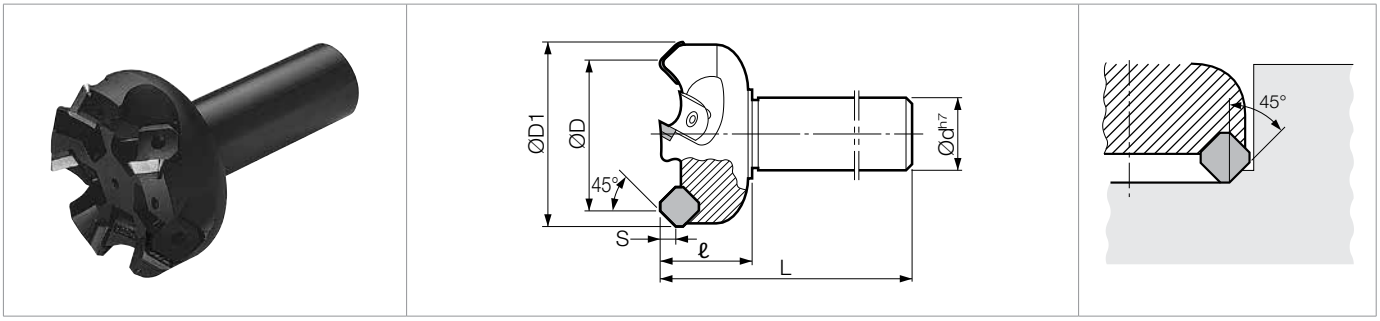
Example of attaching wiper insert

No.	Insert	Edge Fluctuation
①	Standard	-0.006mm
②	Standard	-0.011mm
③	Standard	-0.015mm
④	Standard	0mm
⑤	Standard	-0.008mm
⑥	With Wiper Edge	+0.03mm~+0.10mm



Facing | Chamfering

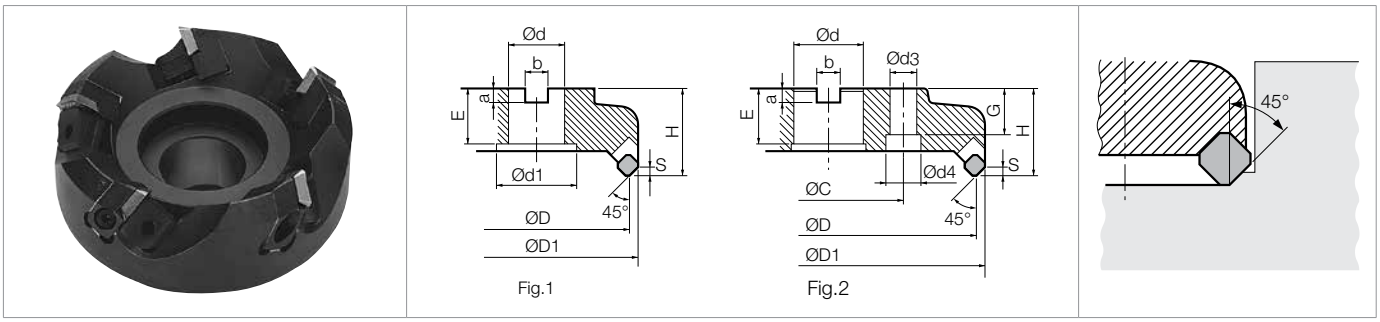
MSO45-S with Cylindrical Shank (High Rake)



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)						Rake Angle (°)		Spare Parts				
			ØD	ØD1	Ød	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	32	120	40	7.1							
4580-S	○	5	80	96	32	120	40	7.1							

MSO45 Face Mill (High Rake)

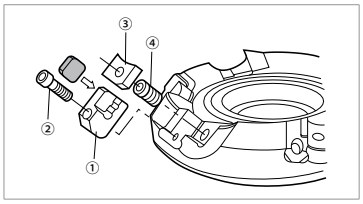


Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)														Rake Angle (°)		Drawing	Weight (kg)
			ØD	ØD1	Ød	Ød1	Ød2	Ød3	Ød4	ØC	H	E	G	a	b	S	A.R.	R.R.		
MSO 45100R	○	5	100	114.8	31.750	48	-	-	-	-	60	32	-	8	12.7	7.1	+27°	-8°	Fig.1	2.5
45125R	○	6	125	140.0	38.100	58	-	-	-	-	60	38	-	10	15.9	7.1			Fig.1	3.7
45160R	○	8	160	174.5	50.800	68	-	-	-	-	60	38	-	11	19.0	7.1			Fig.1	5.4
45200R	○	10	200	214.5	47.625	-	-	18	26	101.6	60	38	32	14	25.4	7.1			Fig.2	8.4

Spare Parts

Part Number	Spare Parts				
	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

Part Number	Applicable Inserts ➡ B10		Applicable PCD Inserts ➡ B26
			
MSO 45...	SOKR 13T3AXEN-J	SOKN 13T3AXTN 13T3AXFN	SOKN 13T3AXFN-NE

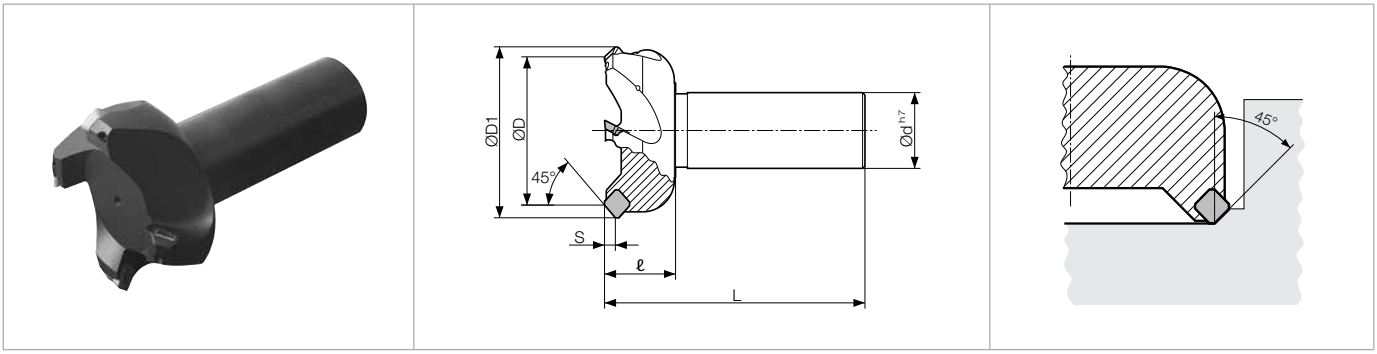
Recommended Cutting Conditions ➡ C23

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Facing | Chamfering

MSO45-S-09 with Cylindrical Shank (High Rake)



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)						Rake Angle (°)		Spare Parts	
			ØD	ØD1	Ød	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	32	110	30	4.2				
4580-S32-09	○	4	80	90	32	110	30	4.2				

Applicable Inserts

Part Number	Applicable Inserts ➡ B22	
		
MSO 45...-09	SOMT 0903AXEN-J	SOMW 0903AXTN 0903AXFN

MSO45 / MS045...-09 Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)				
		Cermet	MEGACOAT		Carbide	PCD
		TN100M	**PR1225**	**PR1210**	**KW10**	**KPD230**
Carbon Steel	~0.0118	★ 390 ~ 660	★ 390 ~ 820	-	-	-
Alloy Steel	~0.0118	★ 330 ~ 590	★ 330 ~ 720	-	-	-
Mold Steel	~0.0098	★ 330 ~ 590	★ 260 ~ 590	-	-	-
Stainless Steel	~0.0098	☆ 390 ~ 660	★ 390 ~ 720	-	-	-
Cast Iron	~0.0118	-	-	★ 330 ~ 720	☆ 260 ~ 490	-
Non-ferrous Metals	~0.0079	-	-	-	★ 330 ~ 980	★ 980 ~ 2620

★: 1st Recommendation ☆: 2nd Recommendation

75° LEAD ANGLE

D

D1 - D8

75° LEAD ANGLE	D2 - D8
MSRS15	D2
MSP15 / MSE15	D8

Facing

MonSteR Square Mill

Square (4-edge) type MSRS15 Face Mill

Roughing Takes Place in One Pass (Max. D.O.C. 0.472")

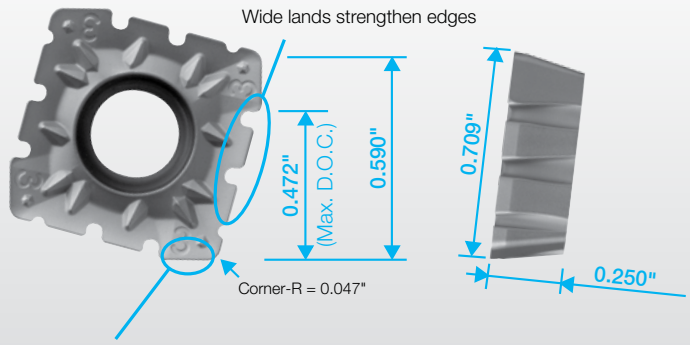
Conventional Tools

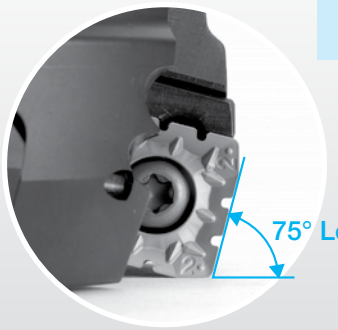
Metal Removal Rate Drastically Increased

MSRS15

Large depths of cut and high feed rates improve metal removal efficiency

● **Recommended D.O.C. : 5mm~10mm (0.200"~0.400")**



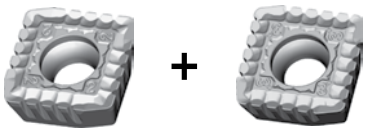
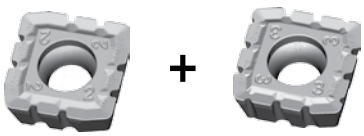
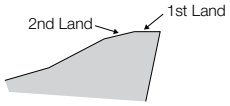
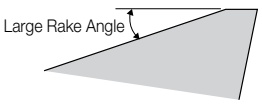
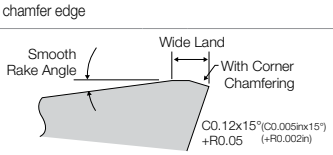


A.R. +9°
R.R. –9° (ø80mm)
–5° (> ø100mm)

Large wiper edges enable increased feed rates.

Strong inserts due to 6.35mm (0.250") thickness.

● Chipbreaker Selection

	Low Cutting Force Oriented	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	Ideal when using extended arbors or for cutting thin plate workpieces	General purpose with good balance of strength and low cutting resistance	Ideal for interrupted cutting Ideal 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, cutting resistance, and chip control are all well balanced	Strength is increased by the edge shape and moderate rake angle of the chamfer edge
			

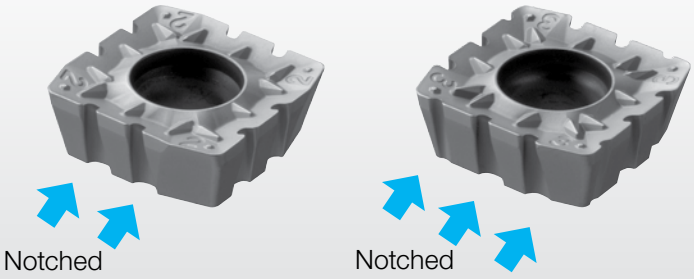
A supplemental chipbreaker may be used when it is necessary to increase strength and bite while focusing on low cutting resistance, as when machining welded areas.

Insert Number - NB2P (4-Notched) and **NB3P** (5-Notched)

In order to match each insert with the corresponding insert pocket of the milling cutter, "**2**" is marked for NB2P insert (4-Notched) and "**3**" is marked on NB3P insert (5-Notched).

Notched Inserts Reduce Cutting Forces and Chattering to Enable Efficient Machining

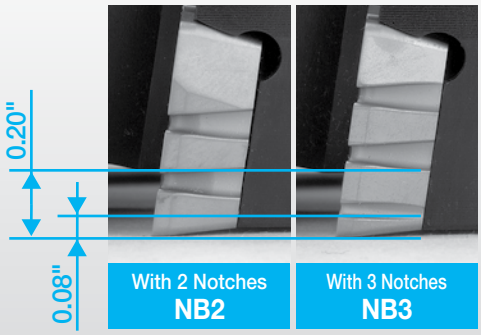
Notched Inserts



NB2 **NB3**

Notch effect

The effects of the notch can be seen at more than 0.20" of vertical axial D.O.C.
(effects for NB3 appears from at least 0.08" or more)



With 2 Notches **NB2** | With 3 Notches **NB3**

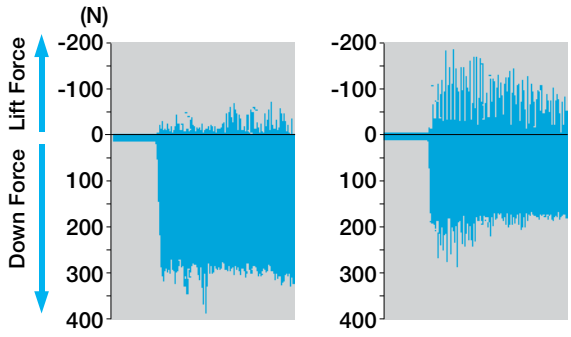
Designed to Suppress Chattering by Reducing Cutting Forces

Possible to cut thin-plate workpieces

MSRS15160R-8T
Workpiece Material: 1050 Steel
Vc = 675 sfm (n = 398 RPM)
fz = 0.006 ipt (Vf = 18.78 ipm), D.O.C. × ae = 0.24" × 3.94"
(Cutting of unsupported overhang from a thickness of 0.600"-0.350")

Comparison of cutting force (radial force)

MSRS suppresses chattering by generating less "lifting force" during cutting.

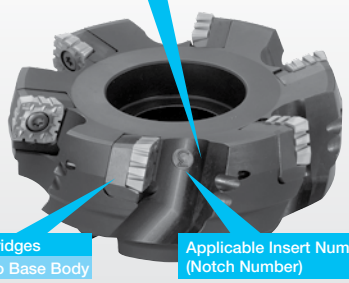


MSRS15 | Competitor A

Features of Toolholder

Coarse Pitch

Designed with Large Chip Pockets
Good Chip Evacuation



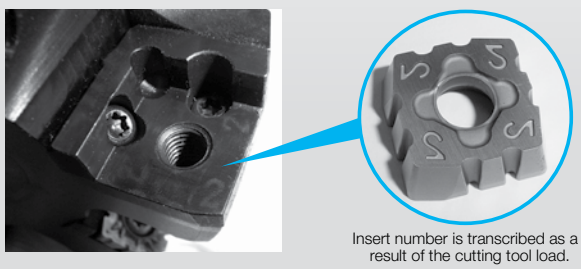
Designed with Cartridges
Prevents Damage to Base Body

Applicable Insert Number
(Notch Number)

Fine Pitch

Higher Productivity Due to Close Pitch Design

Insert Replacement Identification



Insert number is transcribed as a result of the cutting tool load.

* Depending on the cutting conditions, marks may not be transcribed.

MSRS15 Face Mill (Inch Bore Dia.)

(Coarse Pitch Shown)

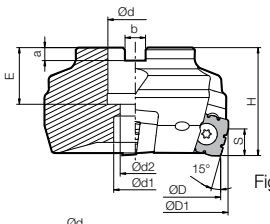


Fig.1

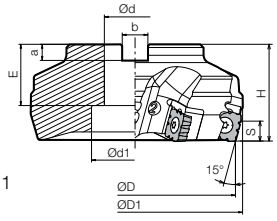


Fig.2

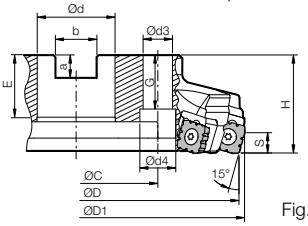


Fig.3

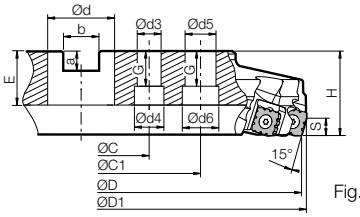


Fig.4

Rake Angle (°)		
Part Number	A.R.	R.R.
MSRS153000R...	+9°	-9°
MSRS154000R... MSRS15~12000R...	+9°	-5°
MSRS15080R...	+9°	-9°
MSRS15100R... MSRS15~315R...	+9°	-5°

D 75° LEAD

Toolholder Dimensions (Bore Dia Ød: Inch)

	Part Number	Stock	Unit	No. of Inserts	Dimensions																Drawing	Weight (kg)
					ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4	Ød5	Ød6	ØC	ØC1	ØG		
Coarse Pitch	MSRS 153000R-4T	●	inch	4	3.00	3.27	1.000	0.87	0.551	1.97	0.75	0.31	0.375	0.47	-	-	-	-	-	-	-	Fig.1	1.3
	154000R-4T	●		4	4.00	4.27	1.250	1.38	-			0.40	0.500										2.0
	155000R-6T	●		6	5.00	5.27	1.500	2.13		2.48	1.00	0.40	0.625									Fig.2	3.6
	156000R-8T	●		8	6.00	6.27	2.000	2.68				0.47	0.750										5.0
	158000R-10T	●		10	8.00	8.27	2.500	-			1.25	0.53	1.000		0.675	1.045	-	-	4	-	1.25	Fig.3	7.7
	1510000R-12T	●		12	10.00	10.27																	12.0
	1512000R-14T	□		14	12.00	12.27											0.795	1.25		2.65		Fig.4	17.0
Fine Pitch	MSRS 153000R-6T	●	inch	6	3.00	3.27	1.000	0.87	0.551	1.97	0.75	0.31	0.375	0.47	-	-	-	-	-	-	-	Fig.1	1.3
	154000R-6T	●		6	4.00	4.27	1.250	1.38	-			0.40	0.500										1.9
	155000R-8T	●		8	5.00	5.27	1.500	2.13		2.48	1	0.40	0.625									Fig.2	3.5
	156000R-10T	●		10	6.00	6.27	2.000	2.68				0.47	0.750										4.9
	158000R-12T	●		12	8.00	8.27	2.500	-			1.25	0.53	1.000		0.675	1.045	-	-	4	-	1.25	Fig.3	7.6
	1510000R-14T	●		14	10.00	10.27																	11.9
	1512000R-16T	□		16	12.00	12.27											0.795	1.25		2.65		Fig.4	17.0
Coarse Pitch	MSRS 15080R-4T	○	mm	4	80	87	1.000"	20	13	50	1.024"	0.236"	0.375"	12	-	-	-	-	-	-	-	Fig.1	1.3
	15100R-4T	○		4	100	107	1.250"	42	-		1.260"	0.315"	0.500"										2.0
	15125R-6T	○		6	125	132	1.500"	54		60	1.496"	0.394"	0.625"									Fig.2	3.6
	15160R-8T	○		8	160	167	2.000"	68				0.433"	0.750"										5.0
	15200R-10T	○		10	200	207	1.875"	-				0.551"	1.000"		18	26	-	-	101.6	-	32	Fig.3	7.7
	15250R-12T	○		12	250	257																	12.0
	15315R-14T	○		14	315	322											22	32		177.8	25	Fig.4	17.0
Fine Pitch	MSRS 15080R-6T	○	mm	6	80	87	1.000"	20	13	50	1.024"	0.236"	0.375"	12	-	-	-	-	-	-	-	Fig.1	1.3
	15100R-6T	○		6	100	107	1.250"	42	-		1.260"	0.315"	0.500"										1.9
	15125R-8T	○		8	125	132	1.500"	54		60	1.496"	0.394"	0.625"									Fig.2	3.5
	15160R-10T	○		10	160	167	2.000"	68				0.433"	0.750"										4.9
	15200R-12T	○		12	200	207	1.875"	-				0.551"	1.000"		18	26	-	-	101.6	-	32	Fig.3	7.6
	15250R-14T	○		14	250	257																	11.9
	15315R-16T	□		16	315	322												32		177.8	25	Fig.4	17.0

- Mounting bolts (HH12X35) are included in MSRS15080R-OT. (HH1/2-1.25) are included with MSRS153000R-OT.
- Cartridge is included in the coarse pitch cutters, but no Cartridge in the fine pitch.

Applicable Inserts ➔ D6

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World Express (Shipping: 7-10 Business Days) : ○

Facing

MSRS15 Face Mill (Metric Bore Dia.)

(Coarse Pitch Shown)

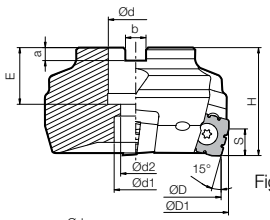


Fig.1

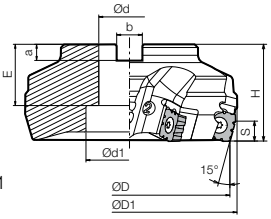


Fig.2

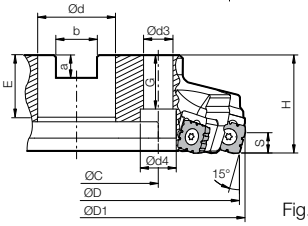


Fig.3

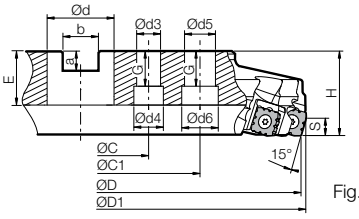


Fig.4

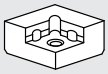
Rake Angle (°)		
Part Number	A.R.	R.R.
MSRS15080R...	+9°	-9°
MSRS15100R... ~ MSRS15315R...	+9°	-5°

Toolholder Dimensions (Bore Dia Ød: Metric)

	Part Number	Stock	Unit	No. of Inserts	Dimensions																	Drawing	Weight (kg)
					ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4	Ød5	Ød6	ØC	ØC1	ØG		
Coarse Pitch	MSRS 15080R-4T-M	○	mm	4	80	87	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig.1	1.3
	15100R-4T-M	○		4	100	107	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		68							14	20	-	-	66.7	-	28	Fig.3	5.0
	15200R-10T-M	○		10	200	207	60	-			38	15	25.7		18	26			101.6		32		7.7
	15250R-12T-M	○		12	250	257																	12.0
	15315R-14T-M	○		14	315	322											22	32		177.8		Fig.4	17.0
Fine Pitch	MSRS 15080R-6T-M	○	mm	6	80	87	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig.1	1.3
	15100R-6T-M	○		6	100	107	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		68							14	20	-	-	66.7	-	28	Fig.3	4.9
	15200R-12T-M	○		12	200	207	60	-			38	15	25.7		18	26			101.6		32		7.6
	15250R-14T-M	○		14	250	257																	11.9
	15315R-16T-M	□		16	315	322											22	32		177.8		Fig.4	17.0

- Mounting bolts (HH12X35) are included in MSRS15080R-OT-M.
- Cartridge is included in the coarse pitch cutters, but no Cartridge in the fine pitch.

Spare Parts

	Part Number	Spare Parts						
		Clamp Screw	Wrench	Cartridge	Clamp Screw	Wrench	Anti-seize Compound	Mounting Bolt
								
Coarse Pitch	MSRS 153000R-4T	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	MP-1	HH1/2-1.25
	154000R-4T							HH3/4-2.3
	155000R-6T ~ 1512000R-14T	Recommended Torque for Insert Screw 7.5N · m		Recommended Torque for Shim Clamp 3.5N · m				-
Fine Pitch	MSRS 153000R-6T	SB-60120TR	TT-25L	-	-	-	MP-1	HH1/2-1.25
	154000R-6T							HH3/4-2.3
	155000R-8T ~ 1512000R-16T	Recommended Torque for Insert Screw 7.5N · m						-
Coarse Pitch	MSRS 15080R-4T(-M)	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	MP-1	HH12X35
	15100R-4T(-M) ~ 15315R-14T(-M)	Recommended Torque for Insert Screw 7.5N · m		Recommended Torque for Shim Clamp 3.5N · m				-
Fine Pitch	MSRS 15080R-6T(-M)	SB-60120TR	TT-25L	-	-	-	MP-1	HH12X35
	15100R-6T(-M) ~ 15315R-16T(-M)	Recommended Torque for Insert Screw 7.5N · m						-

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

Applicable Inserts D6

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□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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Facing

Applicable Inserts

Part Number	Applicable Inserts → B23 (Right-hand Shown)			
	 2-Notch	 3-Notch	 2-Notch / Tough Edge	 3-Notch / Tough Edge
MSRS... MSRS...M	SPMT 1806EDER-NB2	SPMT 1806EDER-NB3	SPMT 1806EDSR-NB2T	SPMT 1806EDSR-NB3T
For Custom Ordered Left-hand Cutter	-	-	SPMT 1806EDSL-NB2T	SPMT 1806EDSL-NB3T

Part Number	Applicable Inserts → B23		
	 4-Notch / Low Cutting Force	 5-Notch / Low Cutting Force	 Without Notch
MSRS... MSRS...M	SPMT 1806EDER-NB2P	SPMT 1806EDER-NB3P	SPMT 1806EDER-V

Chipbreaker Selection → D2

Recommended Cutting Conditions

Part Number	Feed Rate fz (ipt)			Recommended Insert Grades (Cutting Speed Vc: sfm)			
				MEGACOAT			PVD Coated Carbide
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	**PR1225**	**PR1230**	**PR1210**	**PR830**
Carbon Steel	0.006	0.008	0.012	☆ 400 ~ **600** ~ 820	★ 400 ~ **600** ~ 725	-	☆ 400 ~ **575** ~ 725
Alloy Steel	0.006	0.008	0.012	☆ 400 ~ **600** ~ 820	★ 400 ~ **600** ~ 725	-	☆ 400 ~ **575** ~ 725
Mold Steel	0.004	0.006	0.008	☆ 325 ~ **525** ~ 725	★ 325 ~ **525** ~ 675	-	☆ 325 ~ **500** ~ 675
Gray Cast Iron	0.008	0.010	0.014	-	-	★ 400 ~ **600** ~ 820	-
Nodular Cast Iron	0.006	0.008	0.012	-	-	★ 325 ~ **525** ~ 725	-
Stainless Steel	Not Recommended						
Aluminum / Copper	Not Recommended						

★ : 1st Recommendation ☆ : 2nd Recommendation

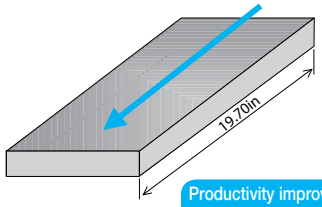
Facing

Case Studies

Structural Steel

Plate
- Vc=492 sfm (n = 382 RPM)
- D.O.C. × ae = 0.39"×4.92"
- fz=0.008 ipt (Vf = 18.03 ipm)
- Dry · 6 flutes
- MSRS15125R-6T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)



Productivity improved by 4.4 times!

MSRS15	Metal Removal Rate 34.91in³/min.
Competitor's Cutter A	7.87in³/min.

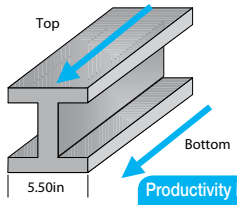
[Competitor's Cutter A]
ø125mm, 6 flutes
Vc=492sfm (n=382RPM)
ap×ae=0.12×4.92in
fz=0.006ipt (Vf=13.54ipm)

[User's Comments]
Because conditions can be raised drastically, this cutter was very effective at reducing cycle time.
Productivity improved by 4.4 times.
(Customer Evaluation)

1050 Steel

Rail
- Vc=492 (n = 300 RPM)
- D.O.C. × ae = 0.24" × 5.51"
- fz=0.008 ipt (Vf = 18.90 ipm)
- Dry · 8 flutes
- MSRS15160R-8T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)



Productivity improved by 4.7 times!

MSRS15	Metal Removal Rate 24.59in³/min.
Competitor's Cutter B	5.21in³/min.

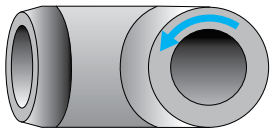
[Competitor's Cutter B]
Machining at 0.08" × 3 passes
Vc = 492 sfm (n = 300RPM)
D.O.C. × ae= 0.08 × 5.51in
fz=0.005ipt (Vf=11.81ipm)

[User's Comments]
MSRS can complete cutting with 1 pass what needed to be cut with 3 passes previously. Cutting sound of MSRS was still quiet. Productivity improved by 4.7 times.
(Customer Evaluation)

Cast Steel

Industrial Machine Components
- Vc = 325 sfm (n = 200 RPM)
- D.O.C. × ae = 0.394" × 4.490"
- fz = 0.016 ipt (Vf = 25 ipm)
- Dry · 8 flutes
- MSRS15160R-8T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)



Productivity improved by 2.5 times!

MSRS15	Metal Removal Rate 44.18in³/min.
Competitor's Cutter C	17.70in³/min.

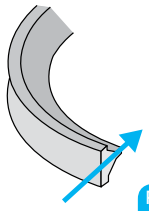
[Competitor's Cutter C]
Ø6", 8 flutes
Vc = 820sfm (n = 522min⁻¹)
D.O.C. × ae = 0.394" × 4.490"
fz=0.010ipt (Vf=40.00ipm)

[User's Comments]
Before MSRS, ap could not be increased due to high cutting resistance, but MSRS can increase ap without increasing load on the main spindle. Productivity improved by 2.5 times
(Customer Evaluation)

1045 Steel

Gear
- Vc = 675 sfm (n = 255 RPM)
- D.O.C. × ae = 0.394" × 7.874"
- fz = 0.007 ipt (Vf = 23.62 ipm)
- Dry · 14 flutes
- MSRS15250R-14T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3

(PR830)



Productivity improved by 2.6 times!

MSRS15	Metal Removal Rate 73.23in³/min.
Competitor's Cutter D	28.00in³/min.

[Competitor's Cutter D]
Ø250mm, 12 flutes
Vc=400sfm (n=153RPM)
D.O.C. × ae = 0.20"×7.87"
fz = 0.010 ipt (Vf = 18.07 ipm)

[User's Comments]
Cutting sound is quiet even when cutting width is less than 80% of cutter dia.
Productivity improved by 2.6 times.
(Customer Evaluation)

Q&A

Q-1 What amount of cutting width (ae) is recommended in a radial direction?

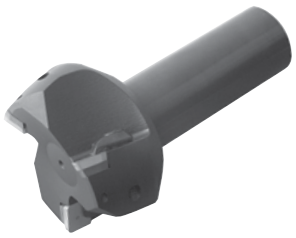
A-1 The estimated amount is 70-80% of the diameter of the cutting tool.

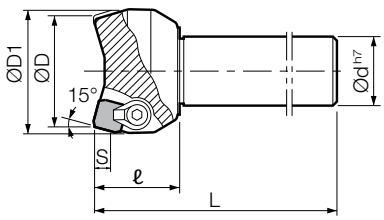
Q-2 Why does the MSRS15 have a 75° lead?

A-2 45° cutting angles can reduce the impact in cutting a workpiece but also increase thrust force. On the other hand, a 90° cutting angle can reduce thrust forces but increases the impact when the insert cuts the workpiece. The 75° cutting angle of the MSRS15 can suppress both thrust force and impact, offering a good balance and enabling smooth machining even in heavy machining applications.

Facing

MSP15 (Cylindrical Shank) MSE15 (Cylindrical Shank / High Rake)





Toolholder Dimensions

Part Number		Stock	No. of Inserts	Dimensions (mm)						Rake Angle (°)		Spare Parts			
				ØD	ØD1	Ød	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

Part Number	Applicable Inserts ➡ **B11** (Right-hand Shown)			Applicable Inserts ➡ **B10**
				
MSP 15...	SPMR 42EDER-H	SPKR 42EDER-S	SPCN 42EDTR SPKN 42EDTR SPKN 42EDER SPKN 42EDFR	-
MSE 15...	-	-	-	SEKN 42EFTR

Recommended Cutting Conditions

Part Number	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)						
		Cermet	MEGACOAT		CVD Coated Carbide	Carbide	PCD	
		TN100M	**PR1225**	**PR1210**	**CA420M**	**KW10**	**KPD001**	**KPD010**
Carbon Steel	~0.012	★ 390 ~ 660	★ 390 ~ 820	-	-	-	-	-
Alloy Steel	~0.012	★ 330 ~ 590	★ 330 ~ 720	-	-	-	-	-
Mold Steel	~0.010	★ 330 ~ 590	★ 260 ~ 590	-	-	-	-	-
Stainless Steel	~0.010	☆ 390 ~ 660	★ 390 ~ 720	-	-	-	-	-
Cast Iron	~0.012	-	-	★ 330 ~ 720	★ 560 ~ 980	☆ 260 ~ 490	-	-
Non-ferrous Metals	~0.008	-	-	-	-	★ 330 ~ 980	★ 980 ~ 2620	☆ 980 ~ 2620

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90° LEAD ANGLE

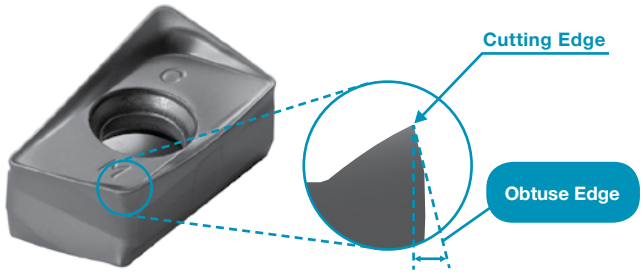
E1 - E75

M-Four

MEW Milling Cutter

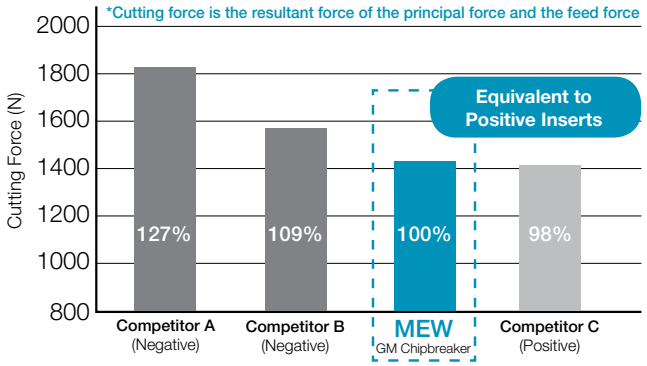
The M-Four double-sided, 4-edge insert with Kyocera's unique mold technology reduces cutting forces for reduced vibrations

Obtuse Edge for Increased Cutting Edge Toughness



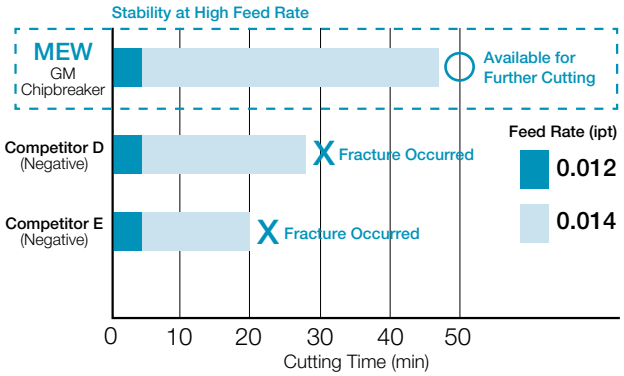
Low Cutting Forces Equivalent to Positive Inserts

• Cutting Force Comparison



1049 Ø20mm Cutter
Vc = 500 sfm D.O.C. × ae = 0.118" × 0.591" fz = 0.006ipt (Internal Evaluation)

• Fracture Resistance Comparison



4140 (37~39Hs) Ø20mm Cutter
Vc = 400sfm D.O.C. × ae = 0.118" × 0.394" fz = 0.012~0.014 ipt (Internal Evaluation)

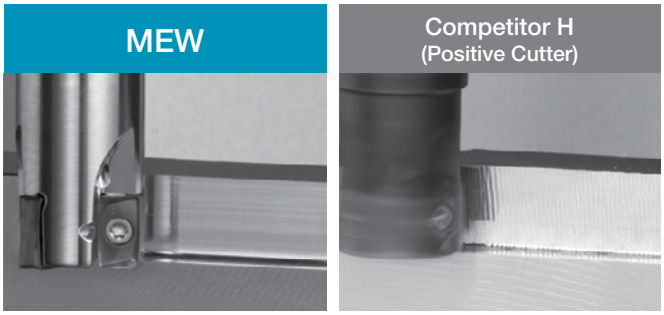
Improved Surface Finish & Minimized Vibration

Sharp cutting and superior resistance to vibration and burrs due to helical cutting edge and optimum axial rake design

Large Rake Angle Reduces Cutting Forces

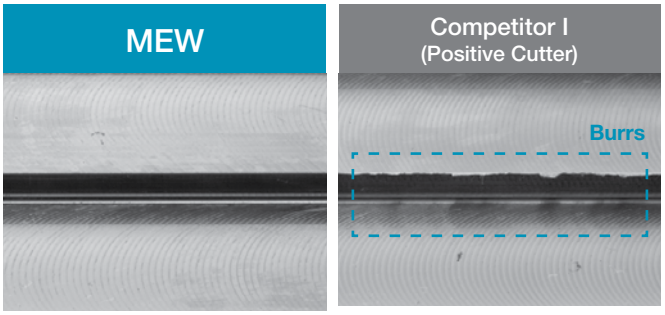
MEW GM Chipbreaker	Competitor F (Negative)	Competitor G (Positive)
+20°	+17°	+17°

Surface of Shoulder Wall



Smooth surface of MEW without chattering

Burr Comparison with Positive Cutters



Fewer burrs than positive cutters due to sharp cutting

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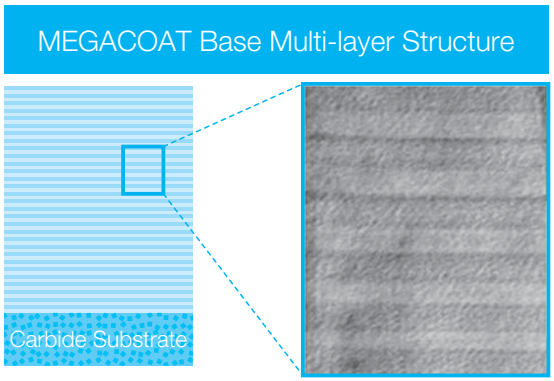
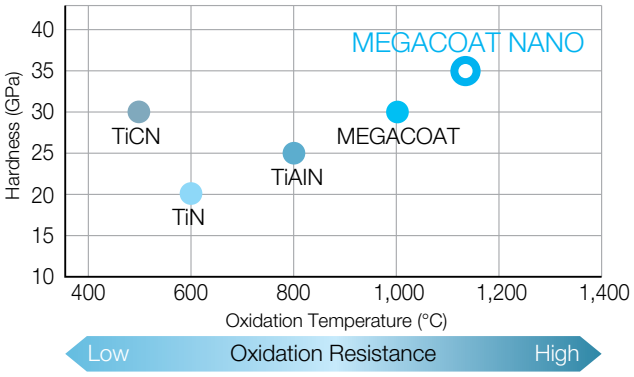
PR1525 for steel and austenitic stainless steel, **PR1510** for cast iron,
PR1535 titanium alloy and precipitation hardened steel
CA1535 (CVD coated carbide) for heat-resistant alloys and martensitic stainless steel



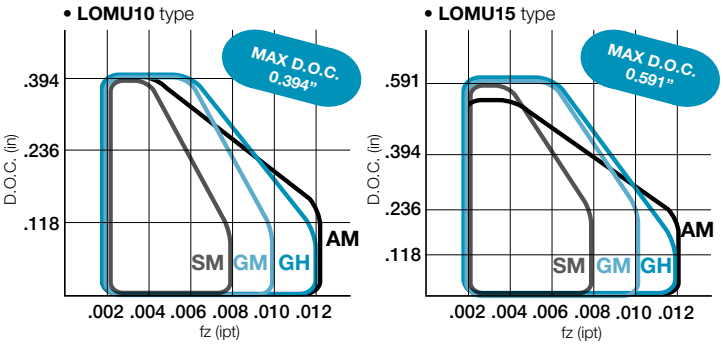


Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C)

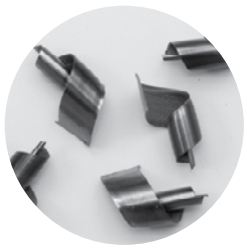
Chipbreaker Lineup

Three innovative chipbreaker designs to cover a wide range of applications

Chipbreaker	Application	Shape
GM	General Purpose	
SM	Low Cutting Force	
GH	Heavy Milling	
NEW AM	Aluminum / Non-ferrous Metals	



<Cutting Conditions> Vc = 500 sfm ae = ØD/2 Workpiece Material: 1050 Steel



Chips (Slotting)

Chips (Shouldering)

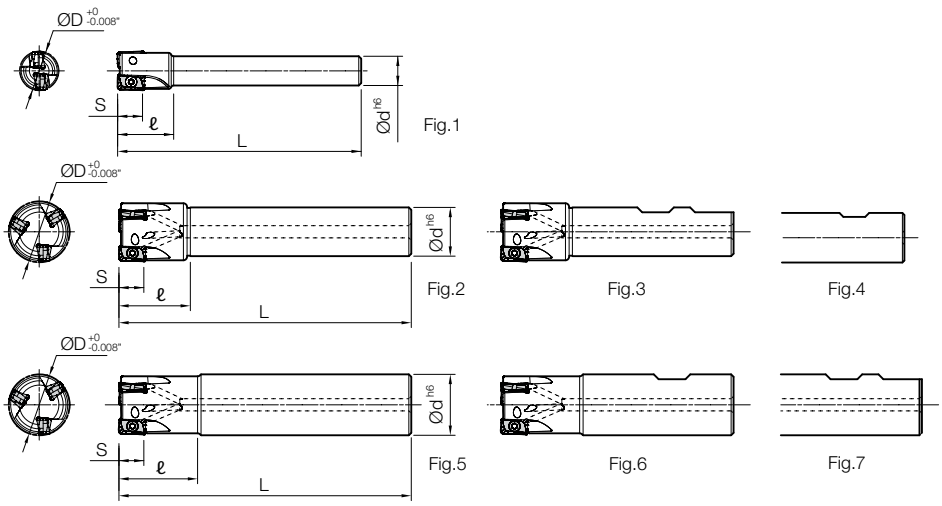
Insert Corner-R(rε) Lineup Expansion

Corner-R(rε) 0.4 ,1.0 ,1.2 ,1.6 and 2.0 added to GM chipbreaker lineup

LOMU100404ER-GM LOMU150504ER-GM	LOMU100408ER-GM LOMU150508ER-GM	LOMU150510ER-GM	LOMU100412ER-GM LOMU150512ER-GM	LOMU100416ER-GM LOMU150516ER-GM	LOMU100420ER-GM LOMU150520ER-GM

MEW End Mill (Inch)

(Cylindrical Shank)



Toolholder Dimensions (Inch)

Shank		Part Number	Stock	No. of Inserts	Dimensions (in)					Rake Angle (°)		Coolant Hole	Drawing	Max RPM*
					ØD	Ød	L	ℓ	S	A.R. (Max)	R.R.			
Weldon	Standard Shank	MEW 0625-W500-10-2T	●	2	0.625	0.500	2.75	0.969	0.393	+7°	-22°	No	Fig.4	43,900
		0625-W625-10-2T	●			0.625	3.00	1.046				Yes	Fig.6	43,900
		0750-W625-10-2T	●		0.750	0.625	3.25	1.145			-20°	Yes	Fig.3	42,000
		0750-W750-10-2T	●			0.750		1.170					Fig.6	42,000
		0750-W750-10-3T	●	3	0.750	0.750	3.25	1.170	0.393	+7°	-20°	Yes	Fig.6	42,000
		0750-W750-4-10-3T	●				4.25	1.413			-21°	Yes		42,000
		1000-W750-10-3T	●		1.000	0.750	3.25	1.219			-20°		Fig.3	37,200
		1000-W100-10-2T	●	2	1.000	1.000	3.75	1.413	0.393	+7°	-20°	Yes	Fig.7	37,200
		1000-W100-10-3T	●	3										37,200
		1000-W100-475-10-3T	●				4.75							37,200
		1250-W100-10-4T	●	4	1.250	1.000	3.75	1.469	0.393	+7°	-20°	Yes	Fig.3	34,000
		1250-W125-10-3T	●	3		1.250	4.00	1.663	0.393	+7°	-20°	Yes	Fig.7	34,000
		1250-W125-10-4T	●	4										34,000
		1500-W125-10-5T	●	5	1.500	1.250	4.125	2.070	0.393	+7°	-19°	Yes	Fig.3	30,700
NEW	Long Overhang	MEW 0750-W750-4-10-3T	●	3	0.750	0.750	4.00	1.921	0.393	+7°	-20°	Yes	Fig.6	42,000
NEW		1000-W100-45-10-3T	●	3	1.000	1.000	4.50	2.163					Fig.7	37,200
NEW	Long Shank	MEW 0625-S625-6-10-2T	●	2	0.625	0.625	6.00	1.500	0.393	+7°	-22°	Yes	Fig.5	43,900
Cylindrical		0750-S750-7-10-2T	●	2	0.750	0.750	7.00	1.586						42,000
		1000-S100-7-10-3T	●	3	1.000	1.000	7.00	1.980	0.393	+7°	-20°	Yes	Fig.5	37,200
		1000-S100-8-10-2T	●	2			8.00	1.980	0.393	+7°	-20°	Yes	Fig.5	37,200
NEW		1000-S100-8-10-3T	●	3										37,200
NEW		1250-S125-8-15-3T	●	3	1.250	1.250	8.00	1.980	0.590	+10°	-22°	Yes	Fig.5	30,100
NEW		1500-S125-8-15-4T	●	4	1.500			2.069			-21°		Fig.2	25,600
Weldon	Standard Shank	MEW 1000-W750-15-2T	●	2	1.000	0.750	3.25	1.219	0.590	+10°	-22°	Yes	Fig.3	34,700
		1000-W100-15-2T	●	2		1.000	3.75	1.413					Fig.7	34,700
		1250-W100-15-2T	●	2	1.250	1.000	3.75	1.469	0.590	+10°	-22°	Yes	Fig.3	30,100
		1250-W125-15-2T	●	2		1.250	4.00	1.663	0.590	+10°	-22°	Yes	Fig.7	30,100
		1250-W125-15-3T	●	3										30,100
		1500-W125-15-3T	●	3	1.500	1.250	4.125	2.069	0.590	+10°	-21°	Yes	Fig.3	25,600
		1500-W125-15-4T	●	4										25,600

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 & Applicable Inserts E6

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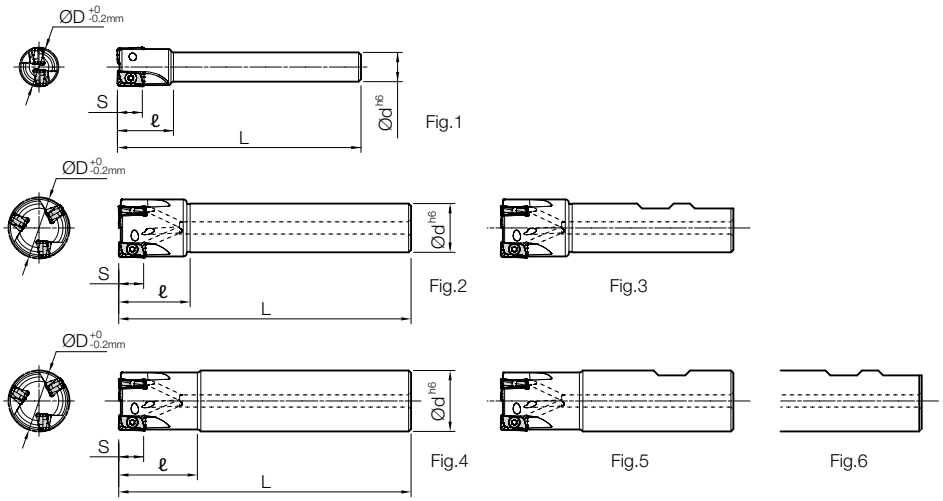
MEW End Mill (Metric)

(Cylindrical Shank)



Toolholder Dimensions (Metric)

Shank		Part Number	Stock	No. of Inserts	Dimensions (mm)					Rake Angle (°)		Coolant Hole	Drawing	Max RPM*
					ØD	Ød	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
		16-S16-10-2T	○			16		26				Yes	Fig.4	43,750
		18-S16-10-2T	○		18			25			-21°		Fig.2	43,000
		20-S16-10-2T	○		20		110	26			-20°			41,000
		20-S20-10-2T	○			20		30					Fig.4	41,000
		20-S20-10-3T	○	3	20									41,000
		22-S20-10-3T	○		22			26					Fig.2	39,600
		25-S20-10-3T	○		25		120	29						37,500
		25-S25-10-2T	○	2		25		32					Fig.4	37,500
		25-S25-10-3T	○	3										37,500
		28-S25-10-3T	○		28			29					Fig.2	35,800
		30-S25-10-4T	○	4	30		130	32						34,800
		32-S25-10-4T	○		32			32						33,900
		32-S32-10-3T	○	3		32		40					Fig.4	33,900
		32-S32-10-4T	○	4										33,900
		40-S32-10-5T	○	5	40		150	50			-19°		Fig.2	30,000
		50-S32-10-5T	○		50		120	40						22,500
	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
		25-S25-15-2T	○			25		32					Fig.4	35,000
		32-S25-15-2T	○		32	25	130						Fig.2	30,000
		32-S32-15-2T	○			32		40					Fig.4	30,000
		32-S32-15-3T	○	3										30,000
		40-S32-15-3T	○		40	32	150	50			-21°		Fig.2	25,000
		40-S32-15-4T	○	4										25,000
		50-S32-15-4T	○		50		120	40						17,000
Weldon	Standard 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
		40-W32-10-5T	□	5	40		111	50			-19°		Fig.3	30,000
		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
		40-W32-15-4T	□	4	40	32	111	50			-21°	Yes	Fig.3	25,000

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 & Applicable Inserts E6

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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(Technical Support) **800.823.7284 - Option 2**
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MEW Face Mill (Inch)

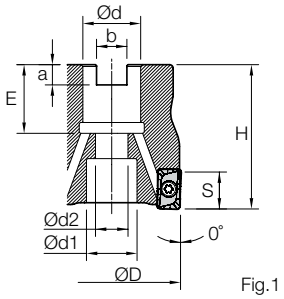


Fig.1

Toolholder Dimensions (Inch)

Part Number	Stock	No. of Inserts	Dimensions (in)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM*
			ØD	Ød	Ød1	Ød2	H	E	a	b	S	A.R. (Max)	R.R.				
MEW 1500R-10-5T	●	5	1.50	0.750	0.669	0.433	1.575	0.826	0.188	0.312	0.393	+7°	-19°	Yes	Fig.1	0.2	30,700
2000R-10-5T	●	5	2.00													0.4	22,300
2500R-10-6T	●	6	2.50													0.6	20,400
MEW 2000R-15-4T	●	4	2.00	0.750	0.669	0.433	1.575	0.826	0.188	0.312	0.590	+10°	-21°	Yes	Fig.1	0.4	16,800
2000R-15-5T	●	5														0.4	16,800
2500R-15-5T	●	5	2.50													0.5	14,400
3000R-15-6T	●	6	3.00	1.000	0.866	0.551	1.969	1.063	0.236	0.381	0.590	+10°	-20°			1.0	12,250
NEW 4000R-15-8T	●	8	4.00	1.500	2.047	-		1.181	0.393	0.625						1.8	10,400

Max. Revolution*
When running the face mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Spare Parts & Applicable Inserts (Inch)

Part Number	Spare Parts					Applicable Inserts ➔ B13			
	Insert Screw	Wrench	Anti-seize Compound	Arbor Bolt	Pre-Set Torque Wrench*	General Purpose	Low Cutting Force	Tough Edge (Heavy Milling)	NEW Aluminum / Non-ferrous
MEW ...-10-_T	SB-3065TRP	DTPM-8	MP-1	-	PST-IP8	LOMU 1004..ER-GM	LOMU 100408ER-SM	LOMU 100408ER-GH	LOGT 100408FR-AM
MEW 1500R-10-5T	Recommended Torque for Insert Screw 1.2N · m			HH3/8-1.25 (HH3/8-1.25H)					
2000R-10-5T									
2500R-10-6T									
MEW ...-15-_T	SB-4090TRP	DTPM-15	MP-1	-	PST-IP15	LOMU 1505..ER-GM	LOMU 150508ER-SM	LOMU 150508ER-GH	LOGT 150508FR-AM
MEW 2000R-15-4T	Recommended Torque for Insert Screw 3.5N · m			HH3/8-1.25 (HH3/8-1.25H)					
2500R-15-5T									
3000R-15-6T									
4000R-15-8T				-					

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

Recommended Cutting Conditions ➔ E10

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately
***If through spindle coolant is required please order arbor bolt in ( ) separately.**

MEW Face Mill (Metric)

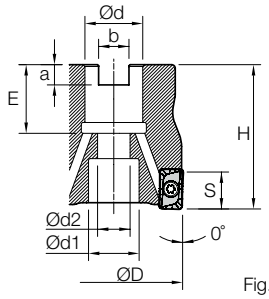


Fig.1

Toolholder Dimensions (Metric)

Part Number	Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM*
			ØD	Ød	Ød1	Ød2	H	E	a	b	S	A.R. (Max)	R.R.				
MEW 032R-10-4T-M	○	4	32	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	22	18	11	40	21	6.3	10.4			-19°			0.2	30,000
050R-10-5T-M	○		50													0.4	22,500
MEW 063R-10-6T-M	○	6	63													0.5	20,500
040R-15-4T-M	○	4	40	16	14	9	40	19	5.6	8.4	15	+10°	-21°	Yes	Fig.1	0.2	25,000
050R-15-4T-M	○		50	22	18	11		21	6.3	10.4						0.3	17,000
063R-15-5T-M	○	5	63													0.5	14,500
080R-15-6T-M	○	6	80	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 face mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Spare Parts & Applicable Inserts (Metric)

Part Number	Spare Parts					Applicable Inserts ➔ B13			
	Insert Screw	Wrench	Anti-seize Compound	Arbor Bolt	Pre-Set Torque Wrench*	General Purpose	Low Cutting Force	Tough Edge (Heavy Milling)	Aluminum / Non-ferrous
MEW ...-10-_T	SB-3065TRP	DTPM-8	MP-1	-	PST-IP8	LOMU 1004..ER-GM	LOMU 100408ER-SM	LOMU 100408ER-GH	LOGT 100408FR-AM
MEW 032R-10...-M				HH8X25 (HH8X25H)					
040R-10...-M	Recommended Torque for Insert Screw 1.2N · m								
050R-10...-M				HH10X30 (HH10X30H)					
063R-10...-M									
MEW ...-15-_T	SB-4090TRP	DTPM-15	MP-1	-	PST-IP15	LOMU 1505..ER-GM	LOMU 150508ER-SM	LOMU 150508ER-GH	LOGT 150508FR-AM
MEW 040R-15...-M				HH8X25 (HH8X25H)					
050R-15...-M	Recommended Torque for Insert Screw 3.5N · m								
063R-15...-M				HH10X30 (HH10X30H)					
080R-15...(-M)									
4000R-15-8T				HH12X35 (HH12X35H)					

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

Recommended Cutting Conditions ➔ E10

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately
***If through spindle coolant is required please order arbor bolt in ( ) separately.**

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.

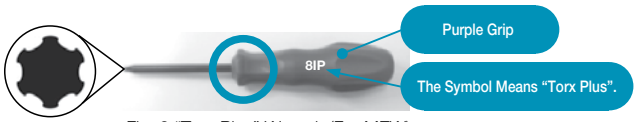


Fig. 2 “Torx Plus” Wrench (For MEW)

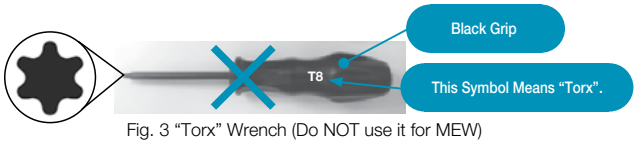
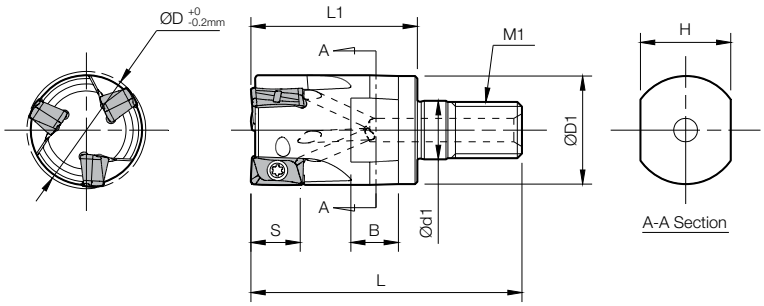


Fig. 3 “Torx” Wrench (Do NOT use it for MEW)

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

MEW Modular End Mill NEW



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Coolant Hole	Applicable Inserts ➡ B13	Max RPM*
			ØD	ØD1	Ød1	L	L1	M1	H	B	S	A.R. (Max)	R.R.			
MEW 16-M08-10-2T	○	2	16	14.7	8.5	43	25	M8xP1.25	12	8	10	+7°	-22°	Yes	LOMU1004... LOGT1004...	43,750
20-M10-10-2T	○	2	20	18.7	10.5	49	30	M10xP1.5	15	9	10	+7°	-20°	Yes	LOMU1004... LOGT1004...	41,000
20-M10-10-3T	○	3	20	18.7	10.5	49	30	M10xP1.5	15	9	10	+7°	-20°	Yes	LOMU1004... LOGT1004...	41,000
25-M12-10-3T	○	3	25	23	12.5	57	35	M12xP1.75	19	10	10	+7°	-20°	Yes	LOMU1004... LOGT1004...	37,500
32-M16-10-4T	○	4	32	30	17	63	40	M16xP2.0	24	12	10	+7°	-20°	Yes	LOMU1004... LOGT1004...	33,900
MEW 25-M12-15-2T	○	2	25	23	12.5	57	35	M12xP1.75	19	10	15	+10°	-22°	Yes	LOMU1505... LOGT1505...	35,000
32-M16-15-3T	○	3	32	30	17	63	40	M16xP2.0	24	12	15	+10°	-22°	Yes	LOMU1505... LOGT1505...	30,000

Max. Revolution*
When running the face mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

Spare Parts & Applicable Inserts

Part Number	Spare Parts				Applicable Inserts ➡ B13			
	Insert Screw	Wrench	Anti-seize Compound	Pre-Set Torque Wrench*	General Purpose	Low Cutting Force	Tough Edge (Heavy Milling)	Aluminum / Non-ferrous
								
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	PST-IP8	LOMU 1004..ER-GM	LOMU 100408ER-SM	LOMU 100408ER-GH	LOGT 100408FR-AM
	Recommended Torque for Insert Screw 1.2N · m							
MEW 25-M12-15-2T 32-M16-15-3T	SB-4090TRP	DTPM-15	MP-1	PST-IP15	LOMU 1505..ER-GM	LOMU 150508ER-SM	LOMU 150508ER-GH	LOGT 150508FR-AM
	Recommended Torque for Insert Screw 3.5N · m							

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

Recommended Cutting Conditions ➡ E10

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately
***If through spindle coolant is required please order arbor bolt in ( ) separately.**

Modular End Mill Identification System

MEW 16 - M08 - 10 - 2T

Series	Cutting Dia.	Thread Dia. Tolerance	Insert Size	No. of Inserts
MEW	16	M08	10	2T

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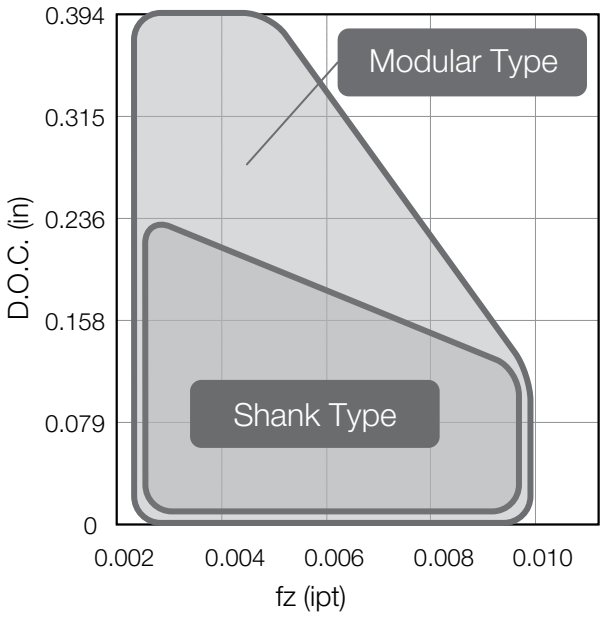
Modular End Mill Features



<Cutting Conditions>

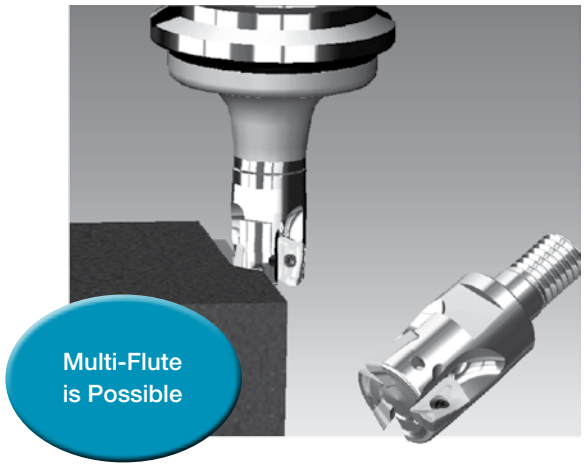
· Cutting Speed : Vc = 490 sfm (n = 2,390min^{-1})
· Width of Cut : ae = 0.394" (Shouldering)
· Workpiece Material : 1055 Dry
· Machine : BT30 M/C

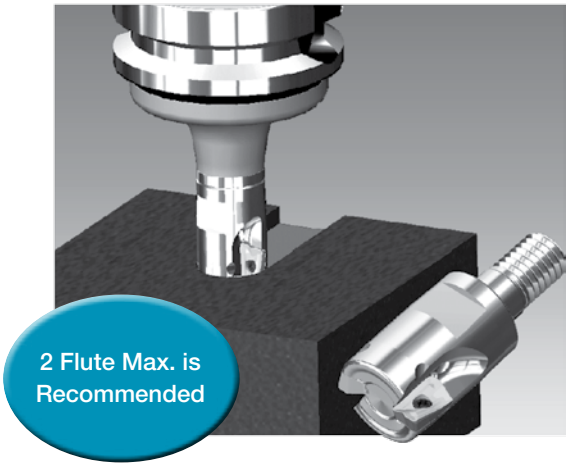
<Cutting Tool>

· 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 (Two-face clamping)
  Insert : LOMU100408ER-GM (PR1525)

Flute Recommendation for Shouldering and Slotting

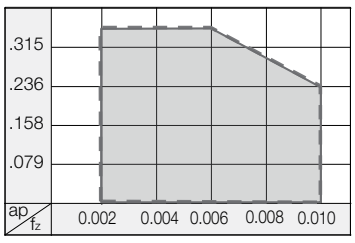
Shouldering (ae = 0.394")	Slotting





Modular End Mill Cutting Conditions by Application

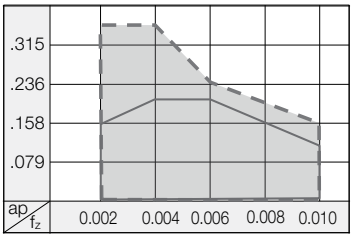
Shouldering



Available Cutting Condition for 2 Flutes

Available Cutting Condition for 3 Flutes

Slotting



For high efficiency shouldering with higher feed rates, 3 or more flutes is possible.
For slotting applications, use 2 flutes maximum to lower cutting forces.

How to Mount Insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Apply anti-seize compound on portion of taper and thread of clamp screw.
   (1) Attach the screw (magnetic head) to the front end of the wrench.
   (2) While lightly pressing the insert against the pocket walls,
   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.
   (Ref. to Fig. 2.) surface of the insert.
3. When tightening the screw, make sure that the wrench is parallel to the screw. For recommended torque, Ref. to E6
4. After tightening the screw, make sure that there is no clearance between the insert seat surface and the pocket floor of the holder or between the insert side surfaces and the pocket walls of the holder. If there is any clearance, remove the insert and mount it again according to the above steps.

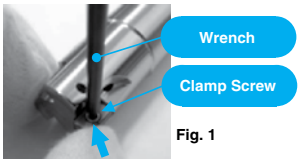


Fig. 1

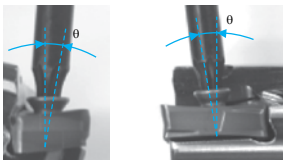


Fig.2

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade Vc (sfm)					
		Toolholder Description		MEGACOAT NANO			CVD Coated Carbide	DLC Coated Carbide	Carbide
		MEW0625~MEW0750 MEW16~MEW18	MEW1000~MEW1500 MEW1500R~MEW3000R MEW20~MEW50 MEW032R~MEW080R	PR1535	PR1525	PR1510	CA6535	PDL025	GW25
GM	Carbon Steel	0.002~**0.004**~0.008	0.003~**0.006**~0.010	☆ 390~**590**~820	★ 390~**590**~820	-	-	-	-
	Alloy Steel	0.002~**0.004**~0.006	0.003~**0.006**~0.008	☆ 330~**520**~720	★ 330~**520**~720	-	-	-	-
	Mold Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.008	☆ 260~**460**~590	★ 260~**460**~590	-	-	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.006	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.008	☆ 490~**660**~820	-	-	★ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.008	☆ 300~**390**~490	-	-	-	-	-
	Gray Cast Iron	0.002~**0.004**~0.007	0.003~**0.007**~0.010	-	-	★ 390~**590**~820	-	-	-
	Nodular Cast Iron	0.002~**0.003**~0.005	0.003~**0.006**~0.008	-	-	★ 330~**490**~660	-	-	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.005	0.003~**0.005**~0.006	☆ 70~**100**~160	-	-	★ 70~**100**~160	-	-
	Titanium Alloys	0.002~**0.003**~0.005	0.003~**0.006**~0.008	☆ 130~**200**~260	-	☆ 100~**160**~230	-	-	-
SM	Carbon Steel	0.002~**0.004**~0.007	0.003~**0.006**~0.008	☆ 390~**590**~820	★ 390~**590**~820	-	-	-	-
	Alloy Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.007	☆ 330~**520**~720	★ 330~**520**~720	-	-	-	-
	Mold Steel	0.002~**0.003**~0.005	0.003~**0.004**~0.006	☆ 260~**460**~590	★ 260~**460**~590	-	-	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005	0.003~**0.004**~0.006	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.005	0.003~**0.004**~0.006	☆ 490~**660**~820	-	-	★ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.005	0.003~**0.004**~0.006	☆ 300~**390**~490	-	-	-	-	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 70~**100**~160	-	-	★ 70~**100**~160	-	-
	Titanium Alloys	0.002~**0.003**~0.005	0.003~**0.005**~0.006	☆ 130~**200**~260	-	☆ 100~**160**~230	-	-	-
GH	Carbon Steel	0.002~**0.004**~0.008	0.003~**0.008**~0.012	☆ 390~**590**~820	★ 390~**590**~820	-	-	-	-
	Alloy Steel	0.002~**0.004**~0.006	0.003~**0.008**~0.010	☆ 330~**520**~720	★ 330~**520**~720	-	-	-	-
	Mold Steel	0.002~**0.003**~0.005	0.003~**0.006**~0.009	☆ 260~**460**~590	★ 260~**460**~590	-	-	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.006	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.008	☆ 490~**660**~820	-	-	★ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.005	0.003~**0.005**~0.008	☆ 300~**390**~490	-	-	-	-	-
	Gray Cast Iron	0.002~**0.004**~0.008	0.003~**0.009**~0.012	-	-	★ 390~**590**~820	-	-	-
	Nodular Cast Iron	0.002~**0.003**~0.006	0.003~**0.007**~0.010	-	-	★ 330~**490**~660	-	-	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.005	0.003~**0.005**~0.006	☆ 70~**100**~160	-	-	★ 70~**100**~160	-	-
	Titanium Alloys	0.002~**0.003**~0.005	0.003~**0.006**~0.008	☆ 130~**200**~260	-	☆ 100~**160**~230	-	-	-
AM	Aluminum Alloy (Si 13% or Less)	-	-	-	-	-	-	★ 660~2950	☆ 660~980
	Aluminum Alloy (Si 13% and Over)	-	-	-	-	-	-		

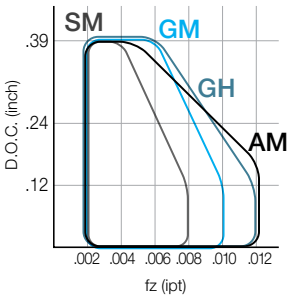
※ Bold numbers in the graph indicate the most recommended value of feed (f) Adjust cutting speed and feed rate according to the actual machining conditions

※ Coolant is recommended for Ni-base heat resistant alloy and titanium alloy with MEW

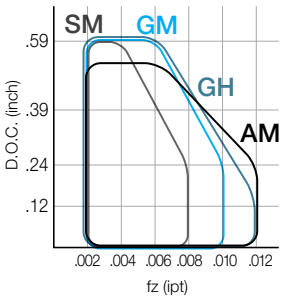
★ :1st Recommendation
☆ : 2nd Recommendation

Applicable Chipbreaker Range (Shouldering)

● LOMU10



● LOMU15

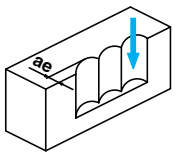


<Cutting Conditions>
Vc = 500 sfm ae = ØD/2
Workpiece Material: 1049

Ramping, Helical Milling and Plunging

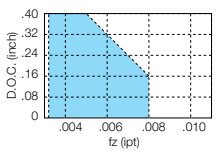
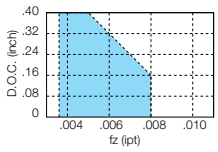
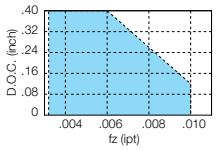
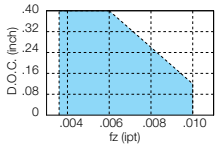
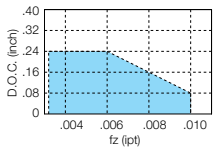
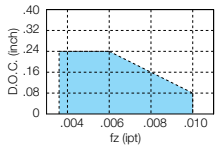
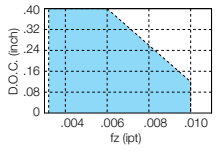
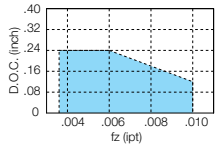
1. Available for vertical milling.
2. NOT available for ramping and helical milling, because interference between workpiece and insert may occur.

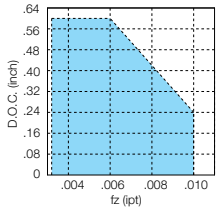
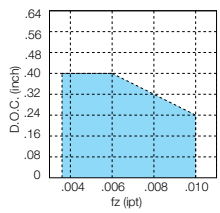
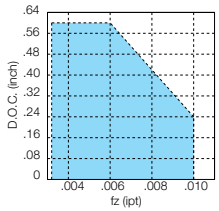
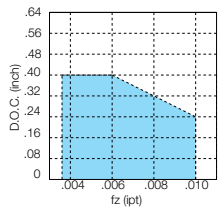
Plunging



Insert Description	Max. Width of Cut (ae)
LOMU10	0.197" (5mm)
LOMU15	0.276" (7mm)

Cutting Performance

Part Number	Shouldering (Cutting Width ae = ØD/2)	Slotting
MEW0625...-10 MEW0750...-10 MEW16...-10 MEW18...-10		
MEW1000...-10 ~ MEW1500...-10 MEW20...-10 ~ MEW50...-10		
MEW0750...-2T MEW1000...-2T (Long Shank) MEW20-...-2T MEW25-...-2T (Long Shank)		
MEW1500R...-10 ~ MEW2500R...-10 MEW032R...-10 ~ MEW063R...-10		

Part Number	Shouldering (Cutting Width ae = ØD/2)	Slotting
MEW1000...-15 ~ MEW1500...-15 MEW25...-15 ~ MEW50...-15		
MEW2000R...-15 ~ MEW3000R...-15 MEW040R...-15 ~ MEW080R...-15		

<Cutting Conditions>
· Vc = 600 sfm
· GM Chipbreaker
· Workpiece Material: 1049
· 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

1018

- Construction Equipment Part
- Vc = 820 sfm
- D.O.C. × ae = 0.158" × 0.787"
- fz = 0.006 ipt (Vf = 53 ipm)
- Wet
- MEW32-S32-10-4T (4 Inserts)
- LOMU100408ER-GM (PR1525)

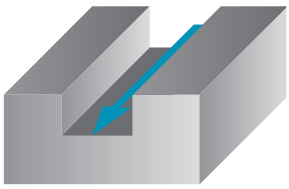
PR1525	Chip Removal Rate = 6.591in³/min
Competitor A (Positive Cutter)	Chip Removal Rate =4.394in³/min

MEW showed stable milling without chattering at higher feed, improving the cutting efficiency by 150%. Burrs are prevented and excellent surface finish is achieved.

Customer Evaluation

1018

- Machine Part
- Vc = 820 sfm
- D.O.C. × ae = 0.128" × 0.787" (Grooving)
- fz = 0.008 ipt (Vf = 94 ipm)
- Dry
- MEW20-S20-10-3T (3 Inserts)
- LOMU100408ER-GM (PR1525)



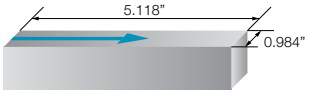
PR1525	Chip Removal Rate = 8.787in³/min (Stable Milling)
Competitor B (Positive Cutter)	Chip Removal Rate = 6.957in³/min (Unstable)

No chattering with MEW, while Competitor B chattered at the same cutting conditions.
No burrs with MEW and excellent surface finish is gained.

Customer Evaluation

15-5PH (42HRC)

- Aircraft Part
- Vc = 590 sfm
- D.O.C. × ae = 0.079" × 0.984"
- fz = 0.004ipt (Vf = 28 ipm)
- Wet
- MEW32-S32-10-4T (4 Inserts)
- LOMU150508ER-GM (PR1525)



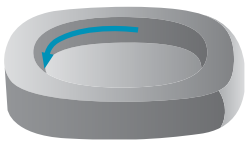
PR1525	Chip Removal Rate = 2.185in³/min (Further Milling Possible)
Competitor C (Positive Cutter)	Chip Removal Rate = 1.635in³/min (Unable to Continue Cutting)

No chattering and more stable milling is possible with MEW.
Dispite the milling difficulty because of the properties of the material, PR1525 kept good cutting edge form, minimizing wear and adhesion.

Customer Evaluation

H13

- Mold Part
- Vc = 330 sfm
- D.O.C. × ae = 0.138" × 1.181"
- fz = 0.004ipt (Vf = 15 ipm)
- Dry
- MEW32-S32-10-4T (4 Inserts)
- LOMU100408ER-GH (PR1525)



PR1525	Chip Removal Rate = 2.563in³/min (Further Milling Possible)
Competitor D (Positive Cutter)	Chip Removal Rate = 1.282in³/min (Unable to Continue Cutting)

MEW doubled cutting efficiency. Furthermore, MEW inserts have double number of edges (4-edge), which enables a drastic cost reduction.

Customer Evaluation

Shouldering | Slotting | Facing

MEC End Mill (Inch)

(Cylindrical Shank)

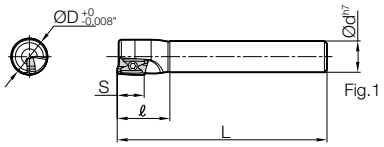


Fig.1

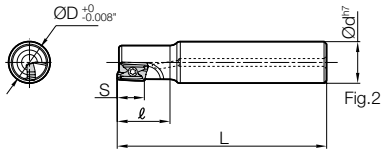


Fig.2

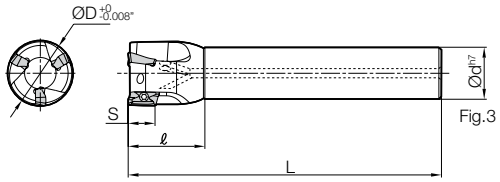


Fig.3

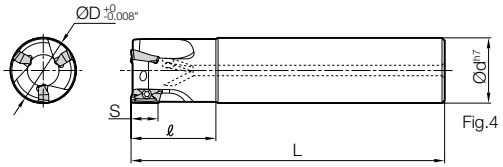


Fig.4

Toolholder Dimensions (Inch)

Shank		Part Number	Stock	No. of Inserts	Dimensions (inch)					Rake Angle (°)		Coolant Hole	Drawing	Spare Parts			Max RPM*
					ØD	Ød	L	ℓ	S	A.R. (Max)	R.R.			Insert Screw	Wrench	Pre-set Torque Wrench*	
Cylindrical	Standard Shank	MEC 0500-S500-11	●	1	0.500	0.500	2.650	0.787	0.400	12°	-21°	No	Fig.1	SB-2545TR	DTM-8	PST-T8	50800
		MEC 0625-S500-11T	●	2	0.625	0.500	2.750	0.906	0.400	18°	-14°	Yes	Fig.3	SB-2555TRG	DTM-8	PST-T8	43750
		0625-S625-11T	●			0.625	3.000	1.024					Fig.4				43750
		0750-S625-11T	●	3	0.750		3.050			20°	-10°		Fig.3				41000
		0750-S750-11T	●		0.750	0.750	3.250	1.142					Fig.4				41000
		1000-S750-11T	●		1.000					21°	-10°		Fig.3				37500
		1000-S100-11T	●			1.000	3.750	1.260					Fig.4				37500
		1250-S100-11T	●	4	1.250					23°	-9°		Fig.3				33900
		1250-S125-11T	●			1.250	4.000	1.575					Fig.4				33900
		1500-S125-11T	●	5	1.500		4.350	1.969		24°	-8°		Fig.3				30000
		MEC 1000-S750-17	●	2	1.000	0.750	3.500	1.417	0.618	16°	-11°		Fig.3	SB-4070TRN	DTM-15	PST-T15	35000
		1000-S100-17	●		1.000	1.000	3.750						Fig.4				35000
		1250-S100-17	●	3	1.250		4.000	1.575		17°	-7°		Fig.3				30000
		1250-S125-17	●			1.250							Fig.4				30000
		1500-S125-17	●	4	1.500		4.350	1.969		19°			Fig.3				25000
	Long Shank	MEC 0750-S750-5.2-11T	●	2	0.750	0.750	5.200	2.362	0.400	20°	-10°		Fig.4	SB-2555TRG	DTM-8	PST-T8	41000
		1000-S100-6.3-11T	●		1.000	1.000	6.300			21°							37500
		1250-S125-7.9-11T	●		1.250	1.250	7.870	2.559	0.400	23°	-9°						33900
		1500-S125-9.5-11T	●		1.500		9.450				-8°		Fig.3				30000
		MEC 1000-S100-6.3-17	●	2	1.000	1.000	6.300	2.362	0.618	16°	-11°		Fig.4	SB-4070TRN	DTM-15	PST-T15	35000
		1250-S125-7.9-17	●		1.250	1.250	7.870	2.559	0.618	17°	-7°		Fig.4				30000
		1500-S125-9.5-17	●		1.500		9.450						Fig.3				25000

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

Applicable Inserts ➔ E14

Max. Revolution*
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

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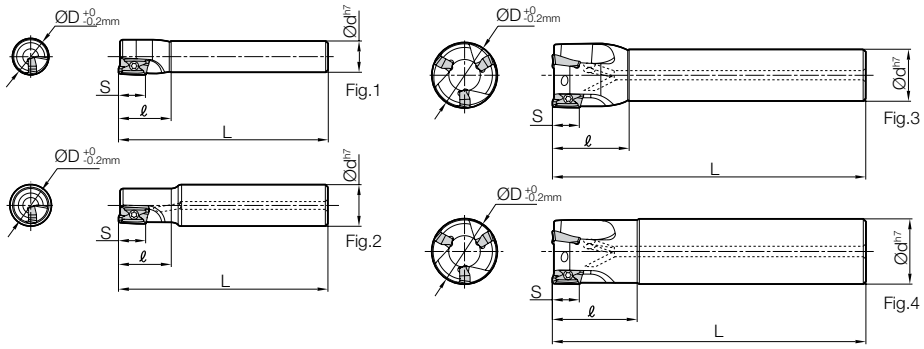
Shouldering | Slotting | Facing

MEC End Mill (Metric)

(Cylindrical Shank)



Toolholder Dimensions for 11mm Inserts (Metric)

Shank		Part Number	Stock	No. of Inserts	Dimensions (mm) ØD	Ød	L	ℓ	S	Rake Angle (°) A.R. (Max)	R.R.	Coolant Hole	Drawing	Spare Parts: Insert Screw	Wrench	Pre-set Torque Wrench*	Max RPM*
Cylindrical	Standard Shank	MEC 10-S10-11	○	1	10	10	80	17	10	+10°	-24°	No	Fig.1	SB-2545TR	DTM-8	PST-T8	54,800
		10-S16-11	○			16						Yes	Fig.2				
		12-S10-11	○		12	10		20		+12°	-21°	No	Fig.1				50,800
		12-S12-11	○			12											
		12-S16-11	○			16						Yes	Fig.2				
		13-S12-11	○		13	12					-19°	No	Fig.1				49,200
		14-S12-11	○		14												47,700
		14-S16-11	○			16						Yes	Fig.2				
		MEC 16-S12-11T	○	2	16	12	100	23	10	+18°	-14°	No	Fig.1	SB-2555TRG	DTM-8	PST-T8	43,750
		16-S16-11T	○			16		30				Yes	Fig.4				43,750
		17-S16-11T	○		17	16		23			-13°		Fig.3				43,500
		18-S16-11T	○		18					+19°							43,000
		19-S16-11T	○	3	19	16	110	26	10	+20°	-10°	Yes	Fig.3	SB-2555TRG	DTM-8	PST-T8	42,000
		20-S16-11T	○		20												41,000
		20-S20-11T	○		20	20		30		+20°	-10°	Yes	Fig.4	SB-2555TRG			41,000
		21-S20-11T	○		21						-9°						40,300
		22-S20-11T	○		22					+21°	-10°						39,600
		24-S20-11T	○		24	20	120	29	10	+21°	-10°	Yes	Fig.4	SB-2555TRG			38,200
		25-S20-11T	○		25												37,500
		25-S25-11T	○			25		32									37,500
		28-S25-11T	○		28					+22°	-9°						35,800
		30-S25-11T	○	4	30	25	130	32	10	+23°	-9°	Yes	Fig.4	SB-2555TRG	DTM-8	PST-T8	34,800
		32-S25-11T	○		32												33,900
		32-S32-11T	○			32		40									33,900
		40-S32-11T	○	5	40	32	150	50	10	+23°	-8°	Yes	Fig.4	SB-2555TRG	DTM-8	PST-T8	30,000
		50-S32-11T	○		50						-7°						22,500
	Long Shank	MEC 20-S18-170-11T	○	2	20	18	170	30	10	+20°	-10°	Yes	Fig.3	SB-2555TRG	DTM-8	PST-T8	41,000
		20-S20-140-11T	○			20	140	60					Fig.4				
		20-S20-170-11T	○				170										
		22-S20-170-11T	○		22			30		+21°			Fig.3				39,600
		25-S23-210-11T	○		25	23	210	32									37,500
		25-S25-160-11T	○			25	160	60					Fig.4				
		25-S25-210-11T	○				210										
		28-S25-210-11T	○		28			32		+22°	-9°		Fig.3				35,800
		32-S30-250-11T	○		32	30	250	40		+23°							33,900
		32-S32-200-11T	○			32	200	65					Fig.4				
		32-S32-250-11T	○				250										
		35-S32-250-11T	○		35			40					Fig.3				32,600
		40-S32-240-11T	○		40		240	65			-8°						30,000
		MEC 20-S20-150-11T-3	○	3	20	20	150	60	10	+20°	-10°	Yes	Fig.4	SB-2555TRG	DTM-8	PST-T8	41,000
		25-S25-170-11T-3	○		25	25	170	60		+21°							37,500
		30-S25-180-11T-3	○		30	25	180	32			-9°		Fig.3				34,800
		32-S32-200-11T-3	○		32	32	200	65		+23°			Fig.4				33,900
		32-S32-200-11T-4	○	4													

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

Applicable Inserts ➡ E14

Max. Revolution*
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

● : U.S. Stock Standard
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Shouldering | Slotting | Facing

MEC End Mill (Metric)

(Cylindrical Shank)

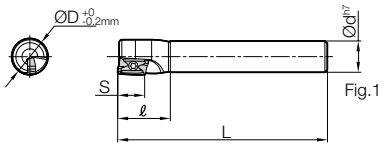

Fig.1

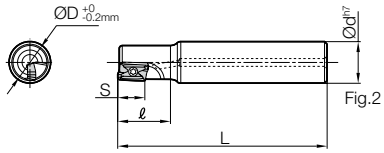

Fig.2

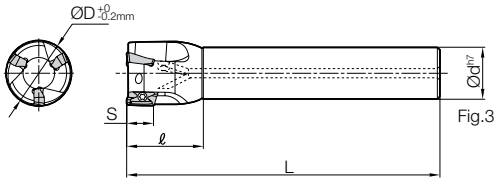

Fig.3

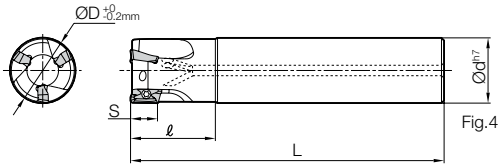

Fig.4

Toolholder Dimensions for 17mm Inserts (Metric)

Shank		Part Number	Stock	No. of Inserts	Dimensions (mm)					Rake Angle (°)		Coolant Hole	Drawing	Spare Parts			Max RPM*
					ØD	Ød	L	ℓ	S	A.R. (Max)	R.R.			Insert Screw	Wrench	Pre-set Torque Wrench*	
Cylindrical	Standard Shank	MEC 25-S20-17	○	2	25	20	120	36	15.7	+16°	-11°	Yes	Fig.3	SB-4070TRN	DTM-15	PST-T15	35,000
		25-S25-17	○			25							Fig.4				35,000
		32-S25-17	○	3	32	25	130	40		+17°	-7°		Fig.3				30,000
		32-S32-17	○			32							Fig.4				30,000
		40-S32-17	○	4	40		150	50		+19°			Fig.3				25,000
		50-S32-17	○		50												17,000
	Long Shank	MEC 25-S25-160-17	○	2	25	25	160	60	15.7	+16°	-11°	Yes	Fig.4	SB-4070TRN	DTM-15	PST-T15	35,000
		25-S25-210-17	○				210										
		28-S25-210-17	○		28			36					Fig.3				32,500
		32-S32-200-17	○		32	32	200	65		+17°	-7°		Fig.4				30,000
		32-S32-250-17	○				250										
		35-S32-250-17	○		35			40					Fig.3				27,700
		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.4	SB-4070TRN	DTM-15	PST-T15	30,000
		40-S32-250-17-3	○		40								Fig.3				25,000
		40-S32-250-17-4	○	4													
		50-S42-250-17-4	○		50	42		64		+19°	-6°						17,000

Coat Anti-seize Compound (MP-1) 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 prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

Applicable Inserts

Part Number	Applicable Inserts ➡ B18, B19			Applicable PCD Inserts ➡ B26
				
MEC...-11	BDMT 1103○○ER-JT	BDMT 1103○○ER-JS	-	-
MEC...-11T	BDMT 11T3○○ER-JT	BDMT 11T3○○ER-JS	BDMT 11T3○○FR-JA	BDMT 11T3○○FR
MEC...-17	BDMT 1704○○ER-JT	BDMT 1704○○ER-JS	BDMT 1704○○FR-JA	BDMT 1704○○FR

Recommended Cutting Conditions ➡ E18-E19

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Shouldering | Slotting | Facing

MEC Face Mill (Inch)

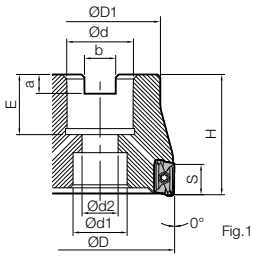


Fig.1

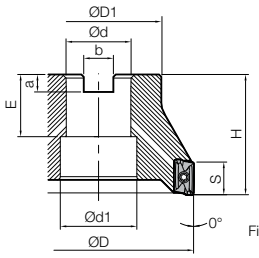
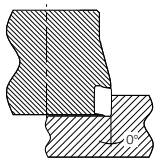


Fig.2

Rake Angle (°)
11 Type A.R. (Max) : +23° R.R. : -7°
17 Type A.R. (Max) : +19° R.R. : -7°



Toolholder Dimensions (Inch)

Part Number	Stock	No. of Inserts	Dimensions (in)									Coolant Hole	Drawing	Weight (kg)	Spare Parts			Max RPM*
			ØD	Ød	Ød1	Ød2	H	E	a	b	S				Insert Screw	Wrench	Pre-set Torque Wrench*	
MEC 1500R-11T-5T	●	5	1.500	0.750	0.63	0.417	1.575	0.807	0.188	0.312	0.400	Yes	Fig.1	0.2	SB-2555TRG	DTM-8	PST-T8	30,700
2000R-11T-5T	●	5	2.000		0.646			0.819						0.3				22,300
2500R-11T-6T	●	6	2.500		0.63			0.819						0.7				20,400
3000R-11T-7T	●	7	3.000	1.000	0.827	0.555	1.969	0.878	0.223	0.375				1.0				18,500
4000R-11-9TN	●	9	4.000	1.500	1.969	-	2.48	1.654	0.375	0.625				1.6				16,800
MEC 2000R-17-4T	●	4	2.000	0.750	0.646	0.417	1.575	0.819	0.188	0.312	0.618	Yes	Fig.1	0.4	SB-4070TRN	DTM-15	PST-T15	16,800
2500R-17-5T	●	5	2.500		0.646			0.819						0.8				14,400
3000R-17-6T	●	6	3.000	1.000	0.827	0.555	1.969	0.878	0.223	0.375				1.0				12,250
4000R-17-7TN	●	7	4.000	1.500	1.969	-	2.48	1.654	0.375	0.625			Fig.2	1.8				10,400

Coat Anti-seize Compound (MP-1) 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 prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

Applicable Inserts

Part Number	Applicable Inserts ➡ B18, B19			Applicable PCD Inserts ➡ B26
				
MEC...R-11	BDMT 1103○○ER-JT	BDMT 1103○○ER-JS	-	-
MEC...R-11T	BDMT 11T3○○ER-JT	BDMT 11T3○○ER-JS	BDMT 11T3○○FR-JA	BDMT 11T3○○FR
MEC...R-17	BDMT 1704○○ER-JT	BDMT 1704○○ER-JS	BDMT 1704○○FR-JA	BDMT 1704○○FR

Recommended Cutting Conditions ➡ E18-E19

Shouldering | Slotting | Facing

MEC Face Mill (Metric)

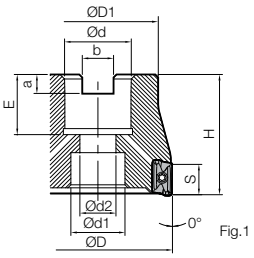


Fig.1

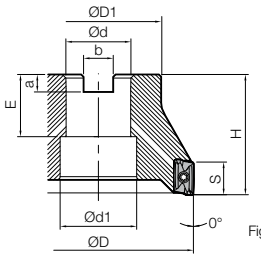
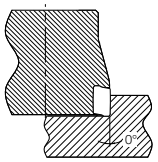


Fig.2

Rake Angle (°)
11 Type A.R. (Max) : +23° R.R. : -7°
17 Type A.R. (Max) : +19° R.R. : -7°



Toolholder Dimensions (Metric)

		Part Number	Stock	No. of Inserts	Dimensions (mm) ØD	Ød	Ød1	Ød2	H	E	a	b	S	Coolant Hole	Drawing	Weight (kg)	Spare Parts: Insert Screw	Wrench	Pre-set Torque Wrench*	Max RPM*
Inch Bore Dia.	Coarse Pitch	MEC 063R-11-6T	○	6	63	1.000"	20	14	50	1.024"	0.236"	0.375"	10	Yes	Fig.1	0.8	SB-2555TRG	DTM-8	PST-T8	20,500
		080R-11-7T	○	7	80											1.0				18,500
		100R-11-9TN	○	9	100	1.250"	26	17.6	63	1.260"	0.315"	0.500"	10	Yes	Fig.1	1.8				17,000
		125R-11-11T	○	11	125	1.500"	45	32		1.496"	0.394"	0.625"				3.4				15,000
		160R-11-14T	○	14	160	2.000"	70	-		1.850"		0.750"			Fig.2	4.4				13,900
	Fine Pitch	MEC 063R-11-8T	○	8	63	1.000"	20	14	50	1.024"	0.236"	0.375"	10	Yes	Fig.1	0.8	SB-2555TRG	DTM-8	PST-T8	20,500
		080R-11-10T	○	10	80											1.0				18,500
	Coarse Pitch	MEC 063R-17-5T	○	5	63	1.000"	20	14	50	1.024"	0.236"	0.375"	15.7	Yes	Fig.1	0.8	SB-4070TRN	DTM-15	PST-T15	14,500
		080R-17-6T	○	6	80											1.0				12,000
		100R-17-7TN	○	7	100	1.250"	26	17.6	63	1.260"	0.315"	0.500"	15.7	Yes	Fig.1	1.8	SB-4070TRN	DTM-15	PST-T15	10,500
		125R-17-9T	○	9	125	1.500"	45	32		1.496"	0.394"	0.625"				3.4				8,900
		160R-17-12T	○	12	160	2.000"	70	-		1.850"		0.750"			Fig.2	4.5				7,400
	Fine Pitch	MEC 063R-17-6T	○	6	63	1.000"	20	14	50	1.024"	0.236"	0.375"	15.7	Yes	Fig.1	0.8	SB-4070TRN	DTM-15	PST-T15	14,500
		080R-17-8T	○	8	80											1.0				12,000
		100R-17-9TN	○	9	100	1.250"	26	17.6	63	1.260"	0.315"	0.500"	15.7	Yes	Fig.1	1.8				10,500
Metric Bore Dia.	Standard 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	PST-T8	30,000
		050R-11-5T-M	○		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	10	Yes	Fig.1	1.0	SB-2555TRG	DTM-8	PST-T8	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	10	Yes	Fig.1	3.1	SB-2555TRG	DTM-8	PST-T8	15,000
		160R-11-14T-M	○	14	160		68	-						No	Fig.2	4.5				13,900
	Fine Pitch	MEC 050R-11-7T-M	○	7	50	22	18	12	40	22	6.3	10.4	10	Yes	Fig.1	0.4	SB-2555TRG	DTM-8	PST-T8	22,500
		063R-11-8T-M	○	8	63											0.6				20,500
	Standard 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	PST-T15	25,000
		050R-17-4T-M	○		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	15.7	Yes	Fig.1	1.0	SB-4070TRN	DTM-15	PST-T15	12,000
		100R-17-7T-MN	○	7	100	32	26	17.6	55	26	8	14.4				1.8				10,500
		125R-17-9T-M	○	9	125	40	45	32	63	33	9.5	16.4	15.7	Yes	Fig.1	3.1	SB-4070TRN	DTM-15	PST-T15	8,900
		160R-17-12T-M	○	12	160		68	-						No	Fig.2	4.5				7,400
	Fine Pitch	MEC 050R-17-5T-M	○	5	50	22	18	12	40	22	6.3	10.4	15.7	Yes	Fig.1	0.4	SB-4070TRN	DTM-15	PST-T15	17,000
		063R-17-6T-M	○	6	63											0.6				14,500

Coat Anti-seize Compound (MP-1) 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 prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

When using Center-through Air / Coolant / Mist

If Center Through air (Coolant, Mist) is used, please use appropriate arbor and clamp with arbor bolt. (Table 1)

MEC's surface finish when shouldering with multiple passes

In order to obtain smoothly finished shoulder wall with multiple passes of MEC Milling Cutter, please keep D.O.C. less than 0.217" (5.5mm) for 11T3 type insert and also keep D.O.C. less than 0.354" (9mm) for 1704 type insert.

(Table 1)

Toolholder	Arbor Bolt	Wrench	Toolholder	Arbor Bolt	Wrench
MEC040R·····-M	HH8×25H	LW-5 (Double width 5mm)	**MEC160R····**	HF24×60H	LW-17 (Double width 17mm)
MEC050R·····-M **MEC063R·····-M**	HH10×30H	LW-6 (Double width 6mm)	**MEC1500····** **MEC2500····**	HH3/8-1.25H	
MEC063R···· **MEC080R····**	HH12×35H	LW-8 (Double width 8mm)	**MEC3000····**	HH1/2-1.25H	
MEC100R·····-(M) N	HH16×52H	LW-12 (Double width 12mm)	**MEC4000····**	HH3/4-2.30H	
MEC125R·····-(M) **MEC160R·····-M**	HF20×53H	LW-14 (Double width 14mm)			

Wrench is not included. Please purchase separately.

Applicable Inserts

Part Number	Applicable Inserts ➡ B18, B19			Applicable PCD Inserts ➡ B26
				
MEC...R-11	BDMT 1103○○ER-JT	BDMT 1103○○ER-JS	-	-
MEC...R-17	BDMT 1704○○ER-JT	BDMT 1704○○ER-JS	BDMT 1704○○FR-JA	BDMT 1704○○FR

Recommended Cutting Conditions ➡ **E18-E19**

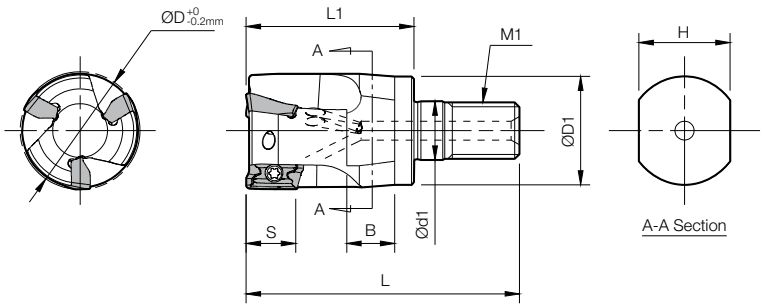
(Customer Service) **800.823.7284 - Option 1**
(Technical Support) **800.823.7284 - Option 2**
Visit us online at **KyoceraPrecisionTools.com**

U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

E 90° LEAD

NEW ITEMS!

MEC Modular NEW



Toolholder Dimensions (Metric)

Part Number	Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Coolant Hole	Applicable Inserts → B18, B19 → B26	Max RPM*
			ØD	ØD1	Ød1	L	L1	M1	H	B	S	A.R. (Max)	R.R.			
MEC 16-M08-11T-2T	○	2	16	14.7	8.5	43	25	M8xP1.25	12	8	10	+18°	-14°	Yes	BDMT11T3 BDGT11T3	43,750
20-M10-11T-2T	○	2	20	18.7	10.5	49	30	M10xP1.5	15	9		+20°	-10°			41,000
20-M10-11T-3T	○	3	20	18.7	10.5	49	30	M10xP1.5	15	9		+20°	-10°			41,000
25-M12-11T-3T	○	3	25	23	12.5	57	35	M12xP1.75	19	10		+21°	-10°			37,500
32-M16-11T-4T	○	4	32	30	17	63	40	M16xP2.0	24	12		+23°	-9°			33,900
MEC 25-M12-17-2T	○	2	25	23	12.5	57	35	M12xP1.75	19	10	15.7	+16°	-11°	Yes	BDMT1704 BDGT1704	35,000
32-M16-17-3T	○	3	32	30	17	63	40	M16xP2.0	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.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

Recommended Cutting Conditions → E18-E19

Spare Parts

Part Number	Spare Parts			
	Insert Screw	Wrench	Anti-seize Compound	Pre-Set Torque Wrench*
				
MEC 16-M08-11T-2T 20-M10-11T-2T 20-M10-11T-3T 25-M12-11T-3T 32-M16-11T-4T	SB-2555TRG	DTM-8	MP-1	PST-IP8
	Recommended Torque for Insert Screw 1.2N · m			
MEC 25-M12-17-2T 32-M16-17-3T	SB-4070TRN	DTM-15	MP-1	PST-IP15
	Recommended Torque for Insert Screw 3.5N · m			

 Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

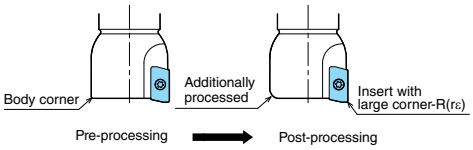
*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

■ 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.

Insert Corner-R(rε)	Additional Modifications of the Cutter Body Corner
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

* R shape is recommended for additional processing to the body corner.
When applying chamfer shaped additional processing, do not cut away too much.



◆ Recommended Cutting Conditions

• JT Chipbreaker

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade Vc (sfm)					
	Toolholder Description		Cermet	MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
	MEC0500~MEC0750 MEC10~MEC19	MEC1000~MEC1500 MEC20~MEC40 MEC1500R~MEC4000R MEC040R~MEC160R	TN100M	PR1535	PR1225	PR1210	PR830	CA6535
Carbon Steel	0.002~**0.004**~0.006	0.003~**0.006**~0.010	☆ 390~**520**~660	☆ 390~**590**~820	★ 390~**590**~820	-	☆ 390~**520**~660	-
Alloy Steel	0.002~**0.004**~0.005	0.003~**0.006**~0.008	☆ 330~**460**~590	☆ 330~**520**~720	★ 330~**520**~720	-	☆ 330~**460**~590	-
Mold Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.008	☆ 260~**390**~490	☆ 260~**460**~590	★ 260~**460**~590	-	☆ 260~**390**~490	-
Austenitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.006	-	☆ 330~**520**~660	☆ 330~**520**~660	-	☆ 330~**460**~590	-
Martensitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.008	-	☆ 490~**660**~820	-	-	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.008	-	★ 300~**390**~490	-	-	-	-
Gray Cast Iron	0.002~**0.004**~0.006	0.003~**0.007**~0.010	-	-	-	★ 390~**590**~820	-	-
Nodular Cast Iron	0.002~**0.003**~0.004	0.003~**0.006**~0.008	-	-	-	★ 330~**490**~660	-	-
Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	0.003~**0.005**~0.006	-	☆ 70~**100**~160	-	-	-	★ 70~**100**~160
Titanium Alloys	0.002~**0.003**~0.004	0.003~**0.006**~0.008	-	☆ 130~**200**~260	-	☆ 100~**160**~230	-	-

※ Bold numbers in the graph indicate the most recommended value of feed (fz) Adjust cutting speed and feed rate according to the actual machining conditions
※ Machining with coolant is recommended for Ni-base heat resistant alloy and titanium alloys

★ :1st Recommendation
☆ : 2nd Recommendation

• JS Chipbreaker

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade Vc (sfm)				
	Toolholder Description		MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
	MEC0500~MEC0750 MEC10~MEC19	**MEC1000~MEC1500 MEC20~MEC40 MEC1500R~MEC4000R MEC040R~MEC160R**	**PR1535**	**PR1225**	**PR1210**	**PR830**	**CA6535**
Carbon Steel	0.002~**0.004**~0.005	0.003~**0.006**~0.007	☆ 390~**590**~820	★ 390~**590**~820	-	☆ 390~**520**~660	-
Alloy Steel	0.002~**0.003**~0.004	0.003~**0.005**~0.006	☆ 330~**520**~720	★ 330~**520**~720	-	☆ 330~**460**~590	-
Mold Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 260~**460**~590	★ 260~**460**~590	-	☆ 260~**390**~490	-
Austenitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	★ 330~**520**~660	☆ 330~**520**~660	-	☆ 330~**460**~590	-
Martensitic Stainless Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 490~**660**~820	-	-	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 300~**390**~490	-	-	-	-
Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004	0.003~**0.004**~0.005	☆ 70~**100**~160	-	-	-	★ 70~**100**~160
Titanium Alloys	0.002~**0.003**~0.004	0.003~**0.004**~0.005	★ 130~**200**~260	-	-	-	-

※ Bold numbers in the graph indicate the most recommended value of feed (fz) Adjust cutting speed and feed rate according to the actual machining conditions
※ Machining with coolant is recommended for Ni-base heat resistant alloy and titanium alloys

★ :1st Recommendation
☆ : 2nd Recommendation

• JA Chipbreaker

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)	
		DLC Coated Carbide	Carbide
		PDL025	**GW25**
Aluminum Alloy (Si 13% or Less)	0.002~0.012	660~3280	660~2620
Aluminum Alloy (Si 13% and Over)	0.002~0.008	660~980	660~980

• PCD

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)
		PCD
		KPD230 (KPD001)
Aluminum Alloy (Si 13% or Less)	0.002~0.008	1640~4920
Aluminum Alloy (Si 13% and Over)	0.002~0.006	980~3280

⚠ 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

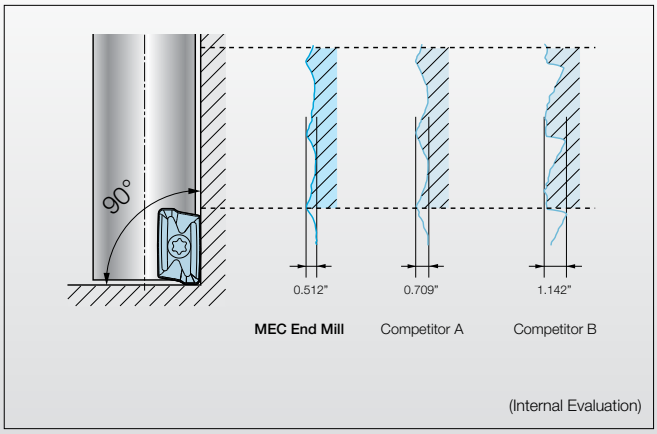
1. When running the end mill and the face mill at revolutions exceeding the maximum revolution limit, the inserts or toolholder may be damaged due to the centrifugal force.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over 10,000min^{-1}), refer to the table to adjust the balance of MEC and suitable arbor.

Max RPM*	Balance quality grade G ISO 1940-1 / 8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

Features of MEC

Perfect 90° Shoulders

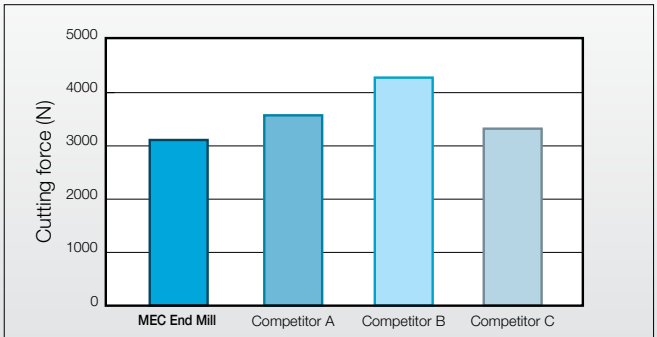
<Cutting Surface Comparison>



(Internal Evaluation)

Low cutting force

<Cutting Force Comparison>

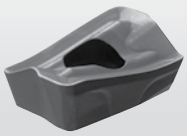


Tool Diameter Ø0.750" 1049
Vc = 330 sfm Shouldering D.O.C. × ae = 0.354"×0.394"
fz = 0.008 ipt Dry

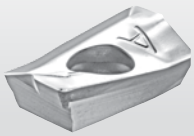
(Internal Evaluation)

Chipbreaker

JT Chipbreaker
(General Purpose)

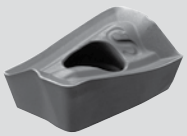


JA Chipbreaker
(for Aluminum)



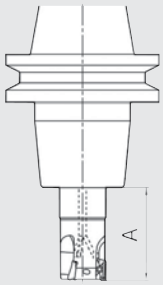
JS chipbreaker
(Low Cutting Force)

Cutting Force 20% Lower

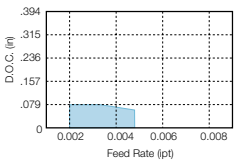
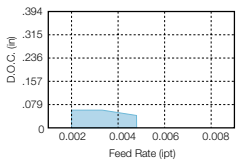
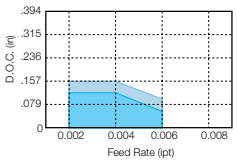
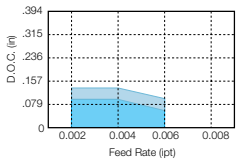
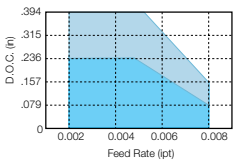
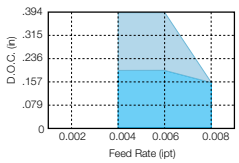
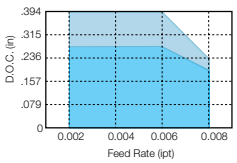
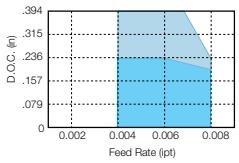
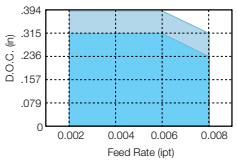
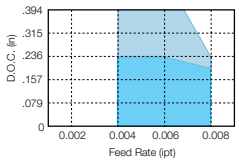
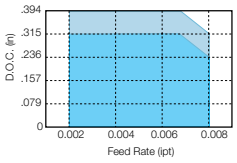
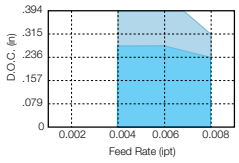


Cutting Performance of MEC End Mill

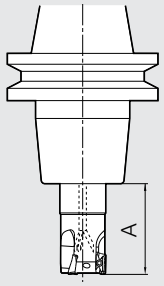
(1) Overhang Length When Using BDMT 11mm-type Insert
(Standard / Straight Shank)

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)		Shape
Ø10mm	MEC10-S10-11	0.670	-	
Ø0.500" Ø12mm	**MEC0500...** MEC12-S16-11	0.787	1.180	
Ø0.625" Ø16mm	**MEC0625-S625-11T** MEC16-S16-11T	1.180	1.790	
Ø0.750" Ø20mm	**MEC0750-S750-11T** MEC20-S20-11T	1.180	1.790	
Ø1.000" Ø25mm	**MEC1000-S100-11T** MEC25-S25-11T	1.260	1.890	
Ø1.250" Ø32mm	**MEC1250-S125-11T** MEC32-S32-11T	1.580	2.360	

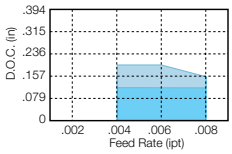
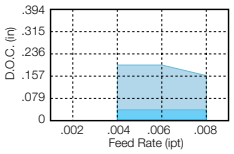
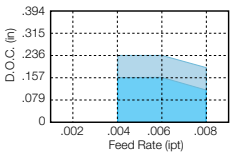
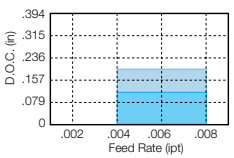
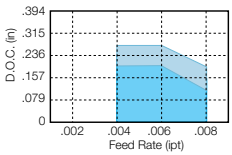
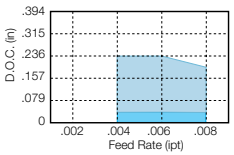
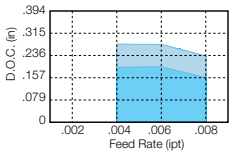
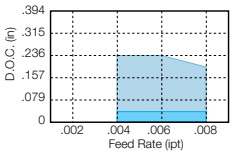
(JT Chipbreaker Vc = 400 sfm Workpiece :1049)

Part Number	■ Shouldering (Cutting Width ae = ØD/2)	■ Slotting ■ Ramping and Helical Milling
MEC10-S10-11		
MEC0500... MEC12-S16-11		
MEC0625-S625-11T MEC16-S16-11T		
MEC0750-S750-11T MEC20-S20-11T		
MEC1000-S100-11T MEC25-S25-11T		
MEC1250-S125-11T MEC32-S32-11T		

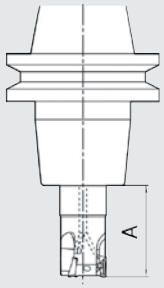
(2) Overhang Length When Using BDMT 11mm-type Insert (Long Shank)

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)		Shape
Ø0.750" Ø20mm Long Shank	**MEC20-S20-140-11T** MEC0750-S750-5.2-11T	2.362	3.543	
Ø1.000" Ø25mm Long Shank	**MEC25-S25-160-11T** MEC1000-S100-6.3-11T	2.362	3.957	
Ø1.250" Ø32mm Long Shank	**MEC32-S32-200-11T** MEC1250-S125-7.9-11T	3.957	5.118	
Ø1.500" Ø40mm Long Shank	**MEC40-S32-240-11T** MEC1500-S125-9.5-11T	3.957	5.119	

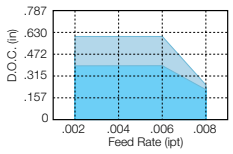
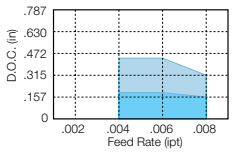
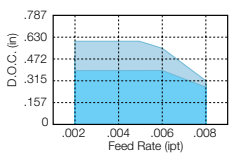
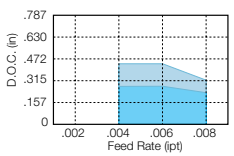
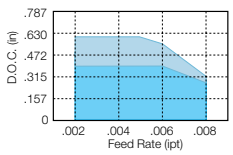
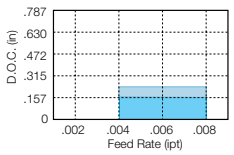
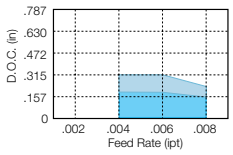
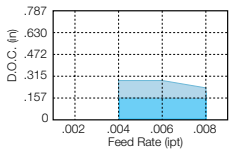
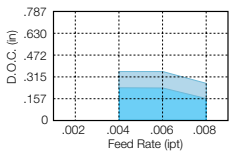
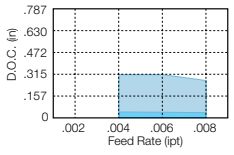
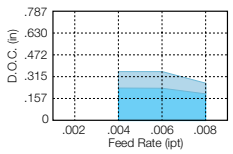
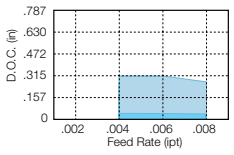
(JT Chipbreaker Vc = 400 sfm Workpiece :1049)

Part Number	■ Shouldering (Cutting Width ae = ØD/2)	■ Slotting ■ Ramping and Helical Milling
MEC0750-S750-5.2-11T MEC20-S20-140-11T Long Shank		
MEC1000-S100-6.3-11T MEC25-S25-160-11T Long Shank		
MEC1250-S125-7.9-11T MEC32-S32-200-11T Long Shank		
MEC1500-S125-9.5-11T MEC40-S32-240-11T Long Shank		

(3) Overhang Length When Using BDMT 17mm-type Insert

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)		Shape
Ø1.000" Ø25mm	**MEC1000-S100-17** MEC25-S25-17	1.417	2.126	
Ø1.250" Ø32mm	**MEC1250-S125-17** MEC32-S32-17	1.575	2.362	
Ø1.500" Ø40mm	**MEC1500-S125-17** MEC40-S32-17	1.969	2.953	
Ø1.000" Ø25mm Long Shank	**MEC1000-S100-6.3-17** MEC25-S25-160-17	2.362	3.937	
Ø1.250" Ø32mm Long Shank	**MEC1250-S125-7.9-17** MEC32-S32-200-17	3.937	5.118	
Ø1.500" Ø40mm Long Shank	**MEC1500-S125-9.5-17** MEC40-S32-240-17	3.937	5.118	

(JT Chipbreaker Vc = 400 sfm Workpiece :1049)

Part Number	■ Shouldering (Cutting Width ae = ØD/2)	■ Slotting ■ Ramping and Helical Milling
MEC1000-S100-17 MEC250S25-17		
MEC1250-S125-17 MEC32-S32-17		
MEC1500-S125-17 MEC40-S32-17		
MEC1000-S100-6.3-17 MEC25-S25-160-17		
MEC1250-S125-7.9-17 MEC32-S32-200-17		
MEC1500-S125-9.5-17 MEC40-S32-240-17		

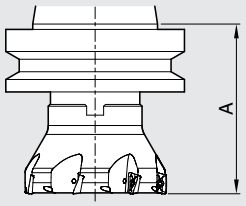
Cutting Performance of MEC Face Mill

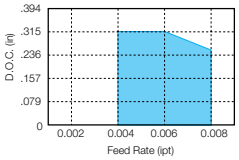
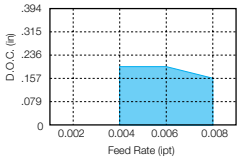
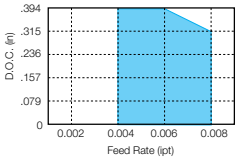
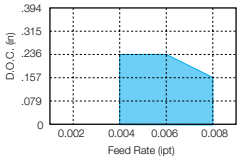
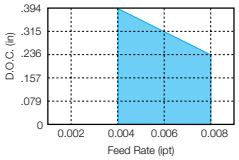
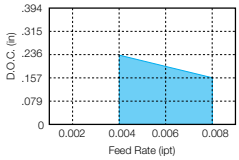
(1) Overhang Length When Using BDMT 11mm-type Insert

(JT Chipbreaker Vc = 400 sfm Workpiece :1049)

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)
Ø1.500" Ø40mm	**MEC1500R-11T-5T** MEC040R-11-5T-M	4.528
Ø2.000" Ø50mm	**MEC2000R-11T-5T** MEC050R-11-○T-M	3.937
Ø2.500" Ø63mm	**MEC2500R-11T-6T** MEC063R-11-○T(-M)	3.740
Ø63mm	MEC063R-11-○T-M	
Ø3.000 Ø80mm	**MEC3000R-11T-7T** MEC080R-11-○T(-M)	
Ø4.000" Ø100mm	**MEC4000R-11-9TN** MEC100R-11-9TN	4.252
Ø125mm	MEC125R-11-11T(-M)	
Ø160mm	MEC160R-11-14T(-M)	

Shape



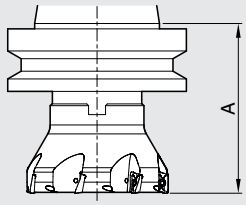
Part Number	■ Shouldering (Cutting Width ae = ØD/2)	■ Slotting
MEC1500R-11T-5T MEC040R-11-5T-M		
MEC2000R-○T-○T ~ **MEC4000R-○T-○T** MEC050R-11-○T-M ~ MEC100R-11-9TN MEC100R-11-9T-MN		
MEC125R-11-11T(-M) MEC160R-11-14T(-M)		

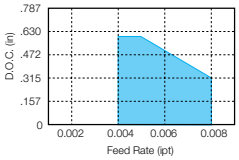
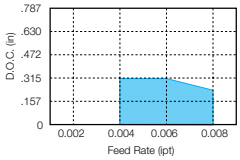
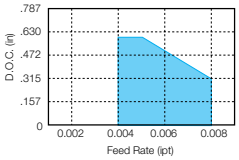
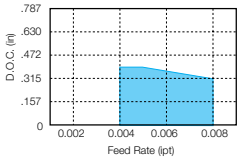
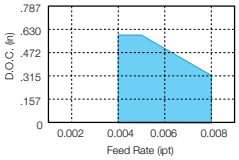
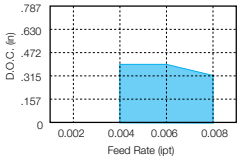
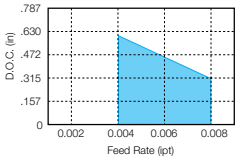
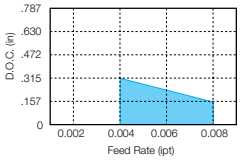
(2) Overhang Length When Using BDMT 17mm-type Insert

(JT Chipbreaker Vc = 400 sfm Workpiece :1049)

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)
Ø40mm	MEC040R-17-4T-M	4.528
Ø2.000" Ø50mm	**MEC2000R-17-4T** MEC050R-17-○T-M	3.937
Ø2.500" Ø63mm	**MEC2500R-17-4T** MEC063R-17-○T	3.740
Ø63mm	MEC063R-17-○T-M	
Ø3.000" Ø80mm	**MEC3000R-17-6T** MEC080R-17-○T	
Ø4.000" Ø100mm	**MEC4000R-17-7T** MEC100R-17-○TN	4.252
Ø125mm	MEC125R-17-9T(-M)	
Ø160mm	MEC160R-17-12T(-M)	

Shape



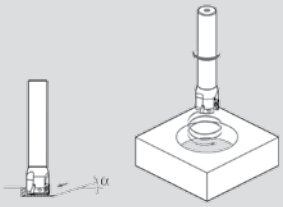
Part Number	■ Shouldering (Cutting Width ae = ØD/2)	■ Slotting
MEC040R-17-4T-M		
MEC2000R-17-4T MEC050R-17-○T-M		
MEC2500R-17-○T ~ **MEC4000R-17-○TN** MEC063R-17-○T(-M) ~ MEC100R-17-○TN MEC100R-17-7T-MN		
MEC125R-17-9T(-M) MEC160R-17-12T(-M)		

E 90° LEAD

Ramping / Helical Milling / Plunging

Ramping / Helical Milling

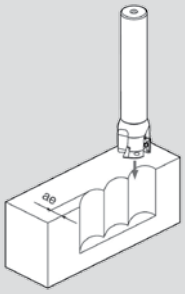
- Ramping angle should be under α°.
- For plunge depth per revolution when helical milling, see the cutting performance data of each tool. Use compressed air during machining.



Cutting Dia.	Applicable Inserts	Max. Ramping Angle (α°)
Ø0.625", Ø16~Ø18mm	BDMT 11T3 BDGT 11T3	3°
Ø0.750", Ø19~Ø21mm		5°
Ø1.000", Ø22~Ø25mm		2.5°
Ø1.250", Ø28~Ø32mm		1.5°
Ø1.500", Ø40mm		0.7°
Ø50mm~		Not Recommended
Ø1.000", Ø25mm	BDMT 1704	8°
Ø1.250", Ø32mm		5°
Ø1.500", Ø40mm		2.5°
Ø50mm~		Not Recommended

BDMT/BDGT1103 type not recommended for ramping or helical milling.

Plunging



Cutting Dia.	Applicable Inserts	Max. Width of Cut (ae)
Ø0.625" Ø16~Ø19mm	BDMT 11T3 BDGT 11T3	0.060" 1.5mm
Ø0.750"~Ø4.000" Ø20~Ø160mm	BDMT 11T3 BDGT 11T3	0.197" 5mm
Ø1.000"~Ø4.000" Ø25~Ø160mm	BDMT 1704 BDGT 1704	0.315" 8mm

BDMT1103 type not recommended for ramping or helical milling.

Minimum Cutting Dia. for Helical Milling

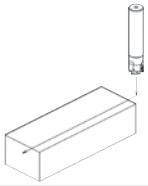
MEC	Cutting Dia.	Ø0.625"	Ø0.750"	Ø1.000"	Ø1.250"	Ø1.500"	Ø16mm	Ø18mm	Ø20mm	Ø22mm	Ø25mm	Ø28mm	Ø30mm	Ø32mm	Ø40mm	Ø50mm
BD_T11T3 Type	Min. Cutting Dia.	Ø0.827"	Ø1.102"	Ø1.575"	Ø2.087"	Ø2.598"	Ø21mm	Ø25mm	Ø29mm	Ø33mm	Ø39mm	Ø45mm	Ø49mm	Ø53mm	Ø69mm	Not recommended for helical milling.
	Min. Cutting Dia. for Flat Bottom	Ø1.102"	Ø1.339"	Ø1.850"	Ø2.362"	Ø2.835"	Ø28mm	Ø32mm	Ø36mm	Ø40mm	Ø46mm	Ø52mm	Ø56mm	Ø60mm	Ø76mm	

MEC	Cutting Dia.	Ø1.000"	Ø1.250"	Ø1.500"	Ø25mm	Ø32mm	Ø40mm	Ø50mm
BD_T1704 Type	Min. Cutting Dia.	Ø1.339"	Ø1.850"	Ø2.362"	Ø34mm	Ø48mm	Ø64mm	Not recommended for helical milling.
	Min. Cutting Dia. for Flat Bottom	Ø1.850"	Ø2.323"	Ø2.835"	Ø46mm	Ø60mm	Ø76mm	

Case Studies

Pre-Hardened Tool Steel

- Test Piece (54~56HRC)
- Vc = 160 sfm (n = 800min^{-1})
- D.O.C. × ae = 0.079" × 0.551"
- fz = 0.005 ipt (Vf = 2.28 ipm)
- Dry
- MEC20-S20-11T (3 Flute)
- BDMT11T308ER-JT (PR830)



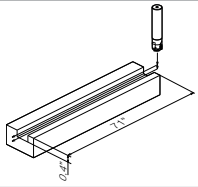
MEC	Chip Removal Amount = 28.1in^3
Competitor's End Mill A	Chip Removal Amount = 1.1in^3 (Chipping Occurred)

Competitor's End Mill A [Ø25 (2 inserts) Vc = 130sfm fz = 0.003ipt D.O.C. x ae = 0.079"x0.118"] had chipping occur in 10 minutes and it was noisy. MEC withstood increased feed rates, and the cutting edge remained in extremely good condition and is still available for further machining.

(User Evaluation)

Structural Steel

- Plate
- Vc = 290 sfm (n = 1,400min^{-1})
- D.O.C. = 0.197" x 2 Passes
- fz = 0.005 ipt (Vf = 19.7 ipm)
- Dry
- MEC20-S20-11T (3 Flute)
- BDMT11T308ER-JT (PR830)



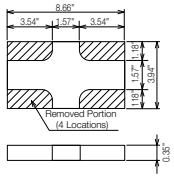
MEC	23 pcs/edge
Competitor's End Mill B	10~11 pcs/edge

MEC doubled Competitor B's tool life under the same conditions.

(User Evaluation)

304

- Plate
- Vc = 410 sfm (n = 1,600min^{-1})
- D.O.C. = 0.354"
- fz = 0.004 ipt (Vf = 12.6 ipm)
- Dry
- MEC25-S25-17 (2 Flute)
- BDMT170408ER-JT (PR830)



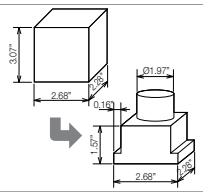
MEC	4 pcs/edge or More
Competitor's End Mill C	1 pcs/edge or Less

Competitor's End mill C (indexable roughing end mill) had high cutting force and insert breakage occurred, but MEC had no breakage and was still usable for further machining, after machining 4 pieces (16 points).

(User Evaluation)

Die Steel

- Mold
- Vc = 430 sfm (n = 1,040min^{-1})
- D.O.C. x ae = ~0.118" x ~0.197"
- fz = 0.007 ipt (Vf = 36.8 ipm)
- Dry (Air Blow)
- MEC40-S32-11T (5 Flute)
- BDMT11T308ER-JT (PR830)



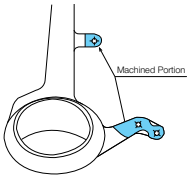
MEC	2 Hours (Small Wear : Extendible)
Competitor's End Mill D	2 Hours (Halted due to Insert Breakage)

MEC had better cutting performance / insert life compared to Competitor's End Mill D, and the insert maintained small wear and was usable for further machining after the same duration as Competitor's End Mill D. Competitor's End Mill D (6 flute) was used with Vf = 3070sfm (fz = 0.006ipt).

(User Evaluation)

4118

- Knuckle Steering
- Vc = 490 sfm (n = 1,200min^{-1})
- D.O.C. = 0.020"~0.197" (Shouldering)
- fz = 0.004 ipt (Vf = 18.8 ipm)
- Dry
- MEC40-S32-17 (4 Flute)
- BDMT170408ER-JT (PR830)



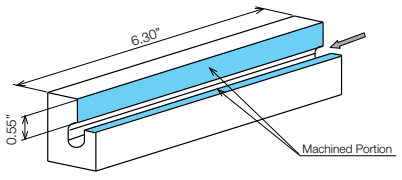
MEC	150 pcs/edge
Competitor's End Mill E	40 pcs/edge

MEC had a better surface finish compared to Competitor's End mill E and also tripled the tool life.

(User Evaluation)

Ni-Base HRSA

- Turbine Parts
- Vc = 50 sfm (n = 120min^{-1})
- D.O.C. = 0.020"
- fz = 0.003 ipt (Vf = 1.5 ipm)
- Wet
- MEC040R-17-4T-M (4 Flute)
- BDMT170408ER-JS (PR1025)



MEC	9 pcs/edge
Competitor's End Mill F	1 pcs/edge or Less

Competitor's End Mill F (Coated Carbide Insert) could not finish machining of 1 workpiece, but MEC could cut 9 pcs/edge and the finished surface was good.

(User Evaluation)

Shouldering | Slotting | Facing

MECX End Mill

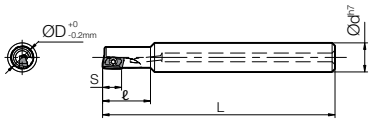


Fig.1

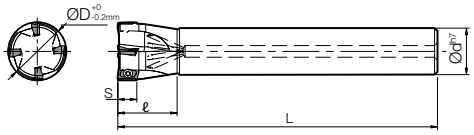


Fig.3

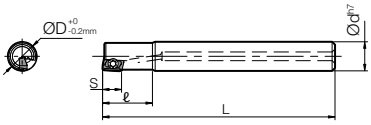


Fig.2

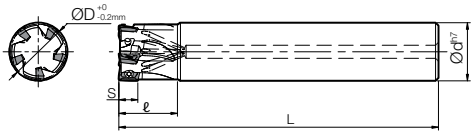


Fig.4

Toolholder Dimensions

Shank		Part Number	Stock	Unit	No. of Inserts	Dimensions ØD	Dimensions Ød	Dimensions L	Dimensions ℓ	Dimensions S	Rake Angle (°) A.R. (Max)	Rake Angle (°) R.R.	Coolant Hole	Drawing	Spare Parts: Insert Screw	Spare Parts: Wrench	Max RPM*
Standard Shank		MECX 0375-S375-07-1T	●	inch	1	0.375	0.375	3.00	0.669	0.236	12.8°	-19.7	Yes	Fig.1	SB-2035TRG	DTM-6	47,150
		0500-S500-07-2T	●		2	0.500	0.500	3.27	0.709		14.3°	-12.9					45,800
		0625-S625-07-3T	●		3	0.625	0.625	3.50	0.787		16.3°	-11.3°		Fig. 2	SB-2042TRG		43,300
		0750-S625-07-4T	●		4	0.750						-10.9°		Fig. 3			40,900
		0750-S625-07-5T	●		5			4.00									40,900
		0750-S750-07-4T	●		4		0.750							Fig. 2			40,900
		0750-S750-07-5T	●		5												40,900
		1000-S100-07-5T	●		5	1.000	1.000	4.50	0.984			-9.5°		Fig. 2			36,900
		1000-S100-07-7T	●		7												36,900
		1000-S750-07-5T	●		5		0.750							Fig.3			36,900
		1000-S750-07-7T	●		7												36,900
		1250-S125-07-6T	●		6	1.250	1.250	5.00	1.181			-8.9°		Fig.2	SB-2035TRG		33,700
		1250-S125-07-8T	●		8									Fig.4			33,700
Long Shank		MECX 0625-S625-07-3T	●	inch	3	0.625	0.625	5.10	2.175	0.236	16.3°	-11.3°	Yes	Fig.4	SB-2042TRG	DTM-6	43,300
		0750-S750-07-4T	●		4	0.750	0.750	5.50	2.362			-10.9°					40,900
		1000-S100-07-5T	●		5	1.000	1.000	6.30				-9.5°					36,900
		1250-S125-07-6T	●		6	1.250	1.250	7.90	2.559			-8.9°					33,700
Standard Shank	Standard	MECX 08-S10-07-1T	○	mm	1	8	10	80	16	6	11.7°	-24.0°	Yes	Fig.1	SB-2035TRG	DTM-6	48,100
		10-S10-07-1T	○			10			17		12.8°	-18.7°		Fig.2			47,100
		12-S12-07-2T	○		2	12	12		18		14.3°	-13.7°		Fig.4			46,200
		14-S12-07-2T	○			14					16.3°	-12.1°		Fig.3			44,800
		16-S16-07-3T	○		3	16	16	100	20		16.3°	-11.3°		Fig.4	SB-2042TRG		43,200
		17-S16-07-3T	○			17						-11.0°		Fig.3			42,400
		18-S16-07-3T	○			18						-10.9°					41,600
		20-S16-07-4T	○		4	20		110				-10.4°					40,200
		20-S20-07-4T	○			20	20							Fig.4			40,200
		21-S20-07-4T	○			21						-10.1°		Fig.3			39,500
		25-S20-07-5T	○		5	25	20	120	25			-9.7°		Fig.3			37,000
		25-S25-07-5T	○				25							Fig.4			37,000
		26-S25-07-5T	○			26						-9.5°	Yes	Fig.3	SB-2042TRG	DTM-6	36,500
		32-S32-07-6T	○		6	32	32	130	30			-8.9°		Fig.4			33,600
		33-S32-07-6T	○			33						-8.8°		Fig.3			33,100
	Fine Pitch	MECX 16-S16-07-4T	○	mm	4	16	16	100	20	6	16.3°	-11.3°	Yes	Fig.4	SB-2042TRG	DTM-6	43,200
		20-S16-07-5T	○		5	20		110				-10.4°		Fig.3			40,200
		20-S20-07-5T	○				20							Fig.4			40,200
		25-S20-07-7T	○		7	25		120	25			-9.7°		Fig.3			37,000
		25-S25-07-7T	○				25							Fig.4			37,000
		32-S32-07-8T	○		8	32	32	130	30			-8.9°					33,600
Long Shank	Standard	MECX 17-S16-130-07-3T	○	mm	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

Coat Anti-seize Compound (MP-1) 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.

Applicable Inserts ➡ E25
Recommended Cutting Conditions ➡ E26

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Shouldering | Slotting | Facing

MECX Face Mill

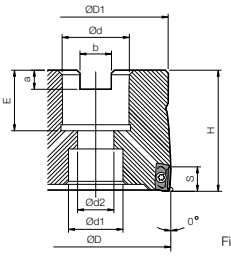


Fig.1

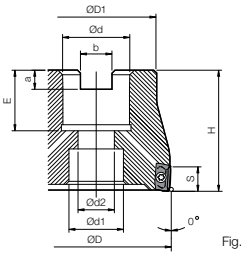
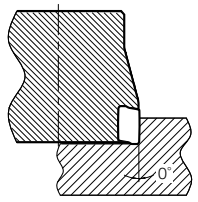


Fig.2



Toolholder Dimensions

Part Number	Stock	Unit	No. of Inserts	Dimensions ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Rake Angle (°) A.R. (Max)	R.R.	Coolant Hole	Drawing	Weight (kg)	Spare Parts: Insert Screw	Wrench	Arbor Bolt	Max RPM*
MECX 1250R-07-8T	●	inch	8	1.250	1.181	0.75	0.630	0.417	1.575	0.807	0.187	0.313	0.236	+7°	-8.9°	Yes	Fig.5	0.15	SB-2042TRG	DTM-6	HH3/8-1.25H	33,600
1500R-07-10T	●		10	1.500	1.496										-8.4°			0.25				30,500
2000R-07-12T	●		12	2.000	1.575		0.646	0.417	1.575	0.819					-8.3°		Fig.6	0.125				27,700
2500R-07-14T	●		14	2.500			0.630								-7.9°			0.50				24,900
MECX 032R-07-8T-M	○	mm	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	HH8x25H	33,600
040R-07-10T-M	○		10	40	38	22	18	12		22	6.3	10.4			-8.4°			0.25			HH10x30H	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 (MP-1) thinly on portion of taper and thread when insert is fixed

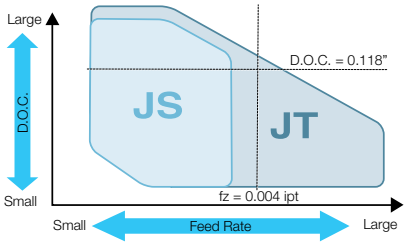
Recommended Cutting Conditions ➡ E26

Max. Revolution*
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
• To obtain a smooth shoulder wall finish using step milling, set D.O.C. within 0.197" for each cut.

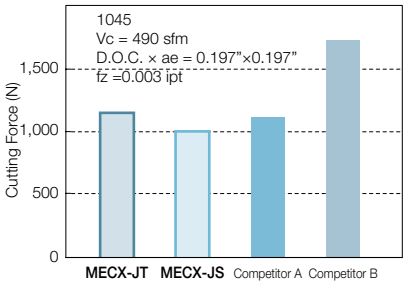
Applicable Inserts

Part Number	Applicable Inserts ➡ B18	
		
MECX...-07...	BDMT 0703○○ER-JT	BDMT 0703○○ER-JS

Selecting Chipbreaker



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.

Max RPM*	Balance quality grade G ISO 1940-1 / 8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade Vc (sfm)				
			MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
	JS Chipbreaker	JT Chipbreaker	PR1535	PR1225	PR1210	PR830	CA6535
Carbon Steel	0.0016~**0.0031**~0.0039	0.0024~**0.0039**~0.0047	☆ 390~**590**~820	★ 390~**590**~820	-	☆ 390~**490**~590	-
Alloy Steel	0.0016~**0.0024**~0.0031	0.0024~**0.0031**~0.0039	☆ 330~**520**~720	★ 330~**520**~720	-	☆ 330~**460**~590	-
Mold Steel	0.0016~**0.0024**~0.0031	0.0024~**0.0031**~0.0039	☆ 260~**460**~590	★ 260~**460**~590	-	☆ 260~**390**~490	-
Austenitic Stainless Steel	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0028	★ 330~**520**~660	☆ 330~**520**~660	-	-	-
Martensitic Stainless Steel	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0039	☆ 490~**660**~820	-	-	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0039	★ 300~**390**~490	-	-	-	-
Gray Cast Iron	0.0016~**0.0031**~0.0039	0.0031~**0.0039**~0.0059	-	-	★ 390~**590**~820	-	-
Nodular Cast Iron	0.0016~**0.0024**~0.0031	0.0031~**0.0039**~0.0047	-	-	★ 330~**490**~660	-	-
Ni-base Heat Resistant Alloy	0.0012~**0.0016**~0.0020	0.0020~**0.0024**~0.0028	☆ 70~**100**~160	-	-	-	★ 70~**100**~160
Titanium Alloys	0.0016~**0.0024**~0.0031	0.0031~**0.0039**~0.0047	★ 130~**200**~260	-	☆ 100~**160**~230	-	-

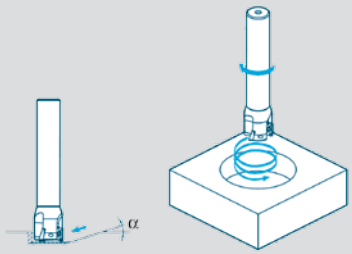
※ Bold numbers in the graph indicate the most recommended value of feed (fz) Adjust cutting speed and feed rate according to the actual machining conditions
※ Machining with coolant is recommended for Ni-base heat resistant alloy and titanium alloys

★ :1st Recommendation
☆ : 2nd Recommendation

Ramping / Helical Milling

Ramping / Helical Milling

- Ramping angle should be under α°.
- For plunge depth per revolution when helical milling, see the cutting performance data of each tool. Use compressed air during machining.



Cutting Dia.	Applicable Inserts	Max. Ramping Angle (α°)
Ø0.375", Ø8mm	BDMT 0703	Not Recommended
Ø10mm		1.5°
Ø0.500" Ø12mm, Ø14mm		2°
Ø0.625", Ø16mm		3°
Ø17mm, Ø18mm		1.5°
Ø0.750", Ø20mm		2°
Ø21mm		1.8°
Ø1.000", Ø25mm		1.3°
Ø26mm		1.2°
Ø1.250", Ø32mm		0.8°
Ø33mm		0.5°

Minimum Cutting Dia. for Helical Milling

MECX	Cutting Dia.	Ø0.375"	Ø0.500"	Ø0.625"	Ø0.750"	Ø8mm	Ø10mm	Ø12mm	Ø14mm	Ø16mm	Ø17mm	Ø18mm	Ø20mm
BDMT0703 Type	Min. Cutting Dia.	Ø0.512"	Ø0.748"	Ø0.984"	Ø1.260"	Not recommended for helical milling.	Ø14mm	Ø18mm	Ø22mm	Ø26mm	Ø28mm	Ø30mm	Ø34mm
	Min. Cutting Dia. for Flat Bottom	Ø0.630"	Ø0.866"	Ø1.142"	Ø1.378"		Ø17mm	Ø21mm	Ø25mm	Ø29mm	Ø31mm	Ø33mm	Ø37mm

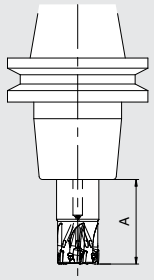
MECX	Cutting Dia.	Ø1.000"	Ø1.250"	Ø21mm	Ø25mm	Ø26mm	Ø32mm	Ø33mm
BDMT0703 Type	Min. Cutting Dia.	Ø1.732"	Ø2.244"	Ø36mm	Ø44mm	Ø46mm	Ø58mm	Ø60mm
	Min. Cutting Dia. for Flat Bottom	Ø1.890"	Ø2.362"	Ø39mm	Ø47mm	Ø49mm	Ø61mm	Ø63mm

MECX End Mill Cutting Performance

(JT Chipbreaker Vc = 400 sfm Workpiece :1049)

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)	
Ø8mm	MECX08-S10-07-1T	0.630	-
Ø0.375" Ø10mm	**MECX0375-S375-07-1T** MECX10-S10-07-1T	0.670	-
Ø0.500" Ø12mm	**MECX0500-S500-07-2T** MECX12-S12-07-2T	0.709	1.180
Ø0.625" Ø16mm	**MECX0625-S625-07-3T** MECX16-S16-07-3T	0.787	1.570
Ø0.750" Ø20mm	**MECX0750-S750-07-4T** MECX20-S20-07-4T	0.787	1.570
Ø1.000" Ø25mm	**MECX1000-S100-07-5T** MECX25-S25-07-5T	1.000	1.970
Ø1.250" Ø32mm	**MECX1250-S125-07-6T** MECX32-S32-07-6T	1.180	1.970

Shape



- Machining with extended overhang length is not recommended for ø0.315" and ø0.394".
- The cutting performance list shows applicable range of JT Chipbreaker (PR830) with Standard flute-number type.

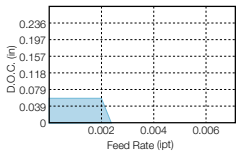
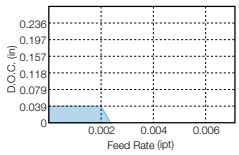
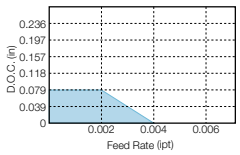
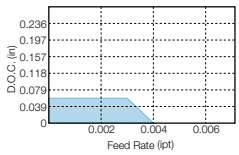
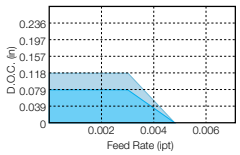
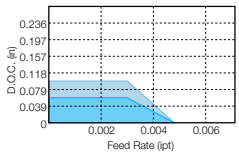
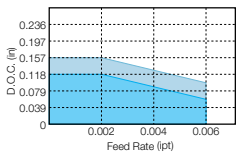
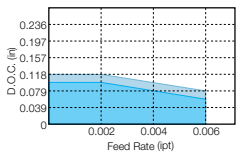
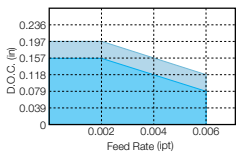
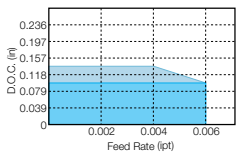
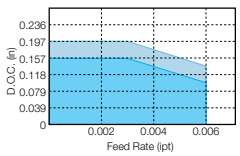
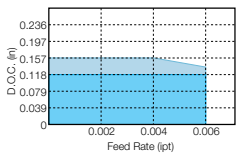
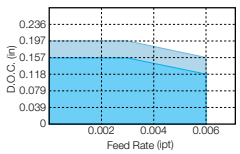
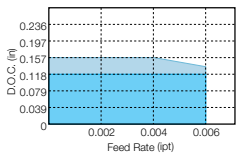
  For Multi-Edge type, use with 70% or less of D.O.C..
- Cutting conditions of JS Chipbreaker

(1) For MECX0375~MECX0500 / MECX08~MECX12

Decrease the feed rate by 25% according to cutting capability list.

(2) For MECX 0625 / MECX16 and over

Decrease the feed rate and ap by 30% according to cutting capability list.

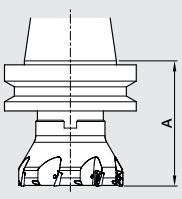
Part Number	■ Shouldering (Cutting Width ae = ØD/2)	■ Slotting ■ Ramping and Helical Milling
MECX08-S10-07-1T		
MECX0375-S375-07-1T MECX10-S10-07-1T		
MECX0500-S500-07-2T MECX12-S12-07-2T		
MECX0625-S625-07-3T MECX16-S16-07-3T		
MECX0750-S750-07-4T MECX20-S20-07-4T		
MECX1000-S100-07-5T MECX25-S25-07-5T		
MECX1250-S125-07-6T MECX32-S32-07-6T		

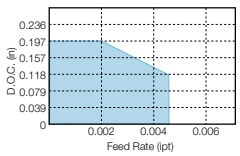
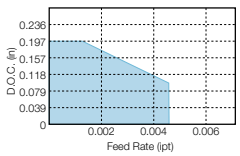
MECX Face Mill Cutting Performance

(JT Chipbreaker Vc = 400 sfm Workpiece :1049)

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)
Ø1.250" Ø32mm	**MECX1250R-07-8T** MECX032R-07-8T-M	3.937
Ø1.500" Ø40mm	**MECX1500R-07-10T** MECX040R-07-10T-M	
Ø2.000" Ø50mm	**MECX2000R-07-12T** MECX050R-07-12T-M	
Ø2.500" Ø63mm	**MECX2500R-07-14T** MECX063R-07-14T-M	

Shape



Part Number	■ Shouldering (Cutting Width ae = ØD/2)
MECX1250R-07-8T MECX032R-07-8T-M **MECX1500R-07-10T** MECX040R-07-10T-M	
MECX2000R-07-12T MECX050R-07-12T-M **MECX2500R-07-14T** MECX063R-07-14T-M	

- Not recommended for slotting

Shouldering | Slotting (2-Flute Only) | Facing

MEWH Helical End Mill

Excellent Surface Finish and Stable Machining due to Innovative Toolholder Design

Chip Evacuation

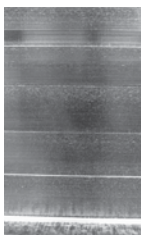
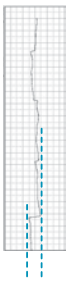
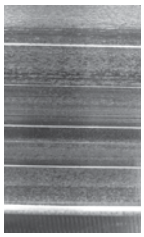
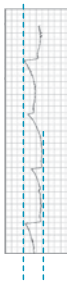
Chipbreaker	Workpiece Material	fz = 0.006 ipt	fz = 0.008 ipt
GM	4137		
GM	SS400		
SM			

Vc = 390 sfm
D.O.C. × ae = 0.787" × 0.591"
Dry

Chips are constantly evacuated in the opposite direction of the cutter feed without clogging

Surface Finish Comparison

MEWH	Competitor A

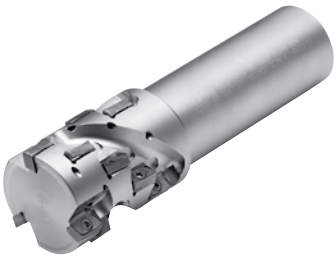
4137
Vc = 390 sfm
D.O.C. × ae = 1.772" × 0.197"
Dry

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

04 Marking on Insert	08 Not Marked	10 Marking on Insert	12 Marking on Insert	16 Marking on Insert	20 Marking on Insert
LOMU100404ER-GM LOMU150504ER-GM	LOMU100408ER-GM LOMU150508ER-GM	LOMU150510ER-GM	LOMU100412ER-GM LOMU150512ER-GM	LOMU100416ER-GM LOMU150516ER-GM	LOMU100420ER-GM LOMU150520ER-GM

MEWH Helical End Mill (Coolant Hole for Bottom Insert)



Rake Angle (°)	A.R. (Max.)	R.R.
	+13°	-20°

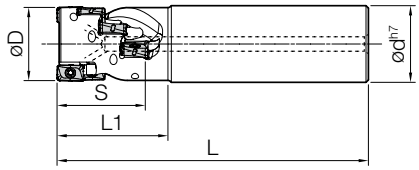


Fig.1

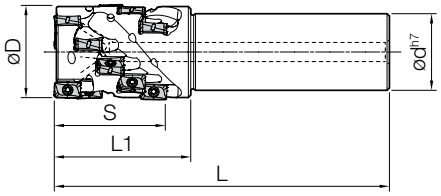


Fig.2

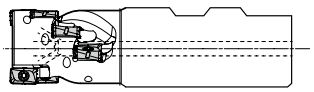


Fig.3

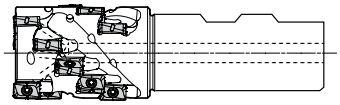


Fig.4

Toolholder Dimensions (Inch)

Shank	Part Number	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (in) ØD	Ød	L	L1	S	Coolant Hole	Drawing	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Pre-set Torque Wrench*	Applicable Inserts ➡ B13
Weldon	MEWH 1000-W100-10-3-2T	●	2	3	6	1.000	1.000	3.806	1.523	1.102	Yes	Fig.3	SB-3065TRP	DTPM-8	MP-1	PST-IP8	LOMU1004..
	1250-W125-10-4-2T	●		4	8	1.250	1.250	4.161	1.878	1.456				Recommended Torque for Insert Screw 1.2N · m			
	1500-W125-10-5-3T	●	3	5	15	1.500		4.610	2.244	1.811		Fig.4					
	1500-W150-10-5-3T	□					1.500	4.957	2.267			Fig.3					
	MEWH 1500-W125-15-4-2T	●	2	4	8	1.500	1.250	4.846	2.480	2.086	Yes	Fig.4	SB-4090TRP	DTPM-15	MP-1	PST-IP15	LOMU1505..
	1500-W150-15-4-2T	□					1.500	5.193	2.504			Fig.3		Recommended Torque for Insert Screw 3.5N · m			
	2000-W150-15-4-3T	●	3		12	2.000		5.252	2.480			Fig.4					

Toolholder Dimensions (Metric)

Shank	Part Number	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (mm) ØD	Ød	L	L1	S	Coolant Hole	Drawing	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Pre-set Torque Wrench*	Applicable Inserts ➡ B13
Cylindrical	MEWH 025-S25-10-3-2T	○	2	3	6	25	25	120	37	28	Yes	Fig.1	SB-3065TRP	DTPM-8	MP-1	PST-IP8	LOMU1004..
	032-S32-10-4-2T	○		4	8	32	32	130	46	37				Recommended Torque for Insert Screw 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	PST-IP15	LOMU1505..
	050-S42-15-4-2T	○				50	42							Recommended Torque for Insert Screw 3.5N · m			
	050-S42-15-4-3T	○	3		12												

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

Recommended Cutting Conditions ➡ E31

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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MEWH Shell Mill (without Coolant Hole) NEW

Rake Angle (°)	A.R. (Max.)	R.R.
	+13°	-20°

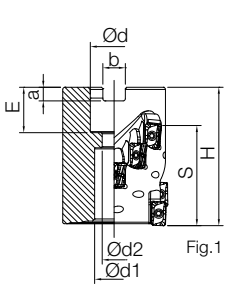


Fig.1

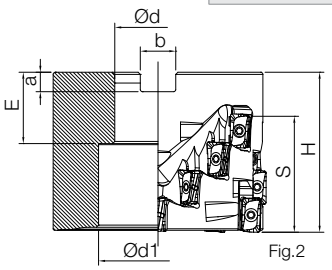


Fig.2

Toolholder Dimensions (Inch)

Part Number	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (in) ØD	Ød	Ød1	Ød2	H	E	a	b	S	Drawing	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Arbor Bolt	Pre-set Torque Wrench*	Applicable Inserts B13
MEWH 1500R-10-4-3T	□	3	4	12	1.50	0.75	0.669	0.433	2.087	0.750	0.187	0.312	1.456	Fig.1	SB-3065TRP Recommended Torque for Insert Screw 1.2N · m	DTPM-15	MP-1	HH3/8-1.25	PST-IP8	LOMU1004..
2000R-10-5-3T	□		5	15	2.00				2.520				1.811							
MEWH 2000R-15-4-3T	●	3	4	12	2.00	0.75	0.669	0.433	2.756	0.750	0.187	0.312	2.086	Fig.1	SB-4090TRP Recommended Torque for Insert Screw 3.5N · m	DTPM-15	MP-1	HH3/8-1.25	PST-IP15	LOMU1505..
2500R-15-3-3T	□		3	9	2.50	1.00	0.866	0.551	2.283	1.063	0.236	0.381	1.614					HH1/2-1.25		
3000R-15-4-4T	□	4	4	16	3.00				2.756				2.086							
4000R-15-4-5T	□	5		20	4.00	1.50	2.047	-	2.913	1.142	0.393	0.625	2.086	Fig.2				-		

Toolholder Dimensions (Metric)

Part Number	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (mm) ØD	Ød	Ød1	Ød2	H	E	a	b	S	Drawing	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Arbor Bolt	Pre-set Torque Wrench*	Applicable Inserts B13
MEWH 040R-10-4-3T-M	○	3	4	12	40	16	15	9	53	19	5.6	8.4	37	Fig.1	SB-3065TRP Recommended Torque for Insert Screw 1.2N · m	DTPM-8	MP-1	HH8X25	PST-IP8	LOMU1004..
050R-10-5-3T-M	○		5	15	50	22	18	11	64	21	6.3	10.4	46					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 Recommended Torque for Insert Screw 3.5N · m	DTPM-15	MP-1	HH10X30	PST-IP15	LOMU1505..
063R-15-3-3T-M	○		3	9	63	27	20	13	58	24	7	12.4	41					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				-		

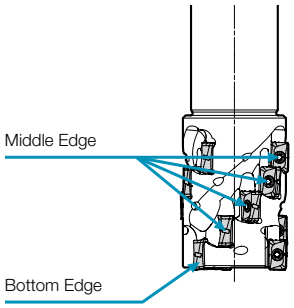
Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

Applicable Inserts

Part Number	Applicable Inserts B13		
	 General Purpose	 Low Cutting Force	 Tough Edge (Heavy Milling)
MEWH ...-10-...	LOMU1004..ER-GM	LOMU100408ER-SM	LOMU100408ER-GH
MEWH ...-15-...	LOMU1505..ER-GM	LOMU150508ER-SM	LOMU150508ER-GH

Recommended Cutting Conditions E31



Applicable Insert Guide for MEWH

Insert Location	Toolholder Part Number										
	MEWH...-10-...					MEWH...-15-...					
	Corner-R(rε) (mm)					Corner-R(rε) (mm)					
Bottom Edges	0.4	0.8	1.2	1.6	2.0	0.4	0.8	1.0	1.2	1.6	2.0
*Middle Edges	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 Edges, 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.

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World Express (Shipping: 7-10 Business Days) : ○

Recommended Cutting Conditions

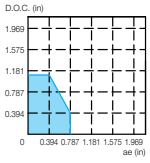
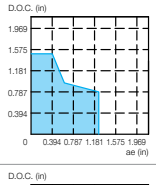
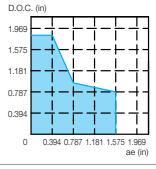
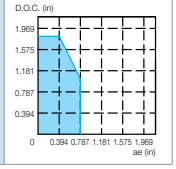
Chipbreaker	Workpiece Material	Feed Rate fz (ipt) Toolholder Part Number: Helical End Mill MEWH1000W~MEWH2000W MEWH025~MEWH050	Feed Rate fz (ipt) Toolholder Part Number: Shell Mill MEWH1500R~MEWH4000R MEWH040R~MEWH100R	Recommended Insert Grade Vc (sfm): MEGACOAT NANO PR1535	PR1525	PR1510	CVD Coated Carbide CA6535
GM	Carbon Steel	0.002~**0.004**~0.008		☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.004**~0.006		☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.002~**0.003**~0.005		☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005		☆ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.004		☆ 490~**660**~820	-	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004		★ 300~**390**~490	-	-	-
	Gray Cast Iron	0.002~**0.004**~0.007		-	-	★ 390~**590**~820	-
	Nodular Cast Iron	0.002~**0.003**~0.005		-	-	★ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004		☆ 70~**100**~160	-	-	★ 70~**100**~160
	Titanium Alloys	0.002~**0.003**~0.005		☆ 130~**200**~260	-	☆ 100~**160**~230	-
SM	Carbon Steel	0.002~**0.004**~0.007		☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.003**~0.005		☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.002~**0.003**~0.005		☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005		★ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.004		☆ 490~**660**~820	-	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004		☆ 300~**390**~490	-	-	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004		☆ 70~**100**~160	-	-	★ 70~**100**~160
	Titanium Alloys	0.002~**0.003**~0.005		★ 130~**200**~260	-	☆ 100~**160**~230	-
GH	Carbon Steel	0.002~**0.004**~0.008		☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.002~**0.004**~0.006		☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel	0.002~**0.003**~0.005		☆ 260~**460**~590	★ 260~**460**~590	-	-
	Austenitic Stainless Steel	0.002~**0.003**~0.005		☆ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.002~**0.003**~0.004		☆ 490~**660**~820	-	-	☆ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.002~**0.003**~0.004		☆ 300~**390**~490	-	-	-
	Gray Cast Iron	0.002~**0.004**~0.008		-	-	☆ 390~**590**~820	-
	Nodular Cast Iron	0.002~**0.003**~0.006		-	-	☆ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.002~**0.003**~0.004		☆ 70~**100**~160	-	-	☆ 70~**100**~160
	Titanium Alloys	0.002~**0.003**~0.005		☆ 130~**200**~260	-	☆ 100~**160**~230	-

※ Bold numbers in the graph indicate the most recommended value of feed (fz) Adjust cutting speed and feed rate according to the actual machining conditions
※ Machining with coolant is recommended for Ni-base heat resistant alloy and titanium alloys

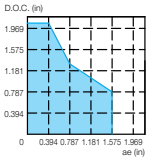
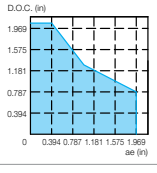
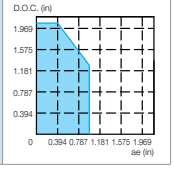
★ :1st Recommendation
☆ : 2nd Recommendation

MEWH Cutting Performance

● LOMU1004 Type

Cutting Dia.	Part Number	2 Flute D.O.C. x ae	Part Number	3 Flute D.O.C. x ae
Ø1.000" Ø25mm	**MEWH1000 -W100-10-3-2T** MEWH025 -S25-10-3-2T		-	-
Ø1.250" Ø32mm	**MEWH1250 -W125-10-4-2T** MEWH032 -S32-10-4-2T		-	-
Ø1.500" Ø40mm	**MEWH1500 -W125-10-5-2T** MEWH040 -S32-10-5-2T		**MEWH1500 -W150-10-5-3T** MEWH040 -S32-10-5-3T	

● LOMU1505 Type

Cutting Dia.	Part Number	2 Flute D.O.C. x ae	Part Number	3 Flute D.O.C. x ae
Ø1.500" Ø40mm	**MEWH1500 -W125-15-4-2T** MEWH040 S32-15-4-2T		-	-
Ø2.000" Ø50mm	**MEWH2000 -W150-15-4-2T** MEWH050 -S42-15-4-2T		**MEWH2000 -W150-15-4-3T** MEWH050 -S42-15-4-3T	

Vc = 400sfm
fz = 0.003~0.005ipt
GM Chipbreaker
Workpiece: 4137
Overhang Length: End mill overhang length is "L1" of the dimension list

Shouldering | Slotting (2-Flute Only) | Facing

MECH Helical End Mill (Coolant Hole for Bottom Insert)

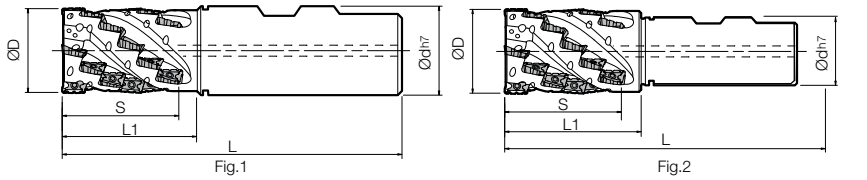


Fig.1 Fig.2 Fig.3 Fig.4

Toolholder Dimensions (Inch)

Shank	Part Number	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (in) ØD	Ød	L	L1	S	Rake Angle (°) A.R. (Max)	R.R.	Drawing	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Pre-set Torque Wrench*	Applicable Inserts ➡ B19
Weldon	MECH 1000-W100-11-4-2T	●	2	4	8	1.00	1.00	4.17	1.81	1.46	+21°	-10°	Fig.1	SB-2555TRG	DTM-8	MP-1	PST-T8	BDMT11T308ER-N2 BDMT11T308ER-N3
	1250-W125-11-5-2T	●		5	10	1.25	1.25	4.52	2.17	1.81	+23°	-9°						
	1250-W125-11-5-4T	●	4		20													
	1500-W125-11-6-4T	●		6	24	1.50		4.90	2.52	2.16		-8°	Fig.2					
	1500-W150-11-6-4T	●					1.50	5.28					Fig.1					
	2000-W150-11-7-4T	●		7	28	2.00		5.73	2.95	2.52		-7°	Fig.2					
	2000-W1500-11-7-6T	●	6		42													
	MECH 1500-W125-17-4-2T	●	2	4	8	1.50	1.25	5.26	2.87	2.32	+19°	-7°	Fig.2	SB-4070TRN	DTM-15	MP-1	PST-T15	BDMT170408ER-N3 BDMT170408ER-N4
	1500-W150-17-4-2T	●					1.50	5.64					Fig.1					
	2000-W1500-17-5-4T	●	4	5	20	2.00		6.26	3.46	2.91			Fig.2					

Toolholder Dimensions (Metric)

Shank	Part Number	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (mm) ØD	Ød	L	L1	S	Rake Angle (°) A.R. (Max)	R.R.	Drawing	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Pre-set Torque Wrench*	Applicable Inserts ➡ B19
Cylindrical	MECH 025-S25-11-4-2T	○	2	4	8	25	25	120	46	37	+21°	-10°	Fig.3	SB-2555TRG	DTM-8	MP-1	PST-T8	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.4					
	040-S42-11-6-4T	○					42	160					Fig.3					
	050-S42-11-7-4T	○		7	28	50		172	75	64		-7°	Fig.4					
	050-S42-11-7-6T	○	6		42													
	MECH 040-S32-17-4-2T	○	2	4	8	40	32	160	73	59	+19°	-7°	Fig.4	SB-4070TRN	DTM-15	MP-1	PST-T15	BDMT170408ER-N3 BDMT170408ER-N4
	040-S42-17-4-2T	○					42	170					Fig.3					
	050-S42-17-5-4T	○	4	5	20	50		185	88	74		-6°	Fig.4					

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

Applicable Inserts

Part Number	Applicable Inserts ➡ B19			
	2-Notch	3-Notch	3-Notch	4-Notch
MECH...-11-...	BDMT 11T308ER-N2	BDMT 11T308ER-N3	-	-
MECH...-17-...	-	-	BDMT 170408ER-N3	BDMT 170408ER-N4

Recommended Cutting Conditions ➡ E37

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
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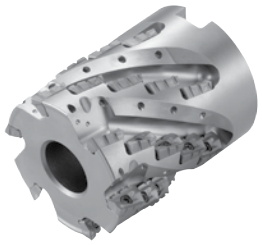
U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

MECH Shell Mill (without Coolant Hole)



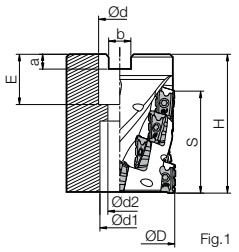


Fig.1

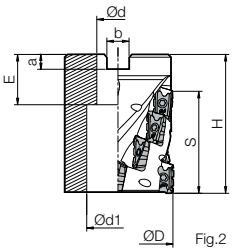


Fig.2

Rake Angle (°)		
Part Number	A.R. (Max)	R.R.
MECH...-11-...	+23°	-8°
MECH...-17-...	+19°	-7°

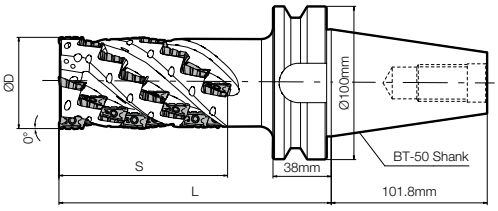
Toolholder Dimensions

Part Number	Stock	Unit	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (in) ØD	Ød	Ød1	Ød2	H	E	a	b	S	Drawing	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Arbor Bolt	Pre-set Torque Wrench*	Applicable Inserts ➡ B19
MECH 2000R-11-5-6T	●	inch	6	5	30	2.00	0.75	0.63	0.417	2.480	0.750	0.197	0.313	1.811	Fig.1	SB-2555TRG	DTM-8	MP-1	HH3/8-1.5	PST-T8	BDMT11T308ER-N2 BDMT11T308ER-N3
2000R-17-2-4T	●		4	2	8					2.047				1.181		SB-4070TRN	DTM-15		HH3/8-1.25	PST-T15	BDMT170408ER-N3 BDMT170408ER-N4
2000R-17-4-4T	●		4	4	16					3.070				2.322							
MECH 040R-11-4-4T-M	○	mm	4	4	16	40	16	15	9	50	19	5.6	8.4	37	Fig.1	SB-2555TRG	DTM-8	MP-1	HH8X25	PST-T8	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	Fig.1	SB-4070TRN	DTM-15	MP-1	HH10X30	PST-T15	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	○					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	PST-T15	BDMT170408ER-N3 BDMT170408ER-N4
080R-17-4-6T	○		6	4	24	80	31.75	26	18	85	32	8	12.7	59					HH16X45		
100R-17-4-6T	○					100	38.1	56	-	85	38	10	15.9	59	Fig.2				-		

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force. Pre-Set Torque Wrench sold separately.

MECH-BT50 Integral Arbor (without Coolant Hole)



Rake Angle (°)		
Part Number	A.R. (Max)	R.R.
MECH...-11-...	+23°	-7°
MECH...-17-...	+19°	-7°

Toolholder Dimensions

Part Number	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (mm) ØD	L	S	Weight (kg)	Spare Parts: Insert Screw	Wrench	Anti-seize Compound	Pre-set Torque Wrench*	Applicable Inserts ➡ B19
MECH 050R11-8-4T-BT50	○	4	8	32	50	143	73	4.8	SB-2555TRG	DTM-8	MP-1	PST-T8	BDMT11T308ER-N2 BDMT11T308ER-N3
MECH 050R17-7-4T-BT50	○	4	7	28	50	173	104	4.9	SB-4070TRN	DTM-15	MP-1	PST-T15	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 (MP-1) thinly on portion of taper and thread when insert is fixed

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force. Pre-Set Torque Wrench sold separately.

Applicable Inserts

Part Number	Applicable Inserts ➡ B19			
	2-Notch	3-Notch	3-Notch	4-Notch
MECH...-11-...	BDMT 11T308ER-N2	BDMT 11T308ER-N3	-	-
MECH...-17-...	-	-	BDMT 170408ER-N3	BDMT 170408ER-N4

Recommended Cutting Conditions ➡ E37

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

MECH-BT50SA Integral Arbor Set (without Coolant Hole)

Base Unit / 1 Front Piece / Arbor Bolt

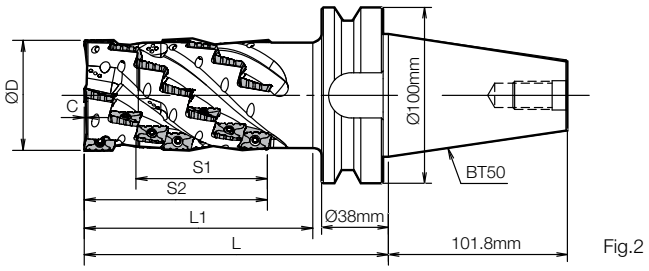
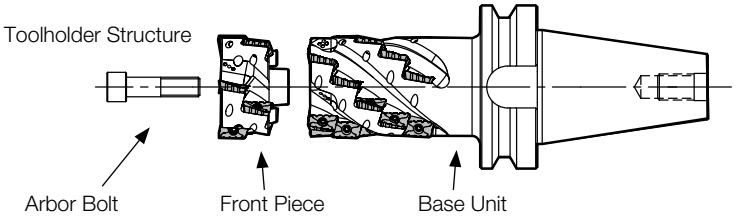


Fig.2



MECH-BT50-A Base Unit (without Coolant Hole)

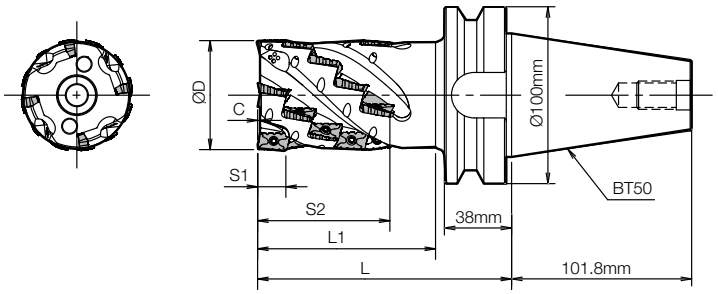


Fig.1

Toolholder Dimensions

Part Number		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (mm)						Rake Angle (°)		Drawing	Weight (kg)
						ØD	L	L1	C	S1	S2	A.R.	R.R.		
Integral Arbor (Set)	MECH 050R11-4T-BT50SA	☐	4	8	32	50	143	99	0.7	55	73	+23°	-7°	Fig.1	4.8
	063R17-4T-BT50SA	☐		7	28	63	173	130	1.3	75	104	+19°	-7°		5.8
	080R17-4T-BT50SA	☐				80									7.6
	100R17-6T-BT50SA	☐	6	7	42	100									9.8
Base Unit	MECH 050R11-4T-BT50-A	☐	4	6	24	50	125	81	0.7	10	55	+23°	-7°	Fig.2	4.6
	063R17-4T-BT50-A	☐		5	20	63	143	100	1.3	16	75	+19°	-7°		5.4
	080R17-4T-BT50-A	☐				80									6.8
	100R17-6T-BT50-A	☐	6	5	30	100									8.5

Recommended Cutting Conditions ➡ E37

Toolholder Structure

End Mill (Above)		Base Unit (Above)	Front Piece (1pc) ➡ E35	Arbor 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

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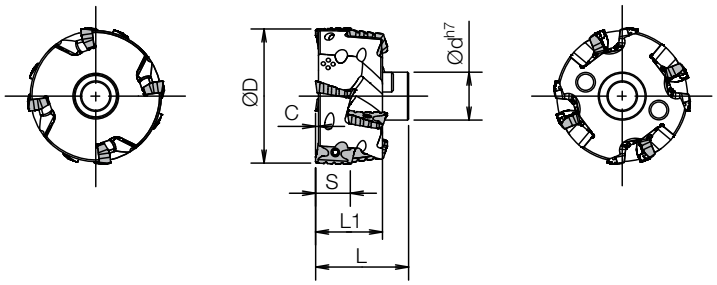
U.S. Stock Standard : ●
Made to Order / Quoted Item : □
World Express (Shipping: 7-10 Business Days) : ○

MECH-F Front Piece (without Coolant Hole)



Toolholder Dimensions

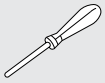
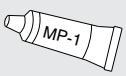
Part Number		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimensions (mm)						Rake Angle (°)		Weight (kg)
						ØD	Ød	L	L1	C	S	A.R.	R.R.	
MECH	050R11-4T-F	○	4	2	8	50	22	44	30	1.3	16	+19°	-7°	0.2
	063R17-4T-F	○				63	22							0.4
	080R17-4T-F	○				80	32							0.8
	100R17-6T-F	○	6	2	12	100	45							1.3

Applicable Inserts

End Mill ➡ E34		Base Unit ➡ E34	Front Piece (1pc Above)	Applicable Inserts ➡ B19
MECH	050R11-4T-BT50SA	MECH050R11-4T-BT50-A	MECH050R11-4T-F	BDMT 11T308ER-N2 BDMT 11T308ER-N3
	063R17-4T-BT50SA	MECH063R17-4T-BT50-A	MECH063R17-4T-F	BDMT 170408ER-N3 BDMT 170408ER-N4
	080R17-4T-BT50SA	MECH080R17-4T-BT50-A	MECH080R17-4T-F	
	100R17-6T-BT50SA	MECH100R17-6T-BT50-A	MECH100R17-6T-F	

For insert installation, see page ➡ E37

Toolholder Dimensions

Part Number			Spare Parts					
			Insert Screw	Wrench (for Insert Screw)	Arbor Bolt	Wrench (for Arbor Bolt)	Pre-set Torque Wrench*	Anti-seize Compound
								
Integral Arbor (Set)	MECH	050R11-4T-BT50SA	SB-2555TRG	DTM-8	HH12X35	LW-10	PST-T8	MP-1
		063R17-4T-BT50SA	SB-4070TRN	DTM-15	HH12X40	LW-10	PST-T15	
		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	PST-T8	
		063R17-4T-BT50-A	SB-4070TRN	DTM-15	HH12X40	LW-10	PST-T15	
		080R17-4T-BT50-A			HH16X40	LW-14		
		100R17-6T-BT50-A			HH20X40	LW-17		
Front Piece	MECH	050R11-4T-F	SB-2555TRG	-	-	-	PST-T8	
		063R17-4T-F	SB-4070TRN	-	-	-	PST-T15	
		080R17-4T-F						
		100R17-6T-F						

• If you purchased the front piece only, the insert screw wrench, arbor bolt, and arbor bolt wrench are not included.

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

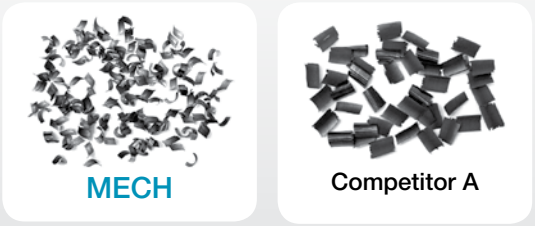
*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force. Pre-Set Torque Wrench sold separately.

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

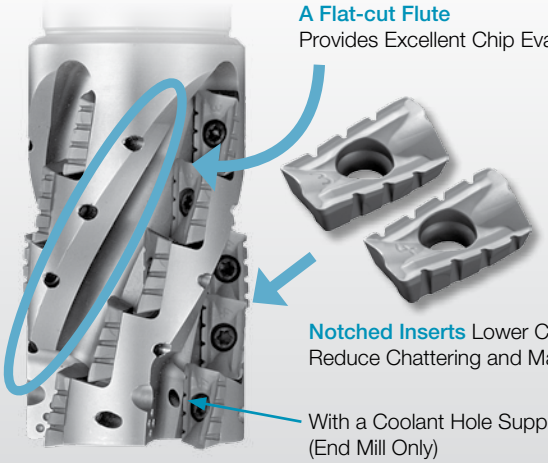
Enhanced Chip Evacuation

● Good Chip Evacuation

Notched Insert Breaks Chips into Small Pieces



Workpiece Material: SS400
Vc = 400 sfm
D.O.C. × ae = 1.575"×0.394"
fz = 0.005 ipt
MECH032-S32-11-5-4T



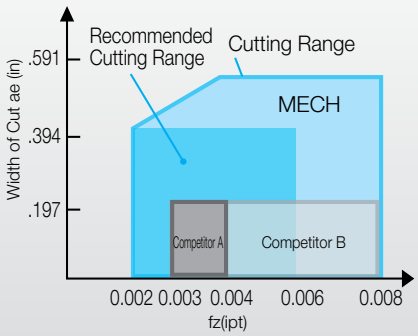
A Flat-cut Flute
Provides Excellent Chip Evacuation

Notched Inserts Lower Cutting Force, Reduce Chattering and Maximize Efficiency.

With a Coolant Hole Supplying to the Tip Insert (End Mill Only)

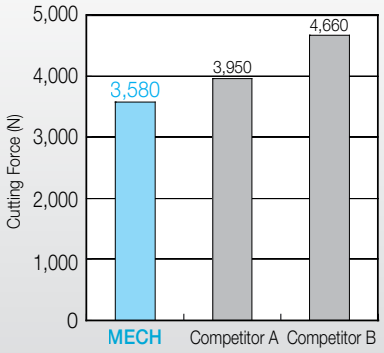
Low Cutting Force

● Low Cutting Force with Notched Inserts



Workpiece Material : 1049
Vc = 390 sfm
D.O.C. × ae = 1.575" × 0.197~0.512"
fz = 0.002~0.008 ipt
MECH032-S32-11-5-4T

Cutting Force (Principal Force)



Workpiece Material : 1049
Vc = 390 sfm
D.O.C. × ae = 1.575" × 0.394"
fz = 0.004 ipt
MECH032-S32-11-5-4T

(Internal Evaluation)

● Number of Inserts to Install

MECH Helical End Mill

Part Number	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 1000-W1000-11-4-2T 025-S25-11-4-2T	2	8	4	4	-	-
1250-W1250-11-5-2T 032-S32-11-5-2T	2	10	5	5	-	-
1250-W1250-11-5-4T 032-S32-11-5-4T	4	20	10	10	-	-
1500-W1250-11-6-2T 040-S32-11-6-4T	4	24	12	12	-	-
1500-W1500-11-6-4T 040-S42-11-6-4T	4	24	12	12	-	-
2000-W1500-11-7-4T 050-S42-11-7-4T	4	28	14	14	-	-
2000-W1500-11-7-6T 050-S42-11-7-6T	6	42	21	21	-	-
MECH 1500-W125-17-4-2T 040-S32-17-4-2T	2	8	-	-	4	4
1500-W150-17-4-2T 040-S42-17-4-2T	2	8	-	-	4	4
2000-W1500-17-5-4T 050-S42-17-5-4T	4	20	-	-	10	10

MECH Shell Mill

Part Number	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 040R-11-4-4T-M	4	16	8	8	-	-
2000R-11-5-6T 050R-11-5-6T-M	6	30	15	15	-	-
MECH 2000R-17-2-4T 050R-17-2-4T-M	4	8	-	-	4	4
2000R-17-4-4T 050R-17-4-4T-M	4	16	-	-	8	8
063R-17-3-4T-M	4	12	-	-	6	6
080R-17-4-6T-M	6	24	-	-	12	12
100R-17-4-6T-M	6	24	-	-	12	12
MECH 063R-17-3-4T	4	12	-	-	6	6
080R-17-4-6T	6	24	-	-	12	12
100R-17-4-6T	6	24	-	-	12	12

Precautions when Installing Notched Inserts

1. Install notched inserts by matching the insert with the number of marks on the holder body.

Insert Number and Holder 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 holder.**

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.)

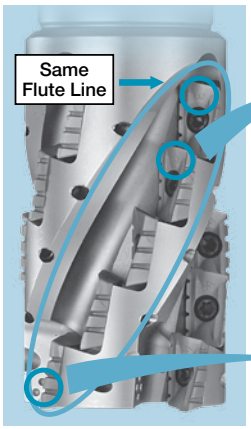


Fig.1 Same Flute Line

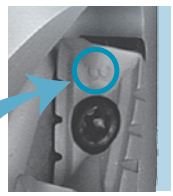


Fig.2 Insert No.

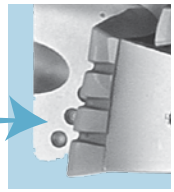


Fig.3 Holder Marks

Recommended Cutting Conditions (when Using a Notched Insert)

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)				
		MEGACOAT NANO	MEGACOAT			PVD Coated Carbide
		PR1535	**PR1225**	**PR1230**	**PR1210**	**PR830**
Carbon Steel	0.003~**0.004**~0.006	☆ 390~**590**~820	☆ 390~**590**~820	★ 390~**590**~720	-	☆ 330~**460**~590
Alloy Steel	0.003~**0.004**~0.006	☆ 330~**520**~720	☆ 330~**520**~720	★ 330~**520**~660	-	☆ 330~**460**~590
Mold Steel	0.003~**0.004**~0.006	☆ 260~**460**~590	☆ 260~**460**~590	★ 260~**460**~520	-	☆ 330~**390**~490
Gray Cast Iron	0.003~**0.006**~0.007	-	-		★ 390~**590**~820	-
Nodular Cast Iron	0.003~**0.006**~0.007	-	-		★ 330~**490**~720	-
Titanium Alloys	0.003~**0.004**~0.006	★ 130~**200**~260	-		☆ 100~**160**~230	-

※ Bold numbers in the graph indicate the most recommended value of feed (fz) Adjust cutting speed and feed rate according to the actual machining conditions
※ Machining with coolant is recommended for titanium alloys
• Recommended cutting conditions above are for notched inserts. If using an insert without a notch, the cutting depth (D.O.C.) and width (ae) should be 60% of that of notched inserts.

★ :1st Recommendation
☆ : 2nd Recommendation

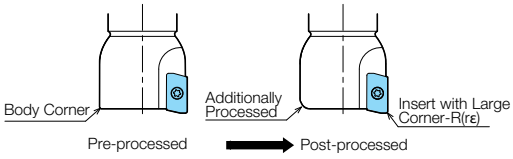
• JA Chipbreaker

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade Vc (sfm)
		Carbide
		GW25
Aluminum Alloy (Si ≤ 13%)	0.003~0.012	660~2620
Aluminum Alloy (Si > 13%)	0.003~0.008	660~980

■ 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 is 1.2mm or less.)

Insert Corner-R(rε)	Additional Processing Dimension to Body Corner
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.

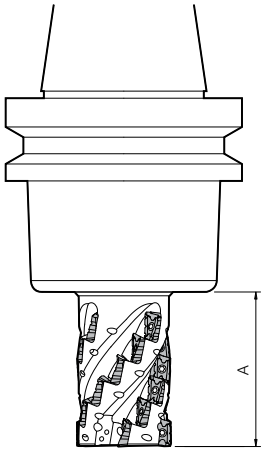


Cutting Performance (Used Machine: Machining Center Equivalent to AC15 / 18.5kW)

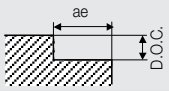
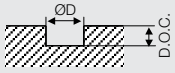
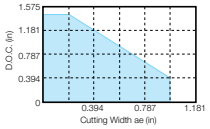
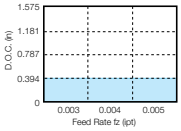
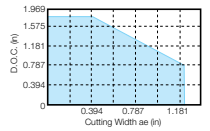
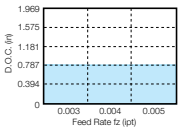
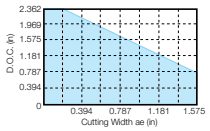
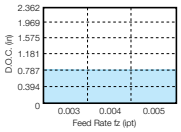
MECH Helical End Mill

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)
Ø1.000" Ø25mm	**MECH1000-W1000-11-4-2T** MECH025-S25-11-4-2T	1.89
Ø1.250" Ø32mm	**MECH1250-W1250-11-5-2T** MECH032-S32-11-5-2T	2.24
	MECH1250-W1250-11-5-4T MECH032-S32-11-5-4T	
Ø1.500" Ø40mm	**MECH1500-W1250-11-6-4T** MECH040-S32-11-6-4T	2.56
	MECH1500-W1500-11-6-4T MECH040-S42-11-6-4T	
Ø2.000" Ø50mm	**MECH2000-W1500-11-7-4T** MECH050-S42-11-7-4T	2.99
	MECH2000-W1500-11-7-6T MECH050-S42-11-7-6T	
Ø1.500" Ø40mm	**MECH1500-W1250-17-4-2T** MECH040-S32-17-4-2T	2.91
	MECH1500-W1500-17-4-2T MECH040-S42-17-4-2T	
Ø2.000" Ø50mm	**MECH2000-W1500-17-5-4T** MECH050-S42-17-5-4T	3.50

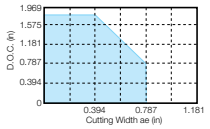
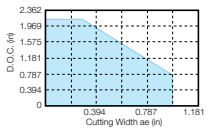
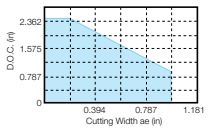
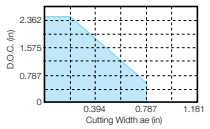
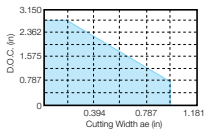
Shape



2 Flute Type (Workpiece :1049)

Part Number	■ Shouldering  Cutting Speed: Vc = 330~590 sfm Feed fz = 0.003~0.006 ipt	■ Slotting  Cutting Speed: Vc = 330~390 sfm Feed fz = 0.003~0.005 ipt
MECH1000-W1000-11-4-2T MECH025-S25-11-4-2T		
MECH1250-W1250-11-5-2T MECH032-S32-11-5-2T		
MECH1500-W1250-17-4-2T **MECH1500-W1500-17-4-2T** MECH040-S32-17-4-2T MECH040-S42-17-4-2T		

4 Flute / 6 Flute Type

MECH1250-W1250-11-5-4T MECH032-S32-11-5-4T	
MECH1500-W1250-11-6-4T **MECH1500-W1500-11-6-4T** MECH040-S32-11-6-4T MECH040-S42-11-6-4T	
MECH1200-W1500-11-7-4T MECH050-S42-11-7-4T	
MECH1200-W1500-11-7-6T MECH050-S42-11-7-6T	
MECH1200-W150017-5-4T MECH050-S42-17-5-4T	

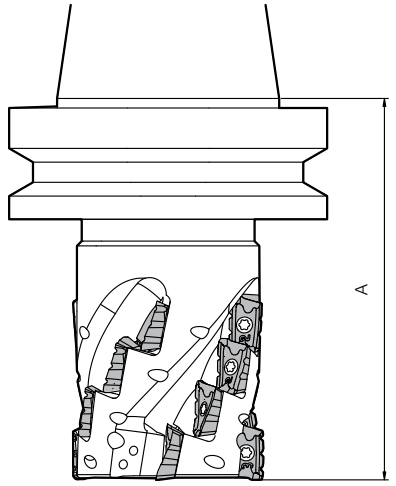
*4 and 6 flute types are not recommended for slotting

E 90° LEAD

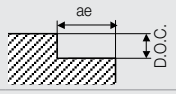
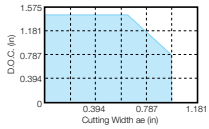
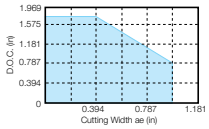
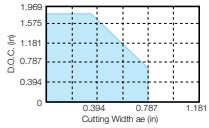
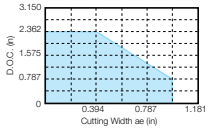
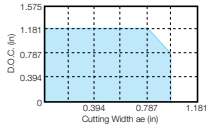
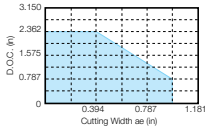
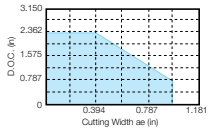
● MECH Shell Mill

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)
Ø40mm	MECH040R-11-4-4T-M	4.92
Ø2.000" Ø50mm	**MECH2000R-11-5-6T** MECH050R-11-5-6T-M	4.84
	MECH2000R-17-2-4T MECH050R-17-2-4T-M	4.41
	MECH2000R-17-4-4T MECH050R-17-4-4T-M	5.43
Ø63mm	MECH063R-17-3-4T-M	4.53
Ø80mm	MECH080R-17-4-6T-M	5.12
Ø100mm	MECH100R-17-4-6T-M	5.12

Shape



(Workpiece :1049)

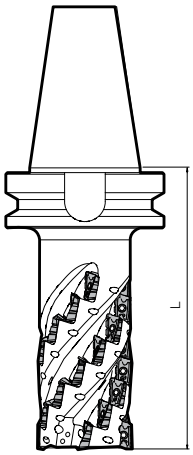
Part Number	■ Shouldering  Cutting Speed: Vc = 330~590 sfm Feed: fz = 0.003~0.006 ipt	
MECH040R-11-4-4T-M		MECH063R-17-3-4T-M 
MECH2000R-11-5-6T MECH050R-11-5-6T-M		MECH080R-17-4-6T-M 
MECH2000R-17-2-4T MECH050R-17-2-4T-M		MECH100R-17-4-6T-M 
MECH2000R-17-4-4T MECH050R-17-4-4T-M		

*Not recommended for slotting

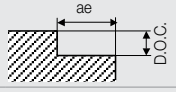
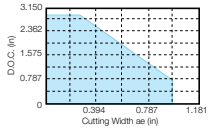
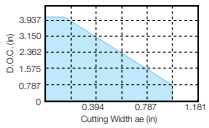
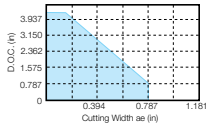
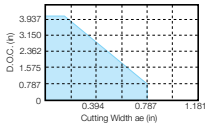
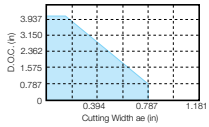
● MECH-BT50 Integral Arbor
● MECH-BT50SA Integral Arbor with Replaceable Front Piece

Cutting Dia.	Part Number **Inch Size** Metric Size	Overhang Length A (in)
Ø50mm	MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA	5.63
	MECH050R17-7-4T-BT50	6.81
Ø63mm	MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA	
Ø80mm	MECH080R17-7-4T-BT50 MECH080R17-4T-BT50SA	
Ø100mm	MECH100R17-7-6T-BT50 MECH100R17-6T-BT50SA	

Shape

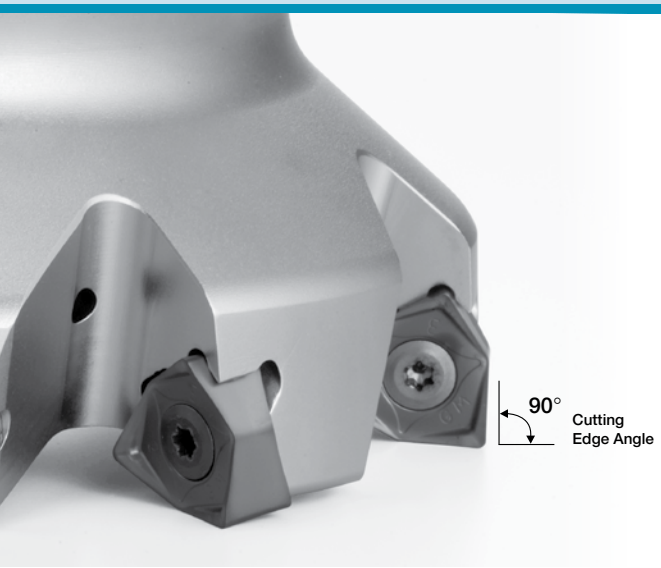


(Workpiece :1049)

Part Number	■ Shouldering  Cutting Speed: Vc = 330~590 sfm Feed: fz = 0.003~0.006 ipt	
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 
MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA		

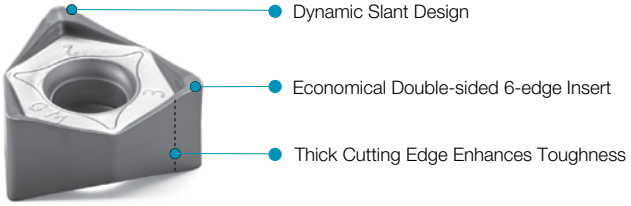
*Not recommended for slotting

*Not recommended for slotting



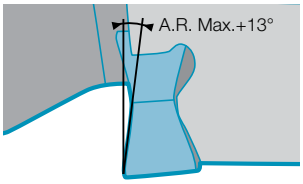
M-Six (MFWN)

Low Cutting Forces for Reduced Chattering and Superior Fracture Resistance
Wide Application Range and Now Includes PDL025 DLC Coated Inserts for Aluminum

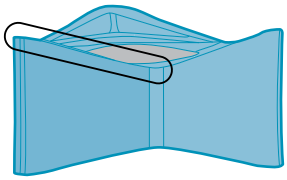


1 Sharp Cutting due to Lower Cutting Forces

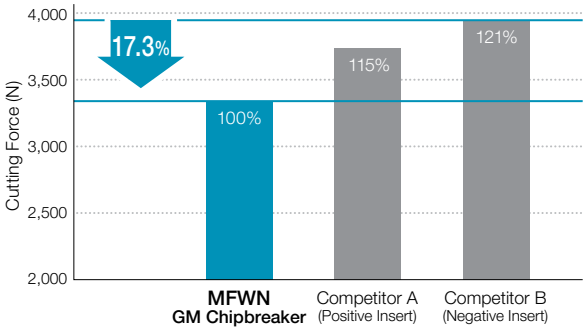
Low Cutting Force due to Steep Rake Angle
Dynamic Slant Design Reduces Initial Impact when Cutting Edge Enters the Workpiece



Dynamic Slant Design



Cutting Force Comparison (In-house Evaluation)



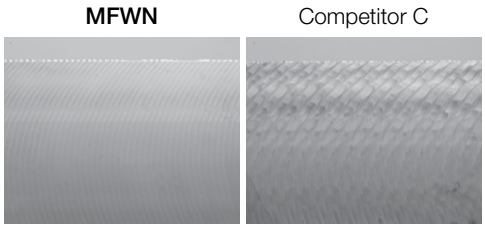
Cutting Force is the Resultant Force of the Principal Force and the Feed Force

Cutting Conditions: Vc = 590 sfm, D.O.C. × ae = 0.275" × 0.400", fz = 0.008 ipt
Workpiece: 1049 Cutter Dia. Ø5.000"

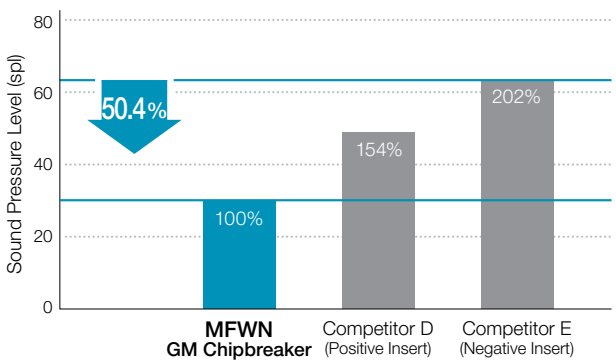
2 Reduced Chattering Even with Extended Milling Adapters

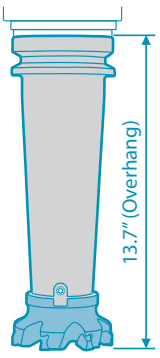
Resistant to Chattering due to Low Cutting Force Design and applicable to long overhang

Surface Roughness Comparison (In-house Evaluation)



Cutting Noise Comparison (In-house Evaluation)



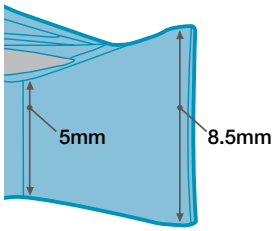


Cutting Conditions: Vc = 660 sfm, D.O.C. × ae = 0.118" × 0.590", fz = 0.004 ipt
Workpiece: 1049 Cutter Dia. Ø3.000" (7 Inserts)

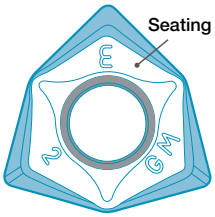
Shouldering | Slotting | Facing | Plunging

3 Superior Fracture Resistance with Thick Edge Design

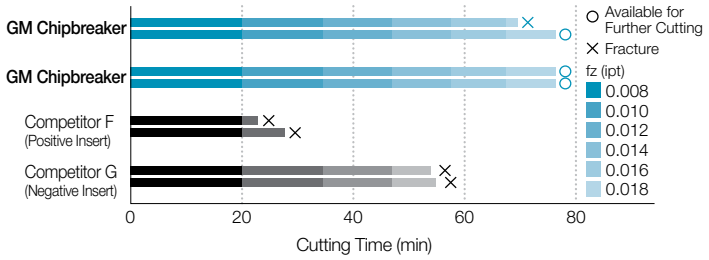
Cutting Edge Thickness: 5 - 8.5mm



Stable Clamping with the Unique Insert Face Design



Fracture Resistance Comparison (In-house Evaluation)



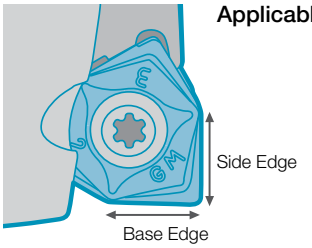
Cutting Conditions: Vc = 330 sfm, D.O.C. × ae = 0.080" × 4.000", fz = 0.004 ~ 0.018 ipt, Dry
Workpiece: 4140H (38 ~ 42HS) Interrupted with a Slot in the Workpiece

4 Neutral Inserts

Available for Shouldering and Facing

Neutral Inserts are Applicable to Left-hand Cutters (Custom Order)

Applicable to a Wide Range of Applications

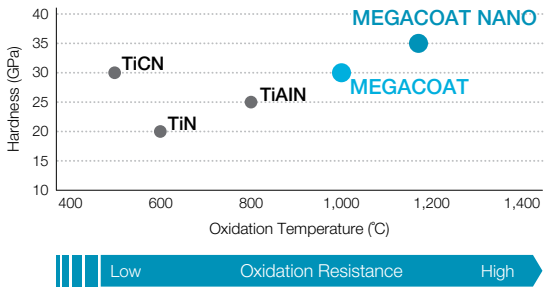


5 MEGACOAT NANO Coated Insert Grade for Long Tool Life

PR1525 for steel, PR1510 for cast iron and PR1535 for Ni-base heat-resistant alloy, titanium alloy and precipitation-hardened stainless steel

Prevents wear and fracturing with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150℃)

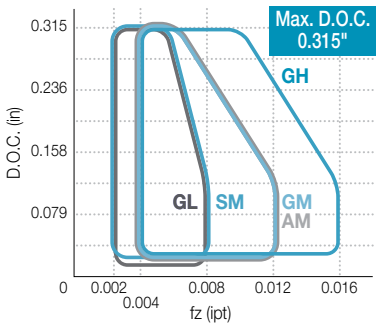
Coating Property



6 Extensive Insert Lineup Covering Various Applications

Chipbreaker	Applications	Shape
GM	General Purpose	
SM	Low Cutting Force	
GH	Heavy Milling	
GL	Surface-Finish Oriented	
AM	Aluminum / Non-ferrous Metals	NEW

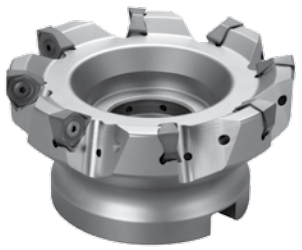
Application Range



Smooth Chip Evacuation

Properly Curled Chips
(The Photo was Taken by a High Speed Camera)

M-SIX (MFWN) Face Mill (Inch)



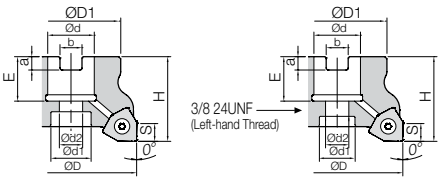


Fig.1 Fig.2

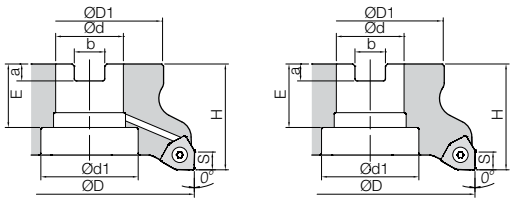


Fig.3 Fig.4

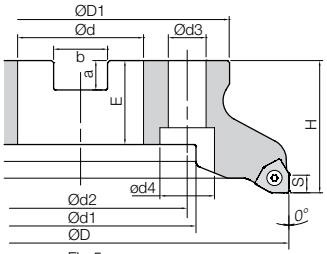


Fig.5

Rake Angle (°)	A.R.	R.R.	
	(MAX) +13°	ØD = 2.000" -12° ØD = 2.500" -10° ØD = 3.000" -9°	ØD = 4.000" -8° ØD = 5.000" -7.5° ØD = 6.000"-10.000" -7°

Toolholder Dimensions (Inch)

E 90° LEAD

	Part Number		Stock	No. of Inserts	Dimensions (in)											Drawing	Weight (kg)	Shim	Coolant Hole
					ØD	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4				
Coarse Pitch	MFWN	902500R-3T	●	3	2.500	0.750	0.669	0.433	1.575	0.750	0.187	0.312				Fig.1	0.4		
		903000R-4T	●	4	3.000	1.000	0.875	0.551	1.968	1.063	0.236	0.381				Fig.1	0.8		Yes
		904000R-5T	●	5	4.000	1.500	2.047		1.968	1.142	0.393	0.625		-	-	Fig.3	1.1		
		905000R-6T	●	6	5.000	1.500	2.175	-	2.480	1.496	0.393	0.625	0.315			Fig.3	2.5	Yes	
		906000R-8T	●	8	6.000	2.000	2.835		2.480	1.496	0.433	0.752				Fig.4	3.4		
		908000R-10T	●	10	8.000	2.500	3.937	4.000	2.480	1.575	0.551	1.008		0.709	1.024	Fig.5	6.0		No
		9010000R-12T	●	12	10.000	2.500	3.937	4.000	2.480	1.575	0.551	1.008		0.709	1.024	Fig.5	8.2		
NEW	MFWN	902000R-4T	●	4	2.000	0.750	0.500	3/8 24UNF	1.968	0.830	0.187	0.312				Fig.2	0.4		
Fine Pitch		902500R-4T	●	4	2.500	0.750	0.669	0.433	1.575	0.750	0.187	0.312				Fig.1	0.5		
		903000R-5T	●	5	3.000	1.000	0.875	0.551	1.968	1.063	0.236	0.381				Fig.1	0.8		Yes
		904000R-7T	●	7	4.000	1.500	2.047		1.968	1.142	0.393	0.625		-	-	Fig.3	1.0		
		905000R-8T	●	8	5.000	1.500	2.175	-	2.480	1.496	0.393	0.625	0.315			Fig.3	2.5	No	
		906000R-10T	●	10	6.000	2.000	2.835		2.480	1.496	0.433	0.752				Fig.4	3.5		
		908000R-12T	●	12	8.000	2.500	3.937	4.000	2.480	1.575	0.551	1.008		0.709	1.024	Fig.5	6.2		No
		9010000R-14T	●	14	10.000	2.500	3.937	4.000	2.480	1.575	0.551	1.008		0.709	1.024	Fig.5	8.4		
Extra-Fine Pitch	MFWN	902500R-5T	●	5	2.500	0.750	0.669	0.433	1.575	0.750	0.187	0.312				Fig.1	0.4		
		903000R-7T	●	7	3.000	1.000	0.875	0.551	1.968	1.063	0.236	0.381				Fig.1	0.8		Yes
		904000R-9T	●	9	4.000	1.500	2.047		1.968	1.142	0.393	0.625		-	-	Fig.3	1.0		
		905000R-12T	●	12	5.000	1.500	2.175	-	2.480	1.496	0.393	0.625	0.315			Fig.3	2.4	No	
		906000R-14T	●	14	6.000	2.000	2.835		2.480	1.496	0.433	0.752				Fig.4	3.4		
		908000R-16T	●	16	8.000	2.500	3.937	4.000	2.480	1.575	0.551	1.008		0.709	1.024	Fig.5	6.1		No
		9010000R-18T	●	18	10.000	2.500	3.937	4.000	2.480	1.575	0.551	1.008		0.709	1.024	Fig.5	8.4		

Spare Parts ➔ **E44**
Applicable Inserts ➔ **E45**

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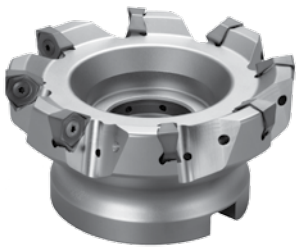
M-SIX (MFWN) Face Mill (Metric)



Rake Angle (°)	A.R.	R.R.	
	(MAX) +13°	ØD = 63mm -10° ØD = 80mm -9° ØD = 100mm -8°	ØD = 125mm -7.5° ØD = 160mm-250mm -7°

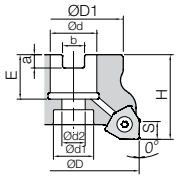


Fig.1

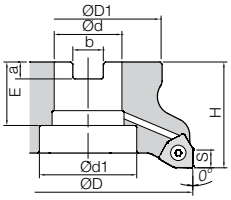


Fig.3

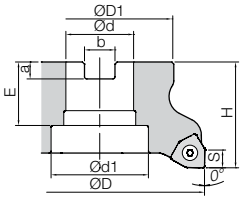


Fig.4

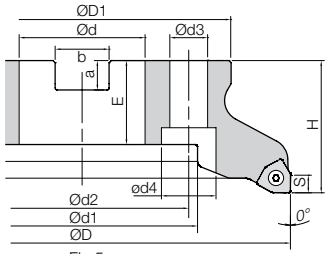


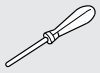
Fig.5

Toolholder Dimensions (Metric)

		Part Number	Stock	No. of Inserts	Dimensions (mm)												Drawing	Weight (kg)	Shim	Coolant Hole
					ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4				
Inch Bore Dia.	Coarse Pitch	MFWN 90080R-4T	○	4	80	60	1.000"	20	13	50	1.063"	0.236"	0.375"	8	-	-	Fig.1	1.0	Yes	Yes
		90100R-5T	○	5	100	70	1.250"	46	-	50	1.339"	0.315"	0.500"				Fig.2	1.3		
		90125R-6T	○	6	125	87	1.500"	55		63	1.496"	0.394"	0.625"				Fig.2	2.6		
		90160R-8T	○	8	160	102	2.000"	72		63	1.496"	0.433"	0.750"				Fig.3	3.9		No
		90200R-10T	○	10	200	142	1.875"	110	101.6	63	1.575"	0.551"	1.000"		18	26	Fig.4	6.3		
		90250R-12T	○	12	250	142	1.875"	110	101.6	63	1.575"	0.551"	1.000"		18	26	Fig.4	8.7		
	Fine Pitch	MFWN 90080R-5T	○	5	80	60	1.000"	20	13	50	1.063"	0.236"	0.375"	8	-	-	Fig.1	1.0	No	Yes
		90100R-7T	○	7	100	70	1.250"	46	-	50	1.339"	0.315"	0.500"				Fig.2	1.4		
		90125R-8T	○	8	125	87	1.500"	55		63	1.496"	0.394"	0.625"				Fig.2	2.7		
		90160R-10T	○	10	160	102	2.000"	72		63	1.496"	0.433"	0.750"				Fig.3	4.0		No
		90200R-12T	○	12	200	142	1.875"	110	101.6	63	1.575"	0.551"	1.000"		18	26	Fig.4	6.6		
		90250R-14T	○	14	250	142	1.875"	110	101.6	63	1.575"	0.551"	1.000"		18	26	Fig.4	8.9		
	Extra-Fine Pitch	MFWN 90080R-7T	○	7	80	60	1.000"	20	13	50	1.063"	0.236"	0.375"	8	-	-	Fig.1	1.1	No	Yes
		90100R-9T	○	9	100	70	1.250"	46	-	50	1.339"	0.315"	0.500"				Fig.2	1.3		
		90125R-12T	○	12	125	87	1.500"	55		63	1.496"	0.394"	0.625"				Fig.2	2.7		
		90160R-14T	○	14	160	102	2.000"	72		63	1.496"	0.433"	0.750"				Fig.3	4.1		
		90200R-16T	○	16	200	142	1.875"	110	101.6	63	1.575"	0.551"	1.000"		18	26	Fig.4	6.7		No
		90250R-18T	○	18	250	142	1.875"	110	101.6	63	1.575"	0.551"	1.000"		18	26	Fig.4	9.1		
Metric Bore Dia.	Coarse Pitch	MFWN 90063R-3T-M	○	3	63	47	22	19	11	40	21	6.3	10.4	8	-	-	Fig.1	0.5	Yes	Yes
		90080R-4T-M	○	4	80	60	27	20	13	50	24	7	12.4				Fig.1	1.0		
		90100R-5T-M	○	5	100	70	32	46	-	50	30	8	14.4				Fig.2	1.3		
		90125R-6T-M	○	6	125	87	40	55		63	33	9	16.4				Fig.2	2.5		
		90160R-8T-M	○	8	160	102	40	68	66.7	63	32	9	16.4		14	20	Fig.4	3.8		No
		90200R-10T-M	○	10	200	142	60	110	101.6	63	40	14	25.7		18	26	Fig.4	6.0		
		90250R-12T-M	○	12	250	142	60	110	101.6	63	40	14	25.7		18	26	Fig.4	8.4		
	Fine Pitch	MFWN 90063R-4T-M	○	4	63	47	22	19	11	40	21	6.3	10.4	8	-	-	Fig.1	0.5	No	Yes
		90080R-5T-M	○	5	80	60	27	20	13	50	24	7	12.4				Fig.1	1.0		
		90100R-7T-M	○	7	100	70	32	46	-	50	30	8	14.4				Fig.2	1.3		
		90125R-8T-M	○	8	125	87	40	55		63	33	9	16.4				Fig.2	2.6		
		90160R-10T-M	○	10	160	102	40	68	66.7	63	32	9	16.4		14	20	Fig.4	3.9		×
		90200R-12T-M	○	12	200	142	60	110	101.6	63	40	14	25.7		18	26	Fig.4	6.3		
		90250R-14T-M	○	14	250	142	60	110	101.6	63	40	14	25.7		18	26	Fig.4	8.7		
	Extra-Fine Pitch	MFWN 90063R-5T-M	○	5	63	47	22	19	11	40	21	6.3	10.4	8	-	-	Fig.1	0.5	No	Yes
		90080R-7T-M	○	7	80	60	27	20	13	50	24	7	12.4				Fig.1	1.1		
		90100R-9T-M	○	9	100	70	32	46	-	50	30	8	14.4				Fig.2	1.3		
		90125R-12T-M	○	12	125	87	40	55		63	33	9	16.4				Fig.2	2.6		
		90160R-14T-M	○	14	160	102	40	68	66.7	63	32	9	16.4		14	20	Fig.4	3.9		No
		90200R-16T-M	○	16	200	142	60	110	101.6	63	40	14	25.7		18	26	Fig.4	6.4		
		90250R-18T-M	○	18	250	142	60	110	101.6	63	40	14	25.7		18	26	Fig.4	8.8		

Spare Parts ➔ **E44**
Applicable Inserts ➔ **E45**

Face Mill Spare Parts (Inch)

	Part Number	Spare Parts								
		Insert Screw	Wrench		Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt	Mounting Screw
			TT	DTM						
										
Coarse Pitch	MFWN 902500R-3T	SB-50140TR	TT-15	-	MFWN-90	SPW-7050	LW-5	MP-1	HH3/8-1.25 (HH3/8-1.25H)	-
	903000R-4T	Recommended Torque for Insert Clamp 4.2 N·m			Recommended Torque for Insert Clamp 6.0 N·m				HH1/2-1.25 (HH1/2-1.25H)	-
	904000R-5T ~ 9010000R-12T								-	-
Fine Pitch	MFWN 902000R-4T	SB-50140TR	TT-15	-	-	-	-	MP-1	-	XNS610*1
	902500R-4T	Recommended Torque for Insert Clamp 4.2 N·m							HH3/8-1.25 (HH3/8-1.25H)	-
	903000R-5T								HH1/2-1.25 (HH1/2-1.25H)	-
	904000R-7T ~ 9010000R-14T								-	-
Extra-Fine Pitch	MFWN 902500R-5T	SB-50140TR	TT-15	-	-	-	-	MP-1	HH3/8-1.25 (HH3/8-1.25H)	-
	903000R-7T	SB-40140TRN	-	DTM-15					HH1/2-1.25 (HH1/2-1.25H)	-
	904000R-9T ~ 9010000R-18T	Recommended Torque for Insert Clamp 3.5 N·m							-	-

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation. *1Differential screw (3/8-24UNF) Applicable Inserts ➡ E45

If through spindle coolant is required, please order arbor bolt in ( ) separately.

Face Mill Spare Parts (Metric)

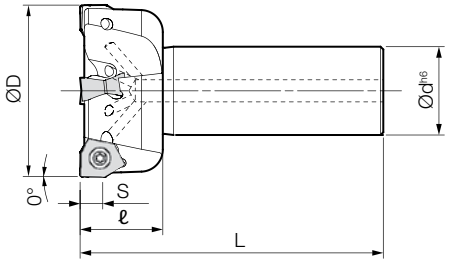
	Part Number	Spare Parts							
		Insert Screw	Wrench		Shim	Shim Screw	Wrench	Anti-Seize Compound	Arbor Bolt
			TT	DTM					
									
Coarse Pitch	MFWN 90063R-3T-M	SB-50140TR	TT-15	-	MFWN-90	SPW-7050	LW-5	MP-1	HH10X30 (HH10X1.25H)
	90080R-4T-(M)	Recommended Torque for Insert Clamp 4.2 N·m			Recommended Torque for Insert Clamp 6.0 N·m				HH12X35 (HH12X35H)
	90100R-5T-(M) ~ 90250R-12T-(M)								-
Fine Pitch	MFWN 90063R-4T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10X30 (HH10X1.25H)
	90080R-5T-(M)	Recommended Torque for Insert Clamp 4.2 N·m							HH12X35 (HH12X35H)
	90100R-7T-(M) ~ 90250R-14T-(M)								-
Extra-Fine Pitch	MFWN 90063R-5T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10X30 (HH10X1.25H)
	90080R-7T-(M)	SB-40140TRN	-	DTM-15					HH12X35 (HH12X35H)
	90100R-9T-(M) ~ 90250R-18T-(M)	Recommended Torque for Insert Clamp 3.5 N·m							-

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation. Applicable Inserts ➡ E45

If through spindle coolant is required, please order arbor bolt in ( ) separately.

NEW ITEMS!

M-SIX (MFWN) End Mill (with Coolant Hole)

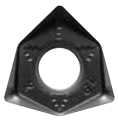
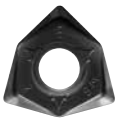
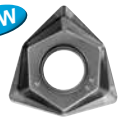


Toolholder Dimensions

Shank	Part Number	Stock	Unit	No. of Inserts	Dimensions ØD	Dimensions Ød	Dimensions L	Dimensions ℓ	Dimensions S	Rake Angle (°) A.R. (Max)	Rake Angle (°) R.R.	Coolant Hole	Spare Parts: Insert Screw	Spare Parts: Wrench	Spare Parts: Anti-seize Compound
Weldon	MFWN 902000R-W125-3T	●	inch	3	2.000	1.250	3.600	1.180	0.315	+13°	-12°	Yes	SB-50140TR	TT-15	MP-1
	902500R-W125-4T	●		4	2.500						-10°		Recommended Torque for Insert Clamp 4.2 N·m		
	903000R-W125-5T	●		5	3.000						-8°				
Cylindrical	MFWN 90050R-S32-3T	○	mm	3	50	32	110	30	8	+13°	-12°	Yes	SB-50140TR	TT-15	MP-1
	90063R-S32-4T	○		4	63						-10°		Recommended Torque for Insert Clamp 4.2 N·m		
	90080R-S32-5T	○		5	80						-9°				

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Applicable Inserts

Part Number	Applicable Inserts ➔ B17				
	 Surface Finish Oriented	 General Purpose	 Low Cutting Force	 Tough Edge (Heavy Milling)	NEW  Aluminum / Non-ferrous Metals (3-Edge)
MFWN90...	WNEU 080608EN-GL	WNMU 080608EN-GM	WNMU 080608EN-SM	WNMU 080608EN-GH	WNGT 080608FN-AM

Recommended Cutting Conditions ➔ E46

How to Mount the 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 (See Fig. 1)
3. When tightening the screw, make sure that the wrench is parallel to the screw. Remember that the screw hole of the holder for Extra Fine pitch is angled to the pocket floor (See Fig. 2 and Fig. 3)
4. Be careful not to tighten the screw with excessive torque. Recommended 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 pocket floor of the holder or between the insert side surfaces and the constraint surface of the holder. If there is any clearance, remove the insert and mount it again according to the above steps
6. To index the cutting edge of the insert, turn the insert counterclockwise. (See Fig. 4) The insert corner identification number is stamped on the top surface of the insert


Fig.1

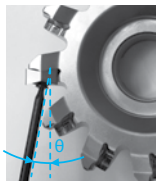


Fig.2

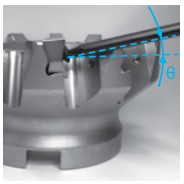


Fig.3

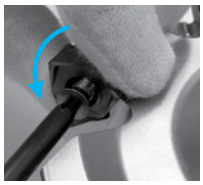


Fig.4

How to Replace the Shim

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 (see Fig. 1) and lightly pressing the shim toward the constraint surface of the pocket wall (see Fig. 2), insert the screw into the hole of the shim and tighten (See Fig. 3). When tightening screw, make sure that the screw is vertical to the pocket floor (See Fig 3). Recommended torque is 6.0Nm
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the pocket floor. If there is any clearance, remove the shim and mount it again according to the above steps

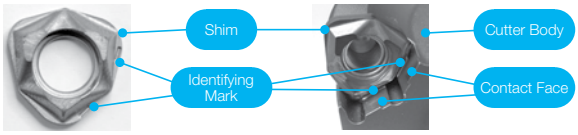


Fig.1 Fig.2

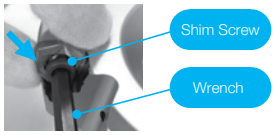


Fig.3

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)					
			MEGACOAT NANO			CVD Coated Carbide	DLC Coated Carbide	Carbide
			PR1535	PR1525	PR1510	CA6535	PDL025	GW25
GM	Carbon Steel	0.004~**0.008**~0.012	☆ 390~**590**~820	★ 390~**590**~820	-	-	-	-
	Alloy Steel	0.004~**0.008**~0.012	☆ 330~**520**~720	★ 330~**520**~720	-	-	-	-
	Mold Steel	0.004~**0.006**~0.010	☆ 260~**460**~590	★ 260~**460**~590	-	-	-	-
	Austenitic Stainless Steel	0.004~**0.006**~0.010	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-
	Martensitic Stainless Steel	0.004~**0.006**~0.010	☆ 490~**660**~820	-	-	☆ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.004~**0.006**~0.010	★ 300~**390**~490	-	-	-	-	-
	Gray Cast Iron	0.004~**0.008**~0.012	-	-	★ 390~**590**~820	-	-	-
	Nodular Cast Iron	0.004~**0.006**~0.010	-	-	★ 330~**490**~660	-	-	-
	Ni-base Heat Resistant Alloy	0.004~**0.005**~0.008	☆ 70~**100**~160	-	-	★ 70~**130**~160	-	-
SM (GL)※1	Carbon Steel	0.002~**0.005**~0.008	☆ 390~**590**~820	☆ 390~**590**~820	-	-	-	-
	Alloy Steel	0.002~**0.005**~0.008	☆ 330~**520**~720	☆ 330~**520**~720	-	-	-	-
	Mold Steel	0.002~**0.003**~0.006	☆ 260~**460**~590	☆ 260~**460**~590	-	-	-	-
	Austenitic Stainless Steel	0.002~**0.005**~0.008	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-
	Martensitic Stainless Steel	0.002~**0.005**~0.008	☆ 490~**660**~820	-	-	★ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.002~**0.005**~0.008	★ 300~**390**~490	-	-	-	-	-
	Gray Cast Iron	0.002~**0.005**~0.008	-	-	☆ 390~**590**~820	-	-	-
	Nodular Cast Iron	0.002~**0.003**~0.006	-	-	☆ 330~**490**~660	-	-	-
	Ni-base Heat Resistant Alloy	0.002~**0.004**~0.006	☆ 70~**100**~160	-	-	☆ 70~**130**~160	-	-
	Titanium Alloy	0.002~**0.003**~0.006	★ 130~**200**~260	-	-	-	-	-
GH※2	Carbon Steel	0.008~**0.012**~0.016	☆ 390~**590**~820	☆ 390~**590**~820	-	-	-	-
	Alloy Steel	0.008~**0.012**~0.016	☆ 330~**520**~720	☆ 330~**520**~720	-	-	-	-
	Mold Steel	0.006~**0.008**~0.012	☆ 260~**460**~590	☆ 260~**460**~590	-	-	-	-
	Austenitic Stainless Steel	0.008~**0.010**~0.012	☆ 330~**520**~660	☆ 330~**520**~660	-	-	-	-
	Martensitic Stainless Steel	0.008~**0.010**~0.012	☆ 490~**660**~820	-	-	☆ 590~**790**~980	-	-
	Precipitation Hardened Stainless Steel	0.008~**0.010**~0.012	☆ 300~**390**~490	-	-	-	-	-
	Gray Cast Iron	0.008~**0.012**~0.016	-	-	☆ 390~**590**~820	-	-	-
	Nodular Cast Iron	0.006~**0.008**~0.012	-	-	☆ 330~**490**~660	-	-	-
	Ni-base Heat Resistant Alloy	0.006~**0.008**~0.010	☆ 70~**100**~160	-	-	☆ 70~**130**~160	-	-
AM	Non-ferrous Material	0.004~**0.008**~0.012	-	-	-	-	★ 660~**1970**~2950	☆ 660~**1640**~2620

• Bold numbers in the graph indicate the most recommended value of feed (fz) Adjust cutting speed and feed rate according to the actual machining conditions
• Machining with coolant is recommended for Ni-base heat resistant alloy and titanium alloys
※1 GL Chipbreaker is recommended for surface finish oriented milling
※2 When using GH chipbreaker for fine pitch cutters, recommended feed is fz ≤ 0.012 ipt. GH chipbreaker is not recommended for extra-fine pitch cutter

★ :1st Recommendation
☆ : 2nd Recommendation

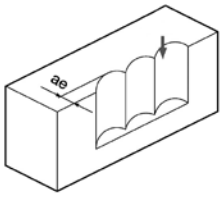
Applicable Chipbreaker

Cutter	Chipbreaker			
	GM	SM (GL)	GH	AM
Coarse Pitch (with Shim)	✓	✓	✓	✓
Fine Pitch (without Shim)	✓	✓	✓ (fz ≤ 0.012 ipt Recommended)	✓
Extra Fine Pitch (without Shim)	✓	✓	Not Recommended	Not Recommended

Cutter Type and Insert Selection Guide

Purpose	Cutter			Chipbreaker				
	Coarse Pitch	Fine Pitch	Extra-Fine Pitch	GM	SM	GH	GL	AM
General Milling for Steel and Alloy Steel		✓		✓				
Steel and Alloy Steel (to prevent chattering due to low rigidity machine or poor clamping power)	✓				✓			
Productivity Oriented (D.O.C. ≥ 0.158" fz ≥ 0.010 ipt)	✓					✓		
Surface Roughness Oriented	✓	✓					✓	
General Milling for Stainless Steel		✓			✓			
Stainless Steel (to prevent chattering due to low rigidity machine or poor clamping power)	✓				✓			
Cast Iron Milling (Improved Efficiency)			✓	✓				
Cast Iron (D.O.C. ≥ 0.158" fz ≥ 0.010 ipt)	✓					✓		
General Milling for Aluminum Alloys		✓						✓
Aluminum Alloys (to prevent chattering due to low rigidity)	✓							✓

Plunging



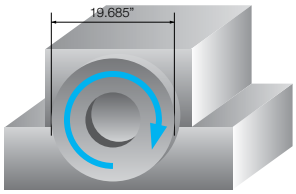
Cutting Dia.	MAX. Width of Cut (ae)
All Items	0.315"

NOT available for ramping or helical milling, due to interference between workpiece and insert.

Case Studies

No.50

- Machine Part
- Vc = 560 sfm
- D.O.C. × ae = 0.098" × 5.118"
- fz = 0.007 ipt (Vf = 19.685 ipm)
- Wet
- MFWN90160R-8T (8 Inserts)
- WNMU080608EN-GM (PR1510)



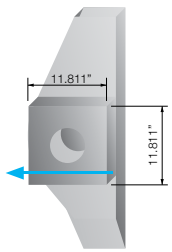
PR1525	163 cc/min
Competitor A (Positive Cutter)	68 cc/min

Competitor A continued to cut under low cutting conditions as the workpiece was slipping due to unstable chucking. With MFWN, stable cutting was possible at higher feed rates.

(User Evaluation)

Manganese Steel

- Construction Equipment Part
- Vc = 490 sfm
- D.O.C. × ae = 0.039" × 3.937"
- fz = 0.008 ipt (Vf = 26.299 ipm)
- Dry
- MFWN90100R-7T (7 Inserts)
- WNMU080608EN-GM (PR1525)



PR1525	2 pcs/edge
Competitor B (Negative Cutter)	1 pcs/edge

Despite instability with the long overhang of the workpiece, MFWN doubled tool life and improved efficiency by 150%.

(User Evaluation)

Shouldering | Slotting | Facing

MTE90-SF Face Mill (Easy Edge Adjustment)

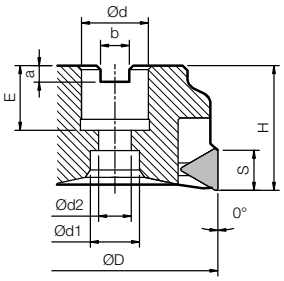


Fig.1

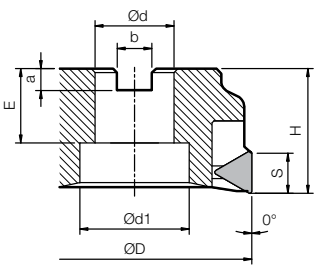


Fig.2

Toolholder Dimensions

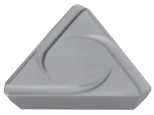
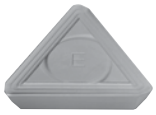
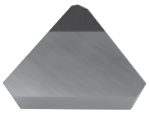
Part Number		Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Drawing	Weight (kg)
				ØD	Ød	Ød1	Ød2	H	E	a	b	S	A.R. (Max)	R.R.		
Inch Bore Dia.	MTE 90080R-4T-SF	○	4	80	1.000"	20	13	50	1.024"	0.236"	0.375"	17	+17°	+3°	Fig.1	1.0
	90100R-5T-SF	○	5	100	1.250"	45	-		1.260"	0.315"	0.500"			+4°	Fig.2	1.5
	90125R-6T-SF	○	6	125	1.500"	55		63	1.496"	0.394"	0.625"			+5°		3.0

Spare Parts

Part Number	Spare Parts						
	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

Applicable Inserts

Part Number	Applicable Inserts ➡ B12			Applicable PCD Inserts ➡ B26
				
MTE90...	TEMR 43PTER-H	TEKR 43PTER-S	TEEN 43PTTR TEKN 43PTTR TEKN 43PTFR	TEKN 43PTFR-NE TEKN 43PTFR

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)					
		Cermet	MEGACOAT		PVD Coated Carbide	Carbide	PCD
		TN100M	PR1225	PR1210	PR830	KW10	KPD001 (KPD010)
Carbon Steel	~0.010	★ 390~660	★ 390~820	-	☆ 390~660	-	-
Alloy Steel	~0.010	★ 330~590	★ 330~720	-	☆ 330~590	-	-
Mold Steel	~0.008	★ 330~590	★ 260~590	-	☆ 260~490	-	-
Stainless Steel	~0.008	☆ 390~660	★ 390~720	-	☆ 390~660	-	-
Cast Iron	~0.010	-	-	★ 330~720	-	☆ 260~490	-
Non-ferrous Metals	~0.008	-	-	-	-	★ 330~980	★ 980~2620

★ :1st Recommendation
☆ : 2nd Recommendation

How to Adjust Cutting Edge Height, See MSE45 ➡ C20

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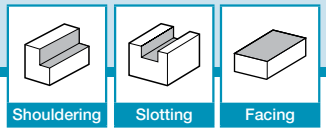
U.S. Stock Standard : ●
Made to Order / Quoted Item : □
World Express (Shipping: 7-10 Business Days) : ○



MTE90 End Mill (High Rake)

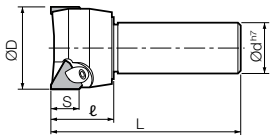


Fig.1

MTP90 End Mill

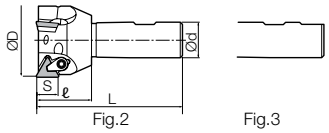


Fig.2

Fig.3

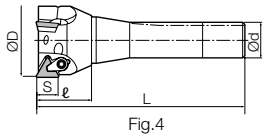


Fig.4

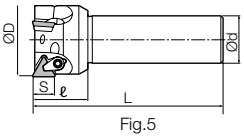
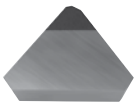


Fig.5

Toolholder Dimensions

Part Number	Stock	Unit	No. of Inserts	Dimensions ØD	Dimensions Ød	Dimensions L	Dimensions ℓ	Dimensions S	Drawing	Rake Angle (°) A.R. (Max)	Rake Angle (°) R.R.	Spare Parts: Clamp Set	Clamp	Clamp	Clamp Screw	Wrench	Shim	Shim Clamp Screw	Wrench
MTE 9050	○	mm	3	50	32	120	40	17	Fig.1	+13°	+3°	-	-	CP-8TE	W8X18	LW-4	MTE-42	SP3X8	-
9063	○		3	63							+5°								
9080-32	□		4	80						+16°	+6°								
MTP 90-075-75W	●	inch	2	0.75	0.750	3.28	1.25	0.34	Fig.2	+3°	-3°	CPS-2S	-	-	-	FT-15	-	-	-
90-100-75W	●		3	1.00															
90-125-75W	●		2	1.25				0.53		+5°	0°	CPS-3	-	-	-	LW-3	KPT-32	SH3X6	LW-2
90-150-75W	●		3	1.50															
90-200-75W	●		3	2.00	0.750	3.53	1.50	0.53	Fig.2										
90-250-875W	●		3	2.50	0.875				Fig.3										
90-200-125W	●		3	2.00	1.250	3.90	1.69	0.71	Fig.3	+8°	0°	-	CP-8W	-	W8X18	LW-4	KPT-42	SH3X6	LW-2
90-250-125W	●		3	2.50															
90-300-125W	●		4	3.00		4.00	1.72												
MTP 90-200-R8	●		3	2.00	0.949	6.00	2.003	0.53	Fig.4	+5°		CPS-3	-	-	-	LW-3	KPT-32	SH3X6	LW-2
MTP 9050	□	mm	3	50	32	130	43	18	Fig.5	+8°	0°	-	CP-8W	-	W8X18	LW-4	KPT-42	SP3X8	-
9063	□		3	63															

Applicable Inserts

Part Number	Applicable Inserts ➡ B12				Applicable PCD Inserts ➡ B26	
						
MTE90...	TEMR 43PTER-H	TEKR 43PTER-S	TEEN 43PTER TEKN 43PTTR TEKN 43PTFR	-	TEKN 43PTFR-NE TEKN 43PTFR	-
MTP90-075-75W MTP90-100-75W	-	-	-	TPG 22_ TPM 22_	-	TPG 22_
MTP90-125-75W MTP90-150-75W MTP90-200-75W MTP90-250-875W MTP90-200-R8	TPMR 32PDER-H		TPKN 32PDTR TPKN 32PDFR	TPG 32_ TPM 32_	-	-
MTP90...-125W MTP9050 MTP9063	TPMR 43PDER-H	TPKR 43PDER-S	TPKN 43PDTR TPKN 43PDFR	-	-	-

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm) Cermet	MEGACOAT		PVD Coated Carbide	Carbide	PCD
		TN100M	**PR1225**	**PR1210**	**PR830**	**KW10**	**KPD001 (KPD010)**
Carbon Steel	~0.010	★ 390~660	★ 390~820	-	☆ 390~660	-	-
Alloy Steel	~0.010	★ 330~590	★ 330~720	-	☆ 330~590	-	-
Mold Steel	~0.008	★ 330~590	★ 260~590	-	☆ 260~490	-	-
Stainless Steel	~0.008	☆ 390~660	★ 390~720	-	☆ 390~660	-	-
Cast Iron	~0.010	-	-	★ 330~720	-	☆ 260~490	-
Non-ferrous Metals	~0.008	-	-	-	-	★ 330~980	★ 980~2620

★ :1st Recommendation
☆ : 2nd Recommendation

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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Shouldering | Slotting | Facing

MSO90 Face Mill (Coarse Pitch / Fine Pitch)

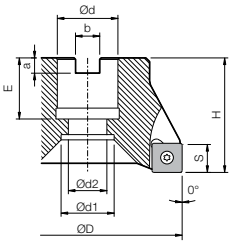


Fig.1

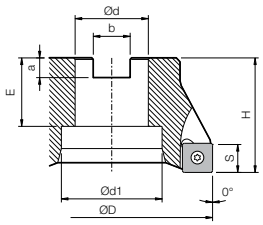


Fig.2

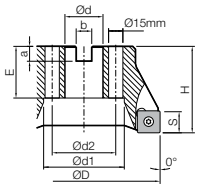


Fig.3

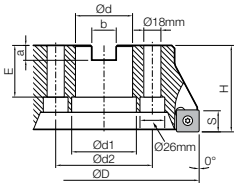


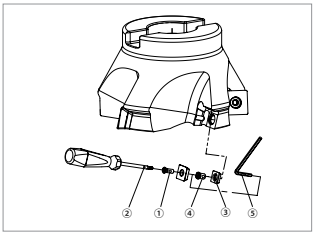
Fig.4

Toolholder Dimensions

		Part Number	Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Drawing	Weight (kg)
					ØD	Ød	Ød1	Ød2	H	E	a	b	S	A.R. (Max)	R.R.		
Inch Bore Dia.	Coarse Pitch	MSO 90080R-15-4T	○	4	80	1.000"	20	13	50	1.024"	0.236"	0.375"	13	+15°	-9°	Fig.1	0.8
		90100R-15-5T	○	5	100	1.250"	48	-	60	1.260"	0.315"	0.500"			-8.5°	Fig.2	1.3
		90125R-15-6T	○	6	125	1.500"	59			1.496"	0.394"	0.625"			-8°		2.3
		90160R-15-7T	○	7	160	2.000"	68		63		0.433"	0.750"			-7.5°		4.1
		90200R-15-9T	○	9	200	1.875"		101.6			0.551"	1.000"			-7.5°	Fig.4	7.1
	Fine Pitch	MSO 90080R-15-6T	○	6	80	1.000"	20	13	50	1.024"	0.236"	0.375"	13	+15°	-9°	Fig.1	0.8
		90100R-15-6T	○	6	100	1.250"	48	-	60	1.260"	0.315"	0.500"			-8.5°	Fig.2	1.3
		90125R-15-7T	○	7	125	1.500"	59			1.496"	0.394"	0.625"			-8°		2.3
		90160R-15-9T	○	9	160	2.000"	68		63		0.433"	0.750"			-7.5°		4.1
		90200R-15-11T	○	11	200	1.875"		101.6			0.551"	1.000"			-7.5°	Fig.4	7.1
Metric Bore Dia.	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

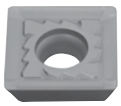
Spare Parts

Part Number	Spare Parts				
	① Clamp Screw	② Wrench	③ Shim	④ Shim Clamp Screw	⑤ Wrench
					
MSO 90○○○R-15-○T	SB-45130TR	DTP-20	MSO-5200	SPW-6045	LW-4.5 (for Shim Clamp Screw)
MSO 90○○○R-15-○T-M					



- Mounting bolts (HH12X35M) are included for MSO90080R-15-○T-M and MSO90080R-15-○T
- Mounting bolts (HH10X30S) are included for MSO90063R-15-○T-M

Applicable Inserts

Part Number	Applicable Inserts ➡ B22
	
MSO90○○○R-15-...	SEMM150408PESR

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)				
		Cermet	MEGACOAT		PVD Coated Carbide	Carbide
		TN100M	PR1225	PR1210	PR830	KW10
Carbon Steel	~0.008	★ 390~660	★ 390~820	-	☆ 390~660	-
Alloy Steel	~0.008	★ 330~590	★ 330~720	-	☆ 330~590	-
Mold Steel	~0.008	★ 330~590	★ 260~590	-	☆ 260~490	-
Stainless Steel	~0.008	☆ 390~660	★ 390~720	-	☆ 390~660	-
Cast Iron	~0.008	-	-	★ 330~720	-	☆ 260~490
Non-ferrous Metals	~0.008	-	-	-	-	★ 330~980

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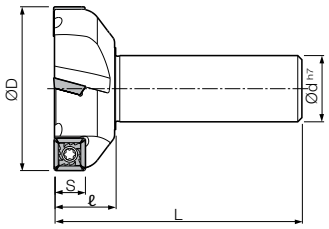
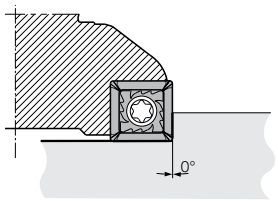
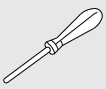
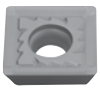
Shouldering | Slotting | Facing

MSO90-S End Mill (High Rake)



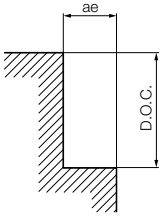
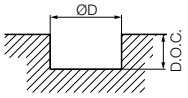
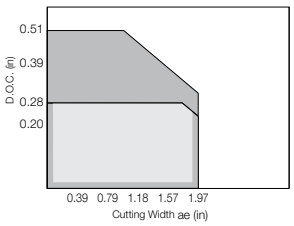
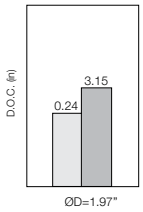


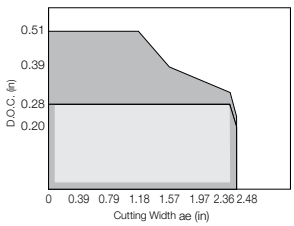
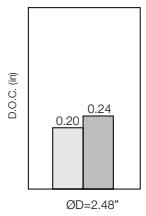
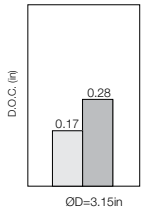
Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm) ØD	Ød	L	ℓ	S	Rake Angle (°) A.R. (Max)	R.R.	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ B22
												
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 = 330 sfm, fz = 0.006 ipt, Dry

Workpiece Material	Shouldering	Slotting
1049		
Part Number		
MSO-9050-S32-OO Insert Size 09 type 15 type		

Part Number	Shouldering	Slotting
MSO-9063-S32-OO Insert Size 09 type 15 type		
MSO-9080-S32-OO Insert Size 09 type 15 type		

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm) Cermet	MEGACOAT		PVD Coated Carbide	Carbide
		TN100M	**PR1225**	**PR1210**	**PR830**	**KW10**
Carbon Steel	~0.008	★ 390~660	★ 390~820	-	☆ 390~660	-
Alloy Steel	~0.008	★ 330~590	★ 330~720	-	☆ 330~590	-
Mold Steel	~0.008	★ 330~590	★ 260~590	-	☆ 260~490	-
Stainless Steel	~0.008	☆ 390~660	★ 390~720	-	☆ 390~660	-
Cast Iron	~0.008	-	-	★ 330~720	-	☆ 260~490
Non-ferrous Metals	~0.008	-	-	-	-	★ 330~980

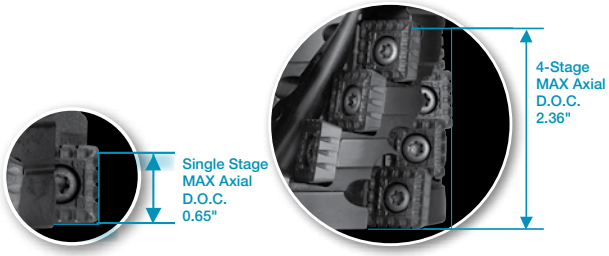
★ :1st Recommendation
☆ : 2nd Recommendation

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

MSRS90 Heavy Milling Cutter

● Multiple Cutting Edge Lengths Available

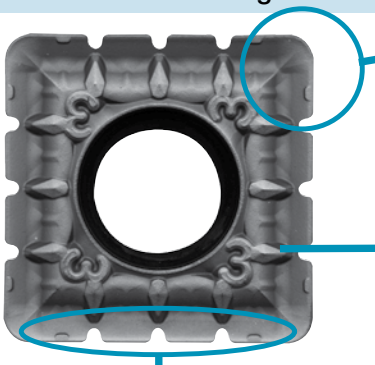
1, 2, and 4-Stage (ø3.00in, ø80mm, ø100mm)



- **High Efficiency, Low Cutting Force and Low Vibration Milling Cutter**
- **Neutral and Corner-R Insert**

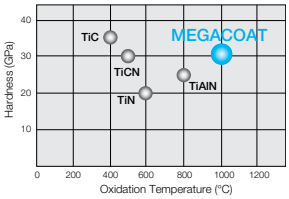
Applicable to Shouldering (Cutting Angle: 90°), High Feed Cutting (Cutting Angle: 30°), Plunging, and Side Cutting.

Custom-ordered Milling Cutter with High Performance Notched Neutral Inserts Offer Expansive Possibilities



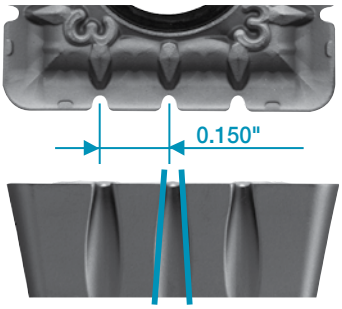
Neutral Insert with Corner-R is Available for a Variety of Applications

Long Tool Life with MEGACOAT



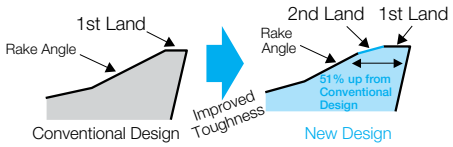
High Hardness and High Oxidation Resistance
Long Tool Life: MEGACOAT

Notched Insert SPMT180616EN type



- Notched inserts break chips into smaller pieces and reduce cutting forces.
- Available for high feed cutting due to lower cutting forces at workpiece entry.
- New, double-land edge prep improves the cutting edge strength, while a small notch helps to reduce cutting forces

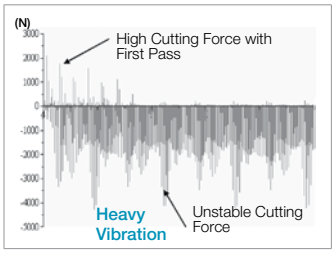
- Neutral Insert
- Available for Various cutting angles
- Cutting edge length 0.709in



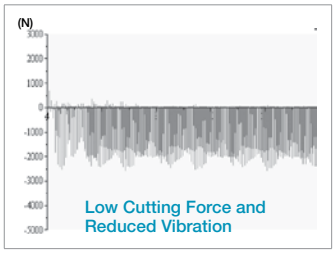
Edge Preparation

● Low Cutting Force (Effect of Notched Insert)

Comparison of Cutting Forces



Competitor A



MSRS90

Notched Inserts Provide Lower Cutting Forces and Reduce Vibration

Tapered Cutter

Plunge Cutter

45° Face Mill

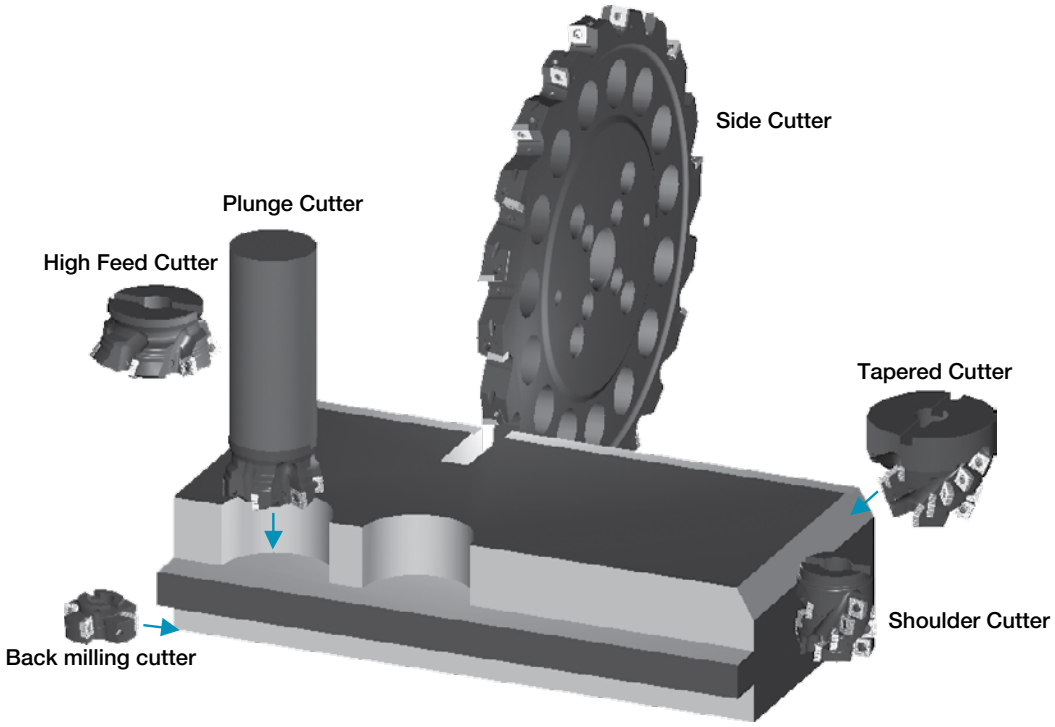
High Feed Cutter

Shoulder Cutter

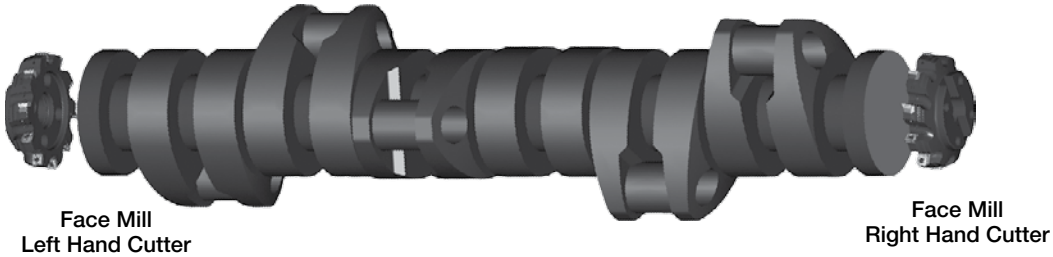
Applicable Inserts: Available for Various Applications

Applications	Chipbreaker Type	3-Notched	4-Notched	Solid Edge
General Purpose (1st Recommendation)	Standard	NB3 +	NB4	
Low Cutting Force	Low Cutting Force	NB3P +	NB4P	
Focusing on Edge Strength	Without Notch (Usable with Notched Inserts)	(NB3 or	NB4) +	

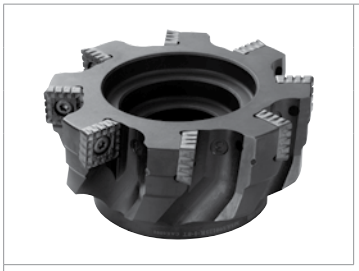
Various Cutting Possibilities with Custom-Design and Standard Cutters



Shaft Length Determination



MSRS90 Heavy Milling (Inch)



Rake Angle	
A.R.	R.R.
+7°	-10°

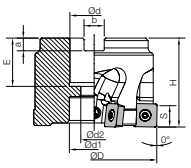


Fig.1

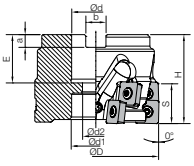


Fig.2

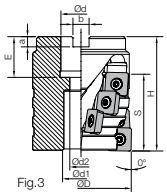


Fig.3

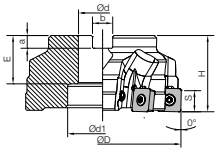


Fig.4

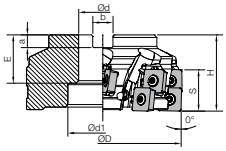


Fig.5

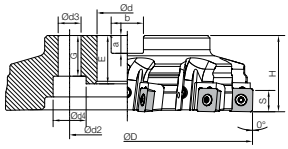


Fig.6

Toolholder Dimensions (Inch)

Part Number		Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimensions (in)												Drawing	Weight (kg)
						ØD	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4	G		
MSRS	903000R-1-4T	●	4	4	1	3.00	1.00	0.87	0.55	2.36	1.06	0.24	0.38	0.65	-	-	-	Fig.1	2.43
	903000R-2-4T	●	8	4	2									1.22				Fig.2	2.21
	903000R-4-4T	●	16	4	4					3.35				2.36				Fig.3	3.50
	904000R-1-6T	●	6	6	1	4.00	1.50	2.05	-	2.76	1.14	0.39	0.63	0.65				Fig.4	4.41
	904000R-2-6T	●	12	6	2									1.22				Fig.5	3.97
	905000R-1-8T	●	8	8	1	5.00		2.17		2.36	1.42			0.65				Fig.4	5.73
	906000R-1-8T	●	8	8	1	6.00	2.00	2.76			1.50	0.43	0.75						7.50
	908000R-1-10T	●	10	10	1	8.00	2.50	-	4.00		1.58	0.55	1.01		0.71	1.02	1.26	Fig.6	13.23
	9010000R-1-12T	●	12	12	1	10.00													27.49

Applicable Inserts

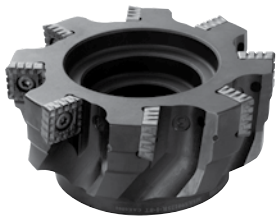
Part Number	Applicable Inserts ➔ B24				
	 3-Notch	 4-Notch	 3-Notch / Low Cutting Force	 4-Notch / Low Cutting Force	 Without Notch
MSRS90...	SPMT 180616EN-NB3	SPMT 180616EN-NB4	SPMT 180616EN-NB3P	SPMT 180616EN-NB4P	SPMT 180616EN-V

Spare Parts ➔ E56
Recommended Cutting Conditions ➔ E56

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
Made to Order / Quoted Item : □
World Express (Shipping: 7-10 Business Days) : ○

MSRS90 Heavy Milling (Metric)



Rake Angle	
A.R.	R.R.
+7°	-10°

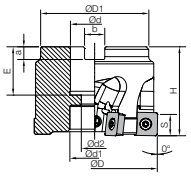


Fig.1

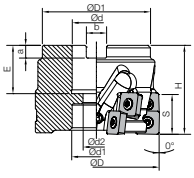


Fig.2

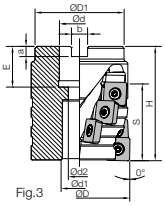


Fig.3

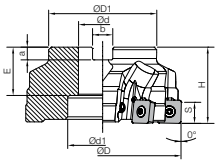


Fig.4

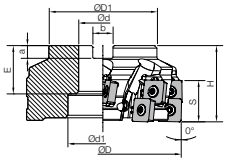


Fig.5

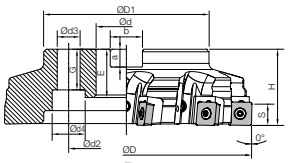


Fig.6

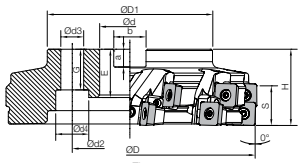


Fig.7

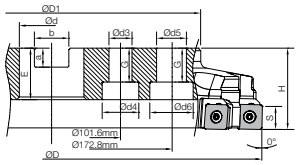


Fig.8

Toolholder Dimensions (Metric)

	Part Number	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimensions (mm)														Drawing	Weight (kg)
						ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4	Ød5	Ød6	G	
Inch Bore Dia.	MSRS 90080R-1-4T	○	4	4	1	80	70	1.250"	27	18	60	1.260"	0.315"	0.500"	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	1.500"	39	21	70	1.496"	0.394"	0.625"	16.5						Fig.1	2.3
	90100R-2-6T	○	12		2										31						Fig.2	2.1
	90100R-4-6T	□	24		4						90				60						Fig.3	3.2
	90125R-1-8T	○	8	8	1	125			55	-	60		0.433"	0.750"	16.5						Fig.4	2.6
	90125R-2-8T	□	16		2										31						Fig.5	2.4
	90160R-1-8T	○	8	8	1	160	100	2.000"	70						16.5						Fig.4	4.3
	90160R-2-8T	□	16		2										31						Fig.5	4.1
	90200R-1-10T	○	10	10	1	200	130	1.875"	-	101.6			0.551"	1.000"	16.5	18	26	-	-	32	Fig.6	6.7
	90200R-2-10T	□	20		2										31						Fig.7	6.6
	90250R-1-12T	○	12	12	1	250									16.5						Fig.6	12.6
	90250R-2-12T	□	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	□	28		2																-	16.0
Metric Bore Dia.	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	□	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	□	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	□	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	□	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	□	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	□	28		2										31						-	16.0

Applicable Inserts

Part Number	Applicable Inserts ➔ B24				
	 3-Notch	 4-Notch	 3-Notch / Low Cutting Force	 4-Notch / Low Cutting Force	 Without Notch
MSRS90...	SPMT 180616EN-NB3	SPMT 180616EN-NB4	SPMT 180616EN-NB3P	SPMT 180616EN-NB4P	SPMT 180616EN-V

Spare Parts ➔ **E56**
Recommended Cutting Conditions ➔ **E56**

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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(Technical Support) **800.823.7284 - Option 2**
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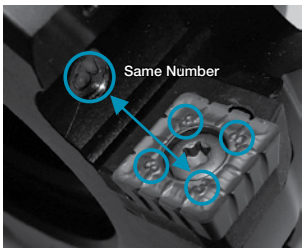
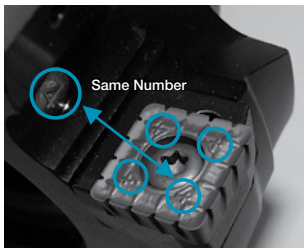
Caution when Installing Notched Inserts

It is important to install the appropriate notched insert into the correct position. Failure to do so may result in damage to the toolholder body. The appropriate insert is marked on the 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 of insert to the number of the cutter body.





Spare Parts (Inch and Metric Toolholders)

Part Number		Spare Parts							
		Clamp Screw	Wrench	Cartridge		Clamp Screw	Wrench	Anti-Seize Compound	Arbor Bolt
				MAP-1806M 	MAP-1806S  (Bottom Edge Only)				
Without Cartridge	**MSRS 903000R-1-4T**	SB-60120TR	TT-25L	-	-	-	-	MP-1	HH1/2-1.25
	903000R-2-4T	Recommended Torque for Insert Clamp 7.5 N·m							
	903000R-4-4T								
	MSRS 904000R-1-6T								-
	904000R-2-6T								
	MSRS 905000R-1-8T								
With Cartridge	**MSRS 906000R-1-8T**			MAP-1806M	-	SB-40140TR	DT-15		
	908000R-1-10T			Recommended Torque for Cartridge Clamp 3.5 N·m					
	9010000R-1-12T								
Without Cartridge	**MSRS 90080R-○-4T**	SB-60120TR	TT-25L	-	-	-	-	MP-1	HH16X45
	90100R-○-6T	Recommended Torque for Insert Clamp 7.5 N·m							HH20X55
	90125R-○-8T								-
With Cartridge	**MSRS 90160R-○-8T ~ 90315R-○-14T**			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		
				Recommended Torque for Cartridge Clamp 3.5 N·m					
Without Cartridge	**MSRS 90080R-○-4T-M**			-	-	-	-		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		
				Recommended Torque for Cartridge Clamp 3.5 N·m					

*1: MAP-1806M is only for applicable MSRS90...R-1... cutters

*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 (MP-1) thinly on portion of taper and thread prior to installation.

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade (Vc sfm)	
	General Purpose **NB3+NB4**	Low Cutting Force **NB3P+NB4P**	MEGACOAT	
			PR1230	**PR1210**
Soft Steel	0.004~**0.008**~0.010	0.004~**0.008**~0.010	★ 400~**500**~725	☆ 400~**500**~725
Carbon Steel	0.004~**0.008**~0.010	0.004~**0.008**~0.010	★ 325~**500**~650	☆ 325~**500**~650
Alloy Steel	0.004~**0.006**~0.008	0.004~**0.006**~0.008	★ 325~**500**~650	☆ 325~**500**~650
Die Steel	0.004~**0.006**~0.008	0.004~**0.005**~0.006	★ 325~**500**~600	☆ 325~**500**~600
Gray Cast Iron	0.004~**0.008**~0.012	0.004~**0.008**~0.010	☆ 325~**600**~825	★ 325~**600**~825
Nodular Cast Iron	0.004~**0.008**~0.010	0.004~**0.007**~0.008	☆ 325~**600**~725	★ 325~**600**~725
Stainless Steel	Not Recommended			
Non-Ferrous Metals	Not Recommended			

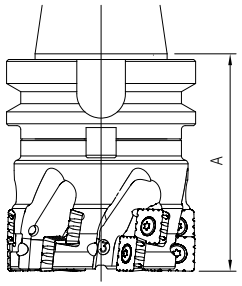
★ :1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (Shouldering)

MSRS90100R-1-6T

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in³/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	< 4.72	Vc = 590sfm	fz = 0.008ipt	0.59 × 3.15	50.41
	4.72~7.87	Vc = 590sfm	fz = 0.008ipt	0.59 × 1.57	25.20
	≥ 7.9	Vc = 425sfm	fz = 0.004ipt	0.59 × 1.57	16.05
Carbon Steel	< 4.72	Vc = 490sfm	fz = 0.008ipt	0.59 × 3.15	42.05
	4.72~7.87	Vc = 490sfm	fz = 0.008ipt	0.59 × 1.57	20.99
	≥ 7.91	Vc = 325sfm	fz = 0.004ipt	0.59 × 1.57	13.97

Overhang Length A (in)



MSRS90100R-2-6T

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in³/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	Less than 4.72in	Vc = 590sfm	fz = 0.008ipt	1.18×1.97	62.97
	4.72~7.87in	Vc = 590sfm	fz = 0.008ipt	1.18×1.18	37.77
	7.91in and over	Vc = 425sfm	fz = 0.004ipt	1.18×0.98	20.08
Carbon Steel	Less than 4.72in	Vc = 490sfm	fz = 0.008ipt	1.18×1.97	52.54
	4.72~7.87in	Vc = 490sfm	fz = 0.008ipt	1.18×1.18	31.55
	7.91in and over	Vc = 325sfm	fz = 0.004ipt	1.18×0.98	17.51

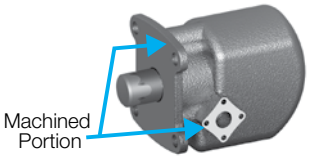
MSRS90100R-4-6T

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in³/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	Less than 5.51in	Vc = 590sfm	fz = 0.008ipt	2.36×0.79	50.41
	5.51in~7.87in	Vc = 590sfm	fz = 0.008ipt	2.36×0.39	25.20
	7.91in and over	Vc = 425sfm	fz = 0.004ipt	2.36×0.39	16.05
Carbon Steel	Less than 5.51in	Vc = 490sfm	fz = 0.008ipt	2.36×0.79	42.05
	5.51in~7.87in	Vc = 490sfm	fz = 0.008ipt	2.36×0.39	20.99
	7.91in and over	Vc = 325sfm	fz = 0.004ipt	2.36×0.39	13.97

Case Studies

Ductile Iron, 60-40-8

- Industrial Parts
- Vc = 490 sfm
- D.O.C. × ae = 0.236" × 2.559"
- fz = 0.006 ipt (Vf = 16.93 ipm)
- MSRS90100R-1-6T (6 Flutes)
- SPMT180616EN-NB3/NB4 (PR1210)



MSRS90 (PR1210)	Chip Removal = 15.7 in³/min
Competitor A	6.5 in³/min

MSRS90 doubled the cutting efficiency compared to competitor A. Competitor A required 2 passes (D.O.C.×ae=0.118×2.56"). MSRS90 completed the cut in only 1 pass. Cutting time was reduced.

(User Evaluation)

Chrome-Moly Steel

- Construction Machine Part
- Vc = 660 sfm
- D.O.C. × ae = 0.394" × 1.968"
- fz = 0.004 ipt (Vf = 15.748 ipm)
- MSRS90125R-1-8T (8 Flutes)
- SPMT180616EN-NB3/NB4 (PR1230)

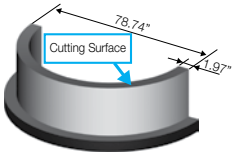
MSRS90 (PR1230)	Chip Removal = 12.2 in³/min
Competitor B	9.3 in³/min

MSRS90 improved the cutting efficiency to 1.3 times that of competitor B. Competitor C machined with D.O.C.×ae=0.20x1.97". Tool cost is reduced to 1/3 although competitor C is expensive using 2-corner inserts. MSRS90 reduced machining cost as well as improved cutting efficiency.

(User Evaluation)

Tool Steel

- Shipbuilding Parts
- Vc = 490 sfm
- D.O.C. × ae = 0.394" × 0.394"~1.968"
- fz = 0.004 ipt (Vf = 9.449 ipm)
- MSRS90160R-1-8T (8 Flutes)
- SPMT180616EN-NB3/NB4 (PR1230)



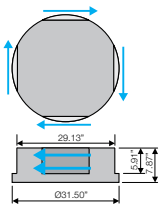
MSRS90 (PR1230)	Chip Removal = 7.32 in³/min
Competitor C	3.66 in³/min

MSRS90 doubled the cutting efficiency compared to competitor C (D.O.C.×ae=0.197×0.394~1.968"). MSRS90 doubled the axial D.O.C. due to lower cutting forces. MSRS90 can increase D.O.C. as the cutting speed (Vc=325 increases to 490). This resulted in total cutting efficiency improvement.

(User Evaluation)

Structural Steel

- Power Generation Parts
- Vc = 530 sfm
- D.O.C. × ae = 0.394" × 0~0.787"
- fz = 0.006 ipt (Vf = 19.69 ipm)
- MSRS90125R-1-8T (8 Flutes)
- SPMT180616EN-NB3/NB4 (PR1230)



MSRS90 (PR1230)	12 faces/edge
Competitor D	8 faces/edge

MSRS90 improved tool life to 1.5 times that of competitor D. Competitor D required 2 passes (D.O.C.×ae=0.472×0~0.394") with a low feed rate (Vf=15.748ipm). Competitor D was very noisy due to large cutting forces. MSRS90 reduces the cutting force and noise level.

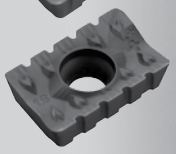
(User Evaluation)

MSR Heavy Milling Cutter

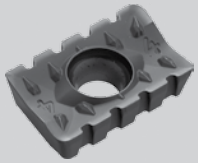
High Efficiency Heavy Milling

PR1230
(for Steel)

Low Cutting Force Design



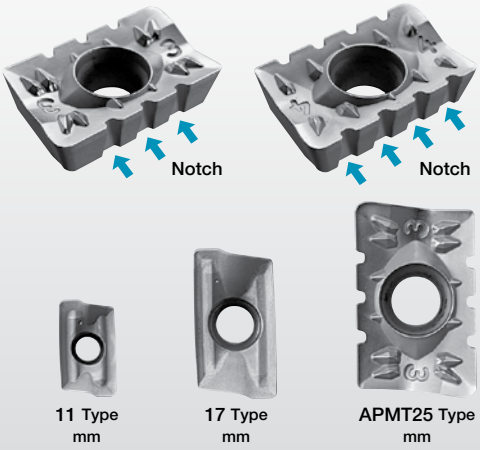
PR1210
(for Cast Iron)



Notched inserts reduce cutting forces, and enable high feed rates by reducing chatter
Improved chip evacuation and low cutting forces due to the special chipbreaker designs
Enables heavy milling and deep cutting, and also drastically improves cutting efficiency (Reduced Cycle Time)

Notched Insert

Size Comparison (Full-Scale)

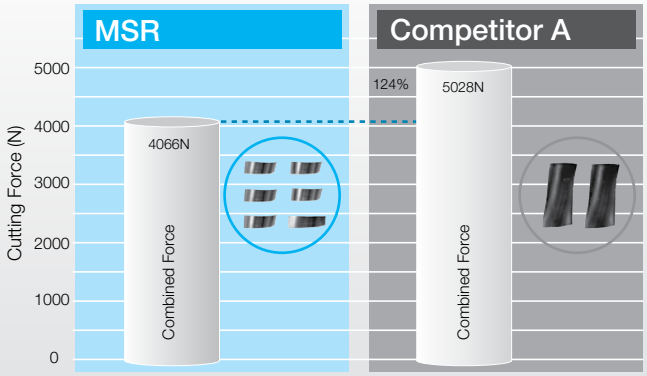


11 Type
mm

17 Type
mm

APMT25 Type
mm

Cutting Force Comparison



The exclusive notched chipbreakers provide low cutting resistance and good chip evacuation.

(User Evaluation)

Shouldering | Slotting | Facing

MSR Heavy Milling (Inch)

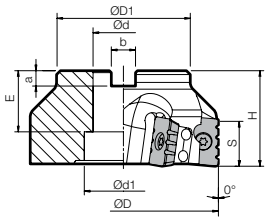


Fig.1

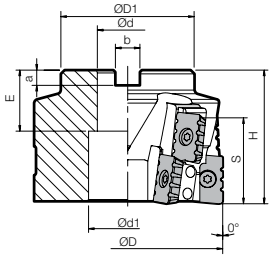
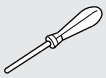


Fig.2

Toolholder Dimensions (Inch)

Part Number	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimensions (in)									Rake Angle		Drawing	Weight (kg)
					ØD	Ød	Ød1	Ød2	H	E	a	b	S	A.R.	R.R.		
MSR 3000R-1	●	4	4	1	3.00	1.00	0.790	-	1.970	1.020	0.240	0.375	0.925	+9°	-5°	Fig.1	1.1
3000R-2	●	8	4	2					2.760				1.770			Fig.2	1.6
4000R-1-1.5ID	●	6	6	1	4.00	1.50	1.610		1.970	1.260	0.310	0.500	0.925			Fig.1	1.6
4000R-2-1.5ID	●	12	6	2					2.760				1.770			Fig.2	2.2

Spare Parts

Part Number	Spare Parts					
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-Seize Compound
						
MSR 3000R... MSR 4000R...	SB-60120TR	TT-25L	MAP-2506	SB-40140TR	DT-15	MP-1
	For Insert Clamp		For Shim Clamp			


Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Applicable Inserts

Part Number	Applicable Inserts ➡ B18			
				
	3-Notch	4-Notch	3-Notch / Low Cutting Force	4-Notch / Low Cutting Force
MSR 3000R... MSR 4000R...	APMT 2506○○ER-NB3	APMT 2506○○ER-NB4	APMT 250616ER-NB3P	APMT 250616ER-NB4P
Custom-Ordered Left-hand Cutter	APMT 250616EL-NB3	APMT 250616EL-NB4	-	-

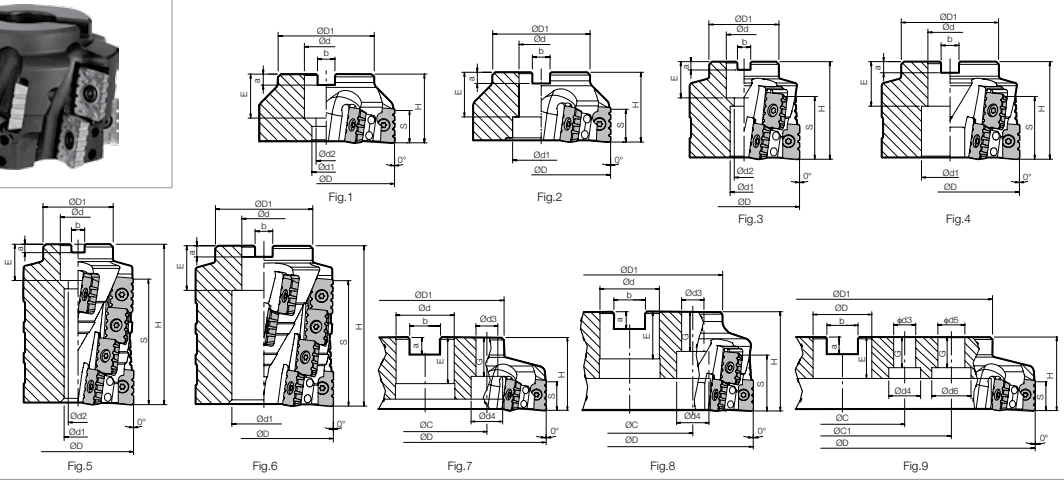
Recommended Cutting Conditions ➡ E62

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

Shouldering | Slotting (1-2 Stage Only) | Facing

MSR Heavy Milling (Metric)

Rake Angle	
Ø63~Ø80	
A.R.	R.R.
+9°	-8°
Ø100~	
A.R.	R.R.
+9°	-5°



E 90° LEAD

Toolholder Dimensions (Inch Bore Dia. Ød)

Part Number	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimensions (mm)																	Drawing	Weight (kg)
					ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4	Ød5	Ød6	ØC	ØC1	G		
MSR 063R-1	○	4	4	1	63	50	1.000"	20	14	65	1.024"	0.236"	0.375"	23.5	-	-	-	-	-	-	-	Fig.1	0.8
063R-2	○	8		2						85				45								Fig.3	1.0
080R-1	○	4	4	1	80	55	1.000"	20	14	50	1.024"	0.236"	0.375"	23.5	-	-	-	-	-	-	-	Fig.1	1.1
080R-2	○	8		2						70				45								Fig.3	1.6
080R-2-31.75	○					70	1.250"	27	18		1.260"	0.315"	0.500"										1.7
080R-4	●	16		4		55	1.000"	20	14	115	1.024"	0.236"	0.375"	90								Fig.5	2.6
080R-4-31.75	○					70	1.250"	27	18		1.260"	0.315"	0.500"										2.7
100R-1	○	6	6	1	100	70	1.250"	42	-	50	1.260"	0.315"	0.500"	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	1.500"	54	-	60	1.496"	0.394"	0.625"	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	2.000"	68	-	60	1.496"	0.433"	0.750"	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	1.875"	-	-	60	1.496"	0.551"	1.000"	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	1.875"	-	-	60	1.496"	0.551"	1.000"	23.5	18	26	-	-	101.6	-	32	Fig.7	10.9
250R-2	○	24		2						80				45								Fig.8	14.7
315R-1	□	14	14	1	315	220	1.875"	-	-	60	1.378"	0.551"	1.000"	23.5	17	27	22	32	101.6	177.8	25	Fig.9	16.0

· Shim is not available for MSR063R (ØD=63).
· Mounting bolt (HH12x40) is included for MSR063R and MSR080R. Mounting bolt (HH16x45) is included for MSR080R-O-31.75.
· It is not recommended using only top edge part (D.O.C.=30mm) for 4 stages type. If D.O.C. is small, use 1 stage or 2 stage type.
· Deep slotting is not recommended with these cutters.

Spare Parts ➔ E61
Applicable Inserts ➔ E61

Toolholder Dimensions (Metric Bore Dia. Ød)

Part Number	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimensions (mm)																	Drawing	Weight (kg)
					ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Ød3	Ød4	Ød5	Ød6	ØC	ØC1	G		
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	□	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 (ØD=63).
· Arbor bolt (HH12x35) is included for MSR063R / MSR080R.
· It is not recommended using only top edge part (D.O.C.=30mm) for 4 stages type. If D.O.C. is small, use 1 stage or 2 stage type.
· Deep slotting is not recommended with these cutters.

Spare Parts ➔ E61
Applicable Inserts ➔ E61

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
Made to Order / Quoted Item : □
World Express (Shipping: 7-10 Business Days) : ○

MSR-BT50

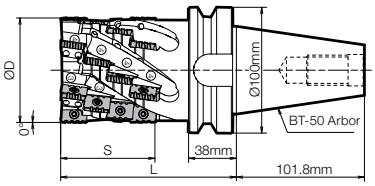


Fig.1

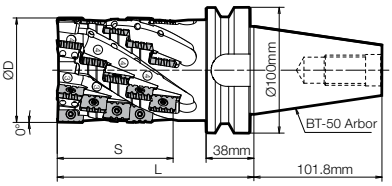
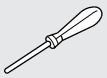


Fig.2

Toolholder Dimensions

Part Number	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimensions (mm)			Rake Angle		Drawing	Weight (kg)
					ØD	L	S	A.R.	R.R.		
MSR 063R-BT50-4	○	16	4	4	63	160	90	+9°	-8°	Fig.1	5.7
063R-BT50-5	○	20		5		180	111			Fig.2	6.2
080R-BT50-4	○	16	4	4	80	160	90			Fig.1	6.9
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

Spare Parts

Part Number	Spare Parts					
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-Seize Compound
						
MSR 063R-○□	SB-60120TR	TT-25L	-	-	-	MP-1
MSR 080R-○□ ~ 315R-○□	For Insert Clamp		MAP-2506	SB-40140TR	DT-15	
			For Shim Clamp			
MSR 063R-BT50-○	SB-60120TR	TT-25L	-	-	-	MP-1
MSR 080R-BT50-○ 100R-BT50-○	For Insert Clamp		MAP-2506	SB-40140TR	DT-15	
			For Shim Clamp			

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Applicable Inserts

Part Number	Applicable Inserts ➡ B18			
	 3-Notch	 4-Notch	 3-Notch / Low Cutting Force	 4-Notch / Low Cutting Force
MSR... MSR...M	APMT 2506○○ER-NB3	APMT 2506○○ER-NB4	APMT 250616ER-NB3P	APMT 250616ER-NB4P
Custom-Ordered Left-hand Cutter	APMT 250616EL-NB3	APMT 250616EL-NB4	-	-

Caution when Installing Notched Inserts

See Page ➡ E52

It is important to install the appropriate notched insert into the correct position. Failure to do so may result in damage to the toolholder body. The appropriate insert is marked on the pocket of the cutter body.

(3) is for APMT2506○○ER-**NB3**
(4) is for APMT2506○○ER-**NB4**

Recommended Cutting Conditions ➡ E62

(No. of Inserts - Example)

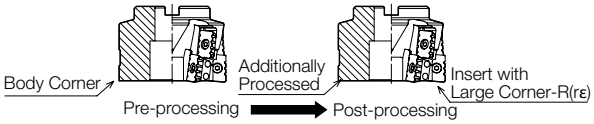
Part Number	No. of Inserts	No. of Flutes	No. of Inserts Notched	
			NB3	NB4
MSR 100R-1	6	6	3	3
100R-2	12		6	6
100R-4	24		12	12

Caution when Installing the Insert with Corner-R(rε) 4.0

When installing the insert with corner-radius 4.0mm, additional modifications for the body will be necessary. Refer to the table below for the recommended modifications.

Insert Corner-R(rε)	Additional Processing Dimension to Body Corner (mm)
4.0	R2.0

* Round- chamfer additional processing is recommended. When applying chamfer, do not cut away too much.



● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grade (Vc sfm)		
	General Purpose **NB3+NB4**	Low Cutting Force **NB3P+NB4P**	MEGACOAT		PVD Coated Carbide
			PR1230	**PR1210**	**PR830**
Carbon Steel	0.008	0.006	★ 330~**490**~660	-	☆ 300~**490**~590
Cast Iron	0.008	0.006	-	★ 330~**490**~660	-
Stainless Steel	Not Recommended				
Non-Ferrous Metals	Not Recommended				

* For MSR, cutting speed should be carefully adjusted depending on the length of toolholder protruding from the end of machine spindle.
· When the protruding length of toolholder is small, set the cutting speed to slightly higher than the recommended cutting conditions.
· When the protruding length of toolholder is large, set the cutting speed to slightly lower than the recommended cutting conditions.

★ :1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (Shouldering)

MSR100R-1

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Carbon Steel	< 3.94	Vc = 590sfm	fz = 0.008ipt	0.79 × 3.15	67.13
	3.94~7.87	Vc = 590sfm	fz = 0.008ipt	0.79 × 1.57	33.56
	≥ 7.91	Vc = 400sfm	fz = 0.008ipt	0.79 × 1.18	16.84
Cast Iron	< 3.94	Vc = 500sfm	fz = 0.008ipt	0.79 × 3.15	56.14
	3.94~7.87	Vc = 500sfm	fz = 0.008ipt	0.79 × 1.57	28.07
	≥ 7.91	Vc = 325sfm	fz = 0.008ipt	0.79 × 1.18	13.91

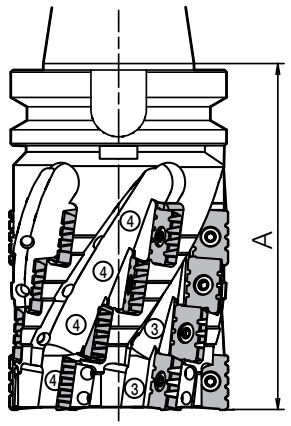
MSR100R-2

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	< 5.12	Vc = 590sfm	fz = 0.008ipt	1.57 × 1.57	67.13
	5.12~9.06	Vc = 590sfm	fz = 0.008ipt	1.57 × 0.79	33.56
	≥ 9.09	Vc = 400sfm	fz = 0.008ipt	1.57 × 0.79	22.46
Carbon Steel	< 5.12	Vc = 500sfm	fz = 0.008ipt	1.57 × 1.57	56.14
	5.12~9.06	Vc = 500sfm	fz = 0.008ipt	1.57 × 0.79	28.07
	≥ 9.09	Vc = 325sfm	fz = 0.008ipt	1.57 × 0.79	18.55

MSR100R-4

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	< 7.09	Vc = 590sfm	fz = 0.008ipt	2.95 × 0.79	63.16
	7.09~11.02	Vc = 590sfm	fz = 0.008ipt	2.95 × 0.39	31.61
	≥ 11.06	Vc = 400sfm	fz = 0.008ipt	2.95 × 0.39	21.05
Carbon Steel	< 7.09	Vc = 500sfm	fz = 0.008ipt	2.95 × 0.79	52.66
	7.09~11.02	Vc = 500sfm	fz = 0.008ipt	2.95 × 0.39	26.30
	≥ 11.06	Vc = 325sfm	fz = 0.008ipt	2.95 × 0.39	17.39

Overhang Length A (in)



◆ Recommended Cutting Conditions (Slotting)

MSR100R-1

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	< 3.94	Vc = 590sfm	fz = 0.008ipt	0.55 × 3.94	58.95
	3.94~7.87	Vc = 500sfm	fz = 0.008ipt	0.28 × 3.94	24.59
	≥ 7.91	Vc = 400sfm	fz = 0.008ipt	0.16 × 3.94	11.23
Carbon Steel	< 3.94	Vc = 500sfm	fz = 0.008ipt	0.28 × 3.94	24.59
	3.94~7.87	Vc = 400sfm	fz = 0.008ipt	0.16 × 3.94	11.23
	≥ 7.91	Vc = 325sfm	fz = 0.008ipt	0.12 × 3.94	6.96

MSR100R-2

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	< 5.12	Vc = 590sfm	fz = 0.008ipt	0.55 × 3.94	58.95
	5.12~9.06	Vc = 500sfm	fz = 0.008ipt	0.28 × 3.94	24.59
	≥ 9.09	Vc = 400sfm	fz = 0.008ipt	0.16 × 3.94	11.23
Carbon Steel	< 5.12	Vc = 500sfm	fz = 0.008ipt	0.28 × 3.94	24.59
	5.12~9.06	Vc = 400sfm	fz = 0.008ipt	0.16 × 3.94	11.23
	≥ 9.09	Vc = 325sfm	fz = 0.008ipt	0.12 × 3.94	6.96

MSR160R-1

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	< 3.94	Vc = 600sfm	fz = 0.008ipt	0.39 × 6.30	56.63
	3.94~7.87	Vc = 500sfm	fz = 0.008ipt	0.20 × 6.30	28.32
	≥ 7.91	Vc = 400sfm	fz = 0.008ipt	0.16 × 6.30	14.83
Carbon Steel	< 3.94	Vc = 500sfm	fz = 0.008ipt	0.20 × 6.30	23.43
	3.94~7.87	Vc = 400sfm	fz = 0.008ipt	0.12 × 6.30	14.04
	≥ 7.91	Vc = 325sfm	fz = 0.008ipt	0.08 × 6.30	6.22

MSR160R-2

Workpiece Material	Overhang Length A (in)	Cutting Conditions		D.O.C. × ae (in)	Chip Removal Rate (in^3/min)
		Cutting Speed (Vc)	Feed Rate (fz)		
Cast Iron	< 5.12	Vc = 600sfm	fz = 0.008ipt	0.39 × 6.30	56.63
	5.12~9.06	Vc = 500sfm	fz = 0.008ipt	0.20 × 6.30	23.43
	≥ 9.09	Vc = 400sfm	fz = 0.008ipt	0.16 × 6.30	14.83
Carbon Steel	< 5.12	Vc = 500sfm	fz = 0.008ipt	0.20 × 6.30	23.43
	5.12~9.06	Vc = 400sfm	fz = 0.008ipt	0.12 × 6.30	11.11
	≥ 9.09	Vc = 325sfm	fz = 0.008ipt	0.08 × 6.30	6.22

*** Slotting is not recommended with 4 stage cutters**

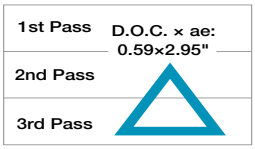
Q & A

Q-1 What cutting conditions are recommended in most cases for MSR?

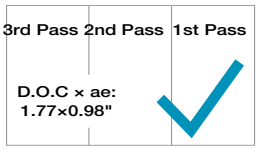
A-1 Vc= 500sfm, fz = 0.008ipt, larger cutting depth and smaller cutting width

In case of MSR100R-2

e.g.) Load Meter 120%



e.g.) Load Meter 90%



Q-2 What is the required equipment for MSR?

A-2 Maximum spindle revolution should be lower than 4000RPM. BT50 or larger.
* The reason it is not recommended for high RPM spindle machines is due to their lower torque value.
* Although MSR works with BT40 shank, maximum available fz is about 0.004ipt.

Q-3 What are the points to remember when using a lower horsepower machine?

A-3 Do not use large size cutters. Ø2.5" or Ø3.0" are recommended
Increase cutting speed and decrease feed rate.
Set up conditions to get the largest available torque by checking torque curve of the machine.
In conditions of Vc = 500sfm, insufficient torque was amiable due to being in high gear.
In this case, use Vc which can exert enough torque, such as Vc = 400sfm.
* Machine torque curve is a priority.

Q-4 How do I deal with an unstable workpiece?

A-4 Decrease feed rate during the initial cut.

* Vibration and workpiece movement are most likely to occur upon the cutters initial entry entry into the cut.

• Effective combinations for maintaining cycle time while reducing the feedrate.
Vc=500sfm, fz=0.008ipt
↓
Vc=650sfm, fz=0.006ipt

Q-5 What tool life can I expect?

A-5 Example:
Chip Weight: 1543lbs/Corner (Result by PR660)
Cutting Time: 90min. (Calculated Value)
Cutting Distance: 213.25ft (Calculated Value)
Metal Removal Rate? ➡ About 17.20lbs Chips Removed per Minute
Tool Life Time = 1543lbs (Chip Weight) **÷ 17.20lbs** (Chip Evacuation Amount per 1min) **= 90min**
Cutting Distance = 90min (Time by the End of Tool Life) **x 28.228ipm** (Table Feed Ratio per 1min) **= 213.25ft**
*** Cutting Vc = 490sfm, D.O.C. x ae: 0.787" x 2.756", Vf = 28.228ipm.**
*** Tool: MSR100R-2 (6 Flutes)**

Q-6 How do I reduce chattering?

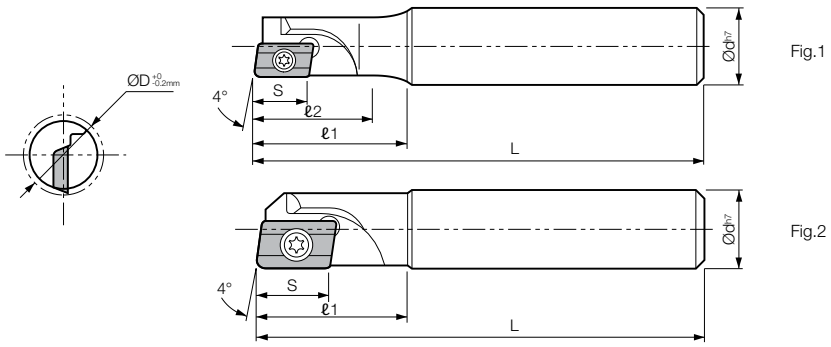
A-6 If chattering occurs, then the following conditions are recommended.
➡Reduce cutting speed and increase feed rate.

In case of Steel
· Vc=250sfm
· fz=0.010ipt

In case of Cast Iron
· Vc=250sfm
· fz=0.014ipt

Shouldering | Slotting | Facing

DMC End Mill



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)						Rake Angle (°)		Drawing	Spare Parts	
			ØD	Ød	L	ℓ1	ℓ2	S	A.R.	R.R.		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

Part Number	Applicable Inserts ➡ B20	
		
DMC8○○(-S○○)	NDCT 831TR NDCT 831FR	NDMM 831ER-SP
DMC0○○	NDCT 032TR NDCT 032FR	NDMM 031ER-SP NDMM 032ER-SP

DMC Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)		Max. D.O.C. (in)		
		Cermet	Carbide			
		TN100M	KW10	Cutting Dia. (ØD)	Slotting (D.O.C.)	Shouldering (D.O.C. x ae)
Carbon Steel	~0.008	★ 390~660	-	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Alloy Steel	~0.008	★ 330~590	-	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Mold Steel	~0.006	★ 330~590	-	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Stainless Steel	~0.006	☆ 390~660	-	~Ø12mm	0.059	0.157 x 0.079
				Ø14mm~	0.079	0.236 x 0.079
Cast Iron	~0.008	-	★ 260~490	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Non-ferrous Metals	~0.008	-	★ 330~980	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118

Use DMC8○○ with Max. D.O.C. = 0.236" for shouldering.

★ :1st Recommendation ☆ : 2nd Recommendation

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

Shouldering | Slotting | Facing

DMC-SX End Mill

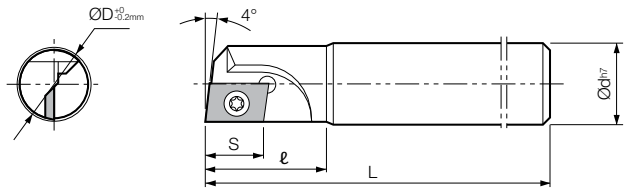


Fig.1

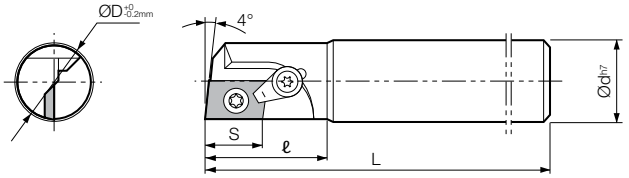


Fig.2

Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm) ØD	Ød	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	○	1	20	20	110	30	14.0	+3°	-3°	Fig.2	CPS-2TR	SB-4065TR	FT-15
325SX	○	2	25	25	120	40	14.0	+3°	-2°	Fig.2	CPS-2TR	SB-4065TR	FT-15
332SX	○	2	32	32	130	40	14.0	+3°	0°	Fig.2	CPS-2TR	SB-4065TR	FT-15
340SX	○	2	40	32	150	40	14.0	+3°	0°	Fig.2	CPS-2TR	SB-4065TR	FT-15
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	14.0	+3°	-2°	Fig.1	-	SB-4065TR	FT-15
332SX-250	○	2	32	32	250	80	14.0	+3°	0°	Fig.1	-	SB-4065TR	FT-15

Applicable Inserts

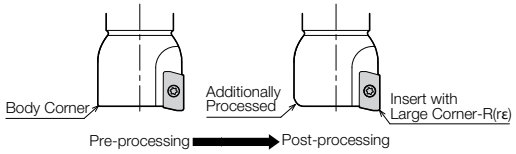
Part Number	Applicable Inserts ➡ B20		
DMC 316SXT 320SX 325SX 332SX 340SX DMC 320SX-200 325SX-220 332SX-250	NDCW 3205TR NDCW 321TR NDCW 322TR NDCW 325TR NDCW 3275TR NDCW 3210TR (NDCW 322TRX) (NDCW 322FRX)	NDCT 322TR NDCT 322FR (NDCT 322TRX)	NDMM 321ER-SP NDMM 322ER-SP

Inserts in parenthese ( ) are applicable, however toolholder will be further out from insert bottom.
(See lower section of ➡ E67

When installing inserts with corner-R(rε) over 2.0mm, grind off the corner part of the tool's insert pocket to avoid contact with the workpiece.
Additional modifications for the body will be necessary. Ref. to the table below for the recommended modifications.
(Additional grind off is not necessary when corner-R(rε) is 0.8mm or less.)

Insert Corner-R(rε)	Additional Processing Dimension to Body Corner (mm)
2.0	R1.0
3.0	R1.6
4.0	R2.0

* Round- chamfer additional processing is recommended.
When applying chamfer, do not cut away too much.



DMC-SX Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm) Cermet TN100M	Carbide KW10	Max. D.O.C. (in) Cutting Dia. (ØD)	Slotting (D.O.C.)	Shouldering (D.O.C. x ae)
Carbon Steel	~0.008	★ 390~660	-	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Alloy Steel	~0.008	★ 330~590	-	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Mold Steel	~0.006	★ 330~590	-	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Stainless Steel	~0.006	☆ 390~660	-	~Ø12mm	0.059	0.157 x 0.079
				Ø14mm~	0.079	0.236 x 0.079
Cast Iron	~0.008	-	★ 260~490	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118
Non-ferrous Metals	~0.008	-	★ 330~980	~Ø12mm	0.079	0.236 x 0.079
				Ø14mm~	0.118	0.354 x 0.118

Use DMC8○○ with Max. D.O.C. = 0.236" for shouldering.

★ :1st Recommendation ☆ : 2nd Recommendation

(Customer Service) 800.823.7284 - Option 1
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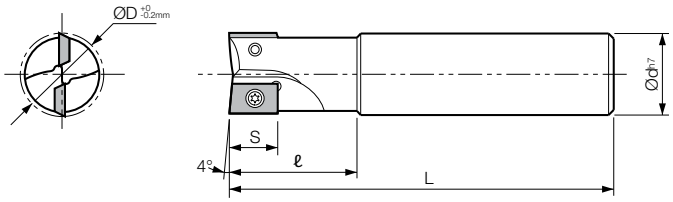
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Shouldering | Slotting | Facing

DMC-H End Mill (High Rake)



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm) ØD	Ød	L	ℓ	S	Rake Angle (°) A.R.	R.R.	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°	-2°	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

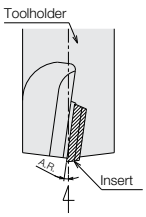
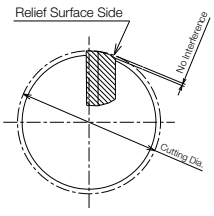
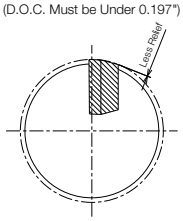
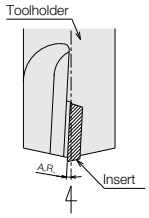
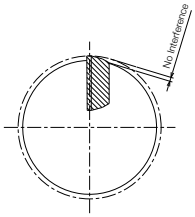
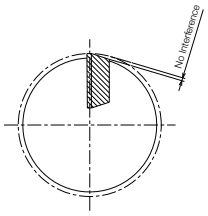
Part Number	Applicable Inserts ➡ B20			Applicable PCD Inserts ➡ B26
				
DMC 316H 320H 325H 332H 340H	NDMM 321ER-SP NDMM 322ER-SP	NDCT 322TRX	NDCW 322TRX NDCW 322FRX	NDCW 3205FRX-NE NDCW 3205FRX (PCD)

DMC-H Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm) Cermet TN100M	Carbide KW10	PCD KPD230 (KPD001)	PCD KPD010	Max. D.O.C. (in) Cutting Dia. (ØD)	Slotting (D.O.C.)	Shouldering (D.O.C. x ae)
Carbon Steel	~0.008	★ 390~660	-	-	-	~Ø20mm	0.157	0.315 x 0.157
						Ø25mm~	0.315	0.551 x 0.236
Alloy Steel	~0.008	★ 330~590	-	-	-	~Ø20mm	0.157	0.315 x 0.157
						Ø25mm~	0.315	0.512 x 0.236
Mold Steel	~0.006	★ 330~590	-	-	-	~Ø20mm	0.118	0.197 x 0.079
						Ø25mm~	0.236	0.394 x 0.118
Stainless Steel	~0.006	☆ 390~660	-	-	-	~Ø20mm	0.118	0.236 x 0.079
						Ø25mm~	0.236	0.512 x 0.118
Cast Iron	~0.008	-	★ 260~490	-	-	~Ø20mm	0.157	0.315 x 0.157
						Ø25mm~	0.236	0.551 x 0.236
Non-ferrous Metals	~0.008	-	★ 330~980	★ 980~1640	☆ 980~1640	~Ø20mm	0.157	0.315 x 0.157
						Ø25mm~	0.236	0.551 x 0.236

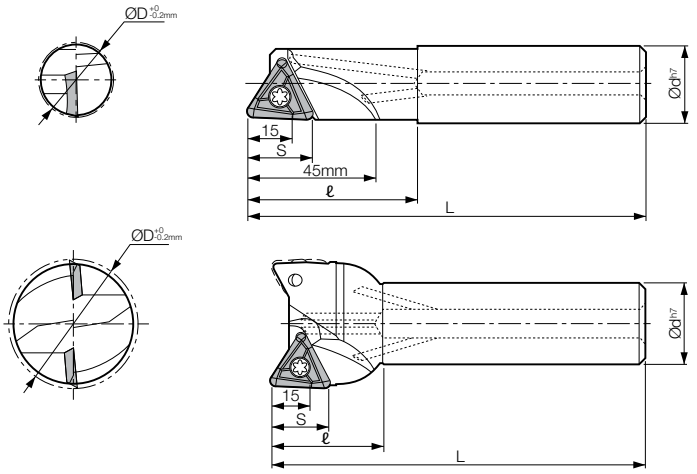
★ :1st Recommendation ☆ : 2nd Recommendation

• Above inserts are also applicable to DMC○○○SX type, but the conventional NDCW1503○○TR type insert is not applicable for this end mill.

Insert Part Number / Toolholder Part Number	NDC...TRX NDCW...(T/F)RX	NDCW...TR NDCT...(T/F)R	Insert Part Number / Toolholder Part Number	NDC...TRX NDCW...(T/F)RX	NDCW...TR NDCT...(T/F)R
DMC-H	No Interference of Relieve Surface	Less Relief (D.O.C. Must be Under 0.197")	DMC-SX	No Interference of Relieve Surface	No Interference of Relieve Surface
					
A	A Direction	A Direction	B	B Direction	B Direction

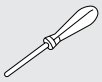
Shouldering | Slotting | Facing

MEAL (Aluminum Machining with Coolant Hole)

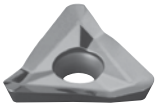


E 90° LEAD

Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)					Rake Angle (°)		Drawing	Spare Parts	
			ØD	Ød	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

Part Number	Applicable Inserts ➡ **B24**
	
MEAL 25-S25	TEMT 250624-AQ
50-S32	

Recommended Cutting Conditions ➡ **E69**

Recommended Cutting Conditions

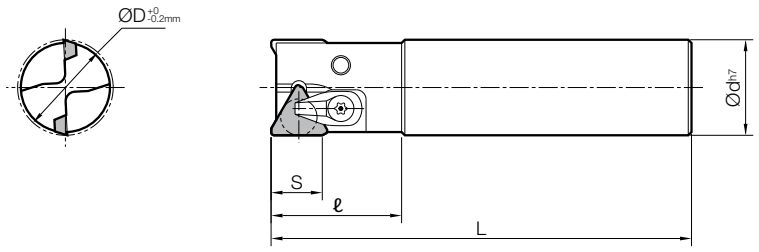
Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)
		Carbide
		KW10
Non-ferrous Metals	0.004~0.012	★ 980~1640

Recommended Max. D.O.C. = 0.591"

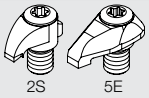
★ :1st Recommendation

Shouldering | Slotting | Facing

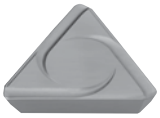
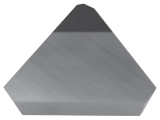
MTPS / MTES End Mill



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)					Rake Angle (°)		Spare Parts	
			ØD	Ød	L	ℓ	S	A.R.	R.R.	Clamp Screw	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

Part Number	Applicable Inserts				
	B12	**B26** (PCD)	**B12**	**B12**	**B26** (PCD)
					
MTPS 216 220	TPG 2205 TPG 221 TPG 222 TPM 221 TPM 222	TPG 2205 TPG 221 TPG 222	-	-	-
MTES 325 330 335	-	-	TEMR 32PTER-H	TEKN 32PTTR TEKN 32PTFR	TEEN 1603PTFR-NE TEEN 1603PTFR

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grade (Vc sfm)							Max. D.O.C. (in)		
		Cermet			MEGACOAT		Carbide	PCD			
		TN60	TN100M	TC60	PR1225	PR1210	KW10	KPD001 (KPD010)	Cutting Dia. (ØD)	Slotting (D.O.C.)	Shouldering (D.O.C. x ae)
Carbon Steel	~0.006	★ 490~660	★ 390~660	☆ 390~660	★ 390~820	-	-	-	~Ø20mm	0.118	0.197 x 0.079
									Ø25mm~	0.236	0.512 x 0.197
Alloy Steel	~0.006	★ 390~660	★ 330~590	☆ 330~590	★ 330~720	-	-	-	~Ø20mm	0.118	0.197 x 0.079
									Ø25mm~	0.236	0.512 x 0.197
Mold Steel	~0.006	★ 390~660	★ 330~590	☆ 330~590	★ 260~590	-	-	-	~Ø20mm	0.118	0.197 x 0.079
									Ø25mm~	0.236	0.512 x 0.197
Stainless Steel	~0.005	-	☆ 390~660	☆ 390~660	★ 390~720	-	-	-	~Ø20mm	0.079	0.197 x 0.079
									Ø25mm~	0.157	0.512 x 0.197
Cast Iron	~0.008	-	-	-	-	★ 330~720	☆ 260~490	-	~Ø20mm	0.118	0.197 x 0.079
									Ø25mm~	0.236	0.512 x 0.197
Non-ferrous Metals	~0.008	-	-	-	-	-	★ 330~980	★ 980~1640	~Ø20mm	0.118	0.197 x 0.079
									Ø25mm~	0.236	0.512 x 0.197

★ :1st Recommendation ☆ : 2nd Recommendation

● : U.S. Stock Standard
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Shouldering | Slotting | Facing

EM End Mill / Extended Length End Mill

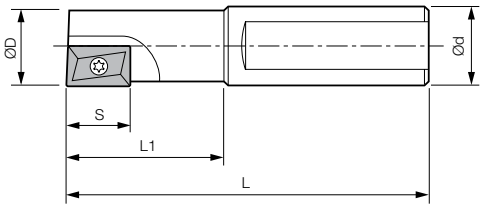


Fig.1

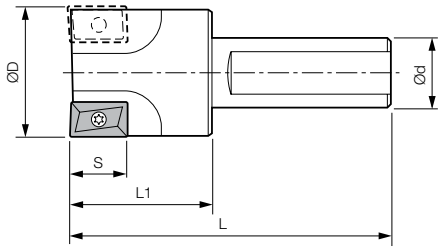


Fig.2

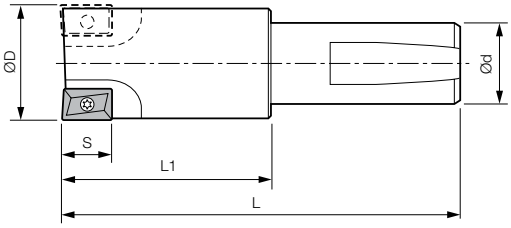
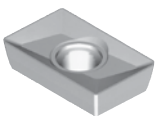


Fig.3

Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (in) ØD	Ød	L	L1	S	Rake Angle (°) A.R.	R.R.	Drawing	Max. Ramping Angle (°)	Spare Parts: Clamp Screw	Spare Parts: Wrench
EM 0437-09	●	1	7/16	1/2	2.78	1.00	0.37	3°	-11°	Fig.1	3°	SCR-04	T7
0500-09	●		1/2						-9°				
0562-09	●		9/16						-7°		8°		
0625-09	●	2	5/8	5/8	2.90			5°	-6°	Fig.2			
0688-09	●		11/16					3°	-5°				
0750-09	●		3/4	3/4	3.03			5°	-2°				
0875-09	●		7/8						-4°			SCR-01	
1000-09-3F	●	3	1					3°	-2°				
EM 0625	●	1	5/8	3/4	2.90	1.00	0.60	5°	14°	Fig.1	3°	SCR-16	T10
0688	●		11/16						-12°				
0750	●		3/4		3.40	1.50			10°				
0813	●		13/16						-8°		8°		
0875	●		7/8						-7°				
0938	●	2	15/16						-5°	Fig.2			
1000	●		1						-5°				
1000-100S	●			1	3.78				-5°				
1125	●		1-1/8	3/4	3.40				-4°			SCR-30	
1250	●		1-1/4						-3°				
1250-3F	●	3		1	3.78				-3°				
1375	●	2	1-3/8	3/4	3.40				-2°				
1500	●		1-1/2						-2°				
1500-3F	●	3		1	3.78				-2°				
EM 1000-2.5	●	2	1	3/4	4.40	2.50	0.60	5°	-5°	Fig.3	8°	SCR-16	T10
1000-3.5	●			1	5.78	3.50			-5°				
1250-2.5	●		1-1/4		4.78	2.50			-3°			SCR-30	

Applicable Inserts

Part Number	Applicable Inserts → B25
	
EM ○○○○-09(-3F)	XPMT 0902..
EM ○○○○ ○○○○-100S ○○○○-3F	XPMT 15T3..
EM ○○○○-2.5	

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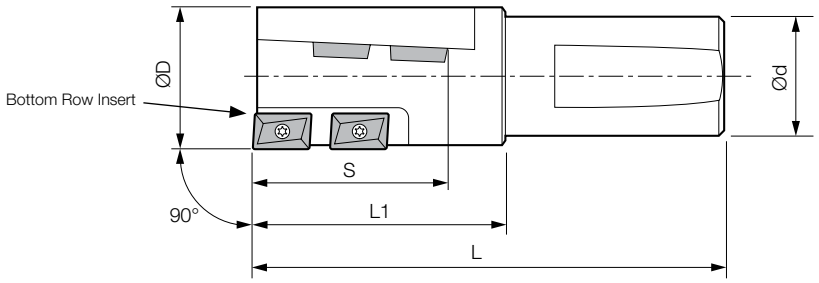
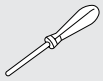
Shouldering | Slotting | Facing

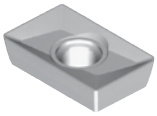
EM-LE Long Edge End Mill



Toolholder Dimensions

Part Number	Stock	No. of Inserts	No. of Flutes	Dimensions (in)					Rake Angle (°)		Spare Parts	
											Clamp Screw	Wrench
				ØD	Ød	L	L1	S	A.R.	R.R.		
EM 1250-1500-LE	●	6	2	1-1/4	1	4.41	2.13	1.50	5°	-3°	SCR-16	T10
1500-2000-LE	●	8		1-1/2	1-1/4	4.91	2.63	2.00	5°	-2°	SCR-30	
2000-2775-LE	●	10		2	1-1/2	6.25	3.50	2.77	5°	0		

Applicable Inserts

Part Number	Applicable Inserts → B25	
		
EM ...-LE	XPMT 15T3.. (Bottom Row)	XPMT 15T308 (Side Row)

Recommended Cutting Conditions (EM, EM-LE, FM, FM-AL, EM-AL)

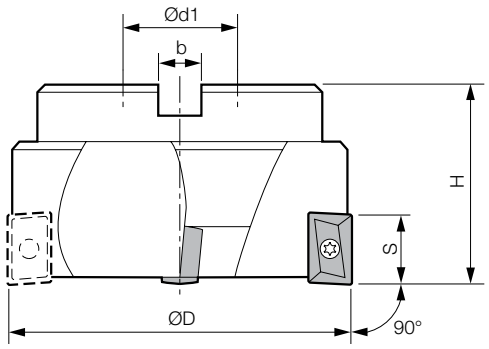
Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)						
		Cermet		MEGACOAT NANO	PVD Coated Carbide			Carbide
		TN100M	TC60	PR1525	PR930	PR905	PR830	KW10
Low Carbon Steel	0.003~0.006	☆ 800~1400	★ 800~1400	★ 400~800	☆ 350~750	-	-	-
Carbon Steel	0.003~0.006	☆ 600~1200	★ 600~1200	★ 300~700	☆ 250~650	-	-	-
Mold Steel	0.003~0.006	☆ 400~700	★ 400~700	★ 250~600	☆ 250~600	-	-	-
Stainless Steel	0.002~0.006	☆ 300~800	☆ 300~800	★ 300~600	☆ 300~500	-	☆ 300~800	-
Cast Iron	0.003~0.008	☆ 400~1200	★ 400~1200	-	-	★ 400~800	-	☆ 300~500
Non-ferrous Metals	0.005~0.007	☆ 1500~1800	☆ 1500~1800	-	-	-	-	★ 2000~4000

* Apply sufficient amount of coolant

★: 1st Recommendation ☆: 2nd Recommendation

Shouldering | Slotting | Facing

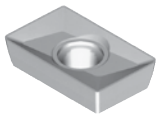
FM-90 Fixed Pocket Face Mill



Toolholder Dimensions

Part Number		Stock	No. of Inserts	Dimensions (in)					Rake Angle (°)		Spare Parts	
				ØD	Ød1	S	b	H	A.R.	R.R.	Clamp Screw	Wrench
FM	2000-90RH	●	2	2.0	3/4	0.6	5/16	1-13/32	+5°	+3°	SCR-30	T10
	3000-90RH	●	3	3.0	1		3/8	1-25/32		+5°		

Applicable Inserts

Part Number	Applicable Inserts ➔ B25
	
FM 2000-90-RH 3000-90-RH	XPMT 15T3..

Recommended Cutting Conditions (EM, EM-LE, FM, FM-AL, EM-AL)

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)						
		Cermet		MEGACOAT NANO	PVD Coated Carbide			Carbide
		TN100M	**TC60**	**PR1525**	**PR930**	**PR905**	**PR830**	**KW10**
Low Carbon Steel	0.003~0.006	☆ 800~1400	★ 800~1400	★ 400~800	☆ 350~750	-	-	-
Carbon Steel	0.003~0.006	☆ 600~1200	★ 600~1200	★ 300~700	☆ 250~650	-	-	-
Mold Steel	0.003~0.006	☆ 400~700	★ 400~700	★ 250~600	☆ 250~600	-	-	-
Stainless Steel	0.002~0.006	☆ 300~800	☆ 300~800	★ 300~600	☆ 300~500	-	☆ 300~800	-
Cast Iron	0.003~0.008	☆ 400~1200	★ 400~1200	-	-	★ 400~800	-	☆ 300~500
Non-ferrous Metals	0.005~0.007	☆ 1500~1800	☆ 1500~1800	-	-	-	-	★ 2000~4000

* Apply sufficient amount of coolant

★: 1st Recommendation ☆: 2nd Recommendation

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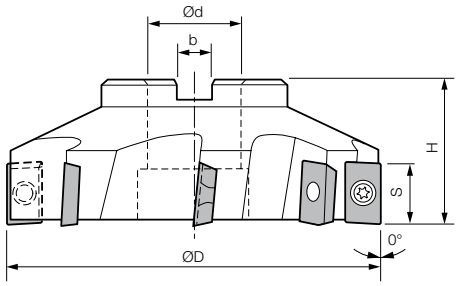
Shouldering | Slotting | Facing

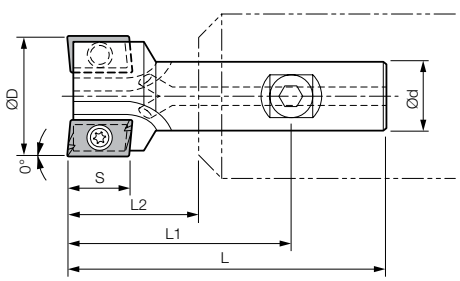
FM-AL Fixed Pocket Face Mill (Aluminum Machining)



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (in) ØD	Ød	H	b	S	Rake Angle (°) A.R.	R.R.	Max. Ramping Angle (°)	Spare Parts: Clamp Screw	Spare Parts: Wrench
FM AL-2500-90-3	●	3	2-1/2	3/4	1.570	3/8	0.64	+5°	-3°	8°	SCR-02	T15
3000-90-AL	●	6	3	1								
4000-90-AL	●	8	4					+5°	+0°			
4000-90-AL-125	●			1-1/4		1/2						
AL-4000-90-5	●	5		1		3/8						
5000-90-AL	●	10	5	1-1/2		5/8						

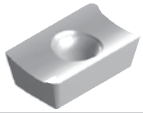
EM-AL Fixed Pocket End Mill (Aluminum Machining)



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (in) ØD	Ød	L	L1	L2	S	Rake Angle (°) A.R.	R.R.	Max. Ramping Angle (°)	Spare Parts: Clamp Screw	Spare Parts: Wrench
EM 0750-AL	●	2	3/4	3/4	3.360	2.351	1.350	0.30	+5°	-8°	8°	SCR-01	T7
0875-AL	●		7/8							-5°			
1000-AL	●		1		3.380	2.365	1.360	0.64		-10°		SCR-02	T15
1250-AL	●		1-1/4							-7°			
1500-AL	●		1-1/2	1	4.000	2.864	1.740			-5°			
2000-AL	●	3	2		4.250	3.110	1.990			-2°			
EM 1000-2.75-AL	●	2	1	3/4	4.780	3.780	2.750	0.64		-10°	8°	SCR-02	T15
1000-3.75-AL	●			1	6.015	4.875	3.750						
1250-2.125-AL	●		1-1/4		4.433	3.293	2.125			-7°			

Applicable Inserts

Part Number	Applicable Inserts ➔ B25
	
FM AL-... ...-AL	APET 1604..
EM ...-AL	

For Chamfering End Mills CM-AL for Aluminum Cutting, See Page ➔ K5

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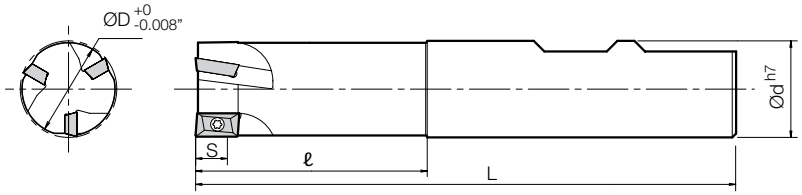
MAP End Mill



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (in)					Rake Angle (°)		Spare Parts	
			ØD	Ød	L	ℓ	S	A.R.	R.R.	Clamp Screw	Wrench
MAP 100R10-S100	●	3	1.000	1.000	3.78	1.417	0.354	+9°	+10°	SB-2560TR	DT-8
100R16-S100	●	2					0.590		+13°	SB-4085TR	DT-15

Applicable Inserts

Part Number	Applicable Inserts → **B18**
	
MAP 100R10-S100	APKT 1003..
100R16-S100	APKT 1604..

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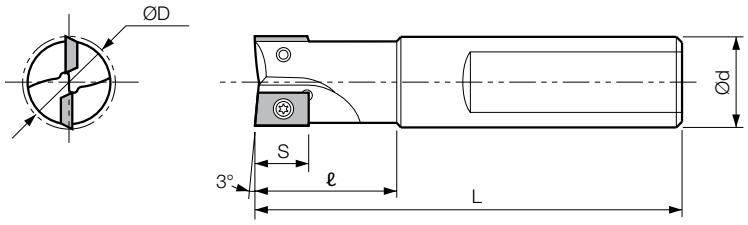
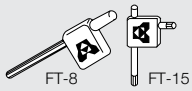
CEM End Mill



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (in)					Rake Angle (°)		Spare Parts	
										Clamp Screw	Wrench
			ØD	Ød	L	ℓ	S	A.R.	R.R.		 FT-8 FT-15
CEM 0375-1W	●	1	0.375	0.375	3.08	0.75	0.374	+3°	-6°	SB-2545TR	FT-8
0500-1W	●	1	0.500	0.500		1.00			-5°		
0625-1W	●	1	0.625	0.625		1.18	0.591		-4°	SB-4STR	FT-15
0750-1W	●	1	0.750	0.750	3.21				-3°		
CEM 0625-2W	●	2	0.625	0.625	3.08	1.18	0.374	+8°	-4°	SB-2545TR	FT-8
0750-2W	●	2	0.750	0.750	3.21		0.500		-3°	SB-3060TR	FT-10
1000-2W	●	2	1.000	1.000	3.85	1.57	0.591	+3°	-2°	SB-4STR	FT-15
1000-2W-7.5	●	2			7.50						
CEM 1000-3W	●	3	1.000	1.000	3.85	1.57	0.500	+8°	-5°	SB-3060TR	FT-10
1250-3W	●	3	1.250	1.250			0.591	+3°	-3°	SB-4STR	FT-15
CEM 1500-4W	●	4	1.500	1.250	3.85	1.57	0.591	+6°	0°	SB-4STR	FT-15

Applicable Inserts

Part Number	Applicable Inserts ➡ B20		
			
CEM 0375-1W	NDCT 831FR 831R-B 832R-B	-	NDMM 831ER-SP
0500-1W			
0625-2W			
CEM 0750-2W	NDCT 032TR 032FR	NDCW 032TR	NDMM 031ER-SP 032ER-SP
1000-3W			
CEM 0625-1W	NDCT 322FR 322FR-B	NDCW 322TRX 322FRX	NDMM 321ER-SP 322ER-SP
0750-1W			
1000-2W			
1000-2W-7.5			
1250-3W			
1500-4W			

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

HIGH FEED MILLNG

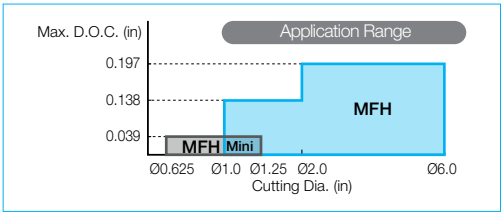
F1 - F25

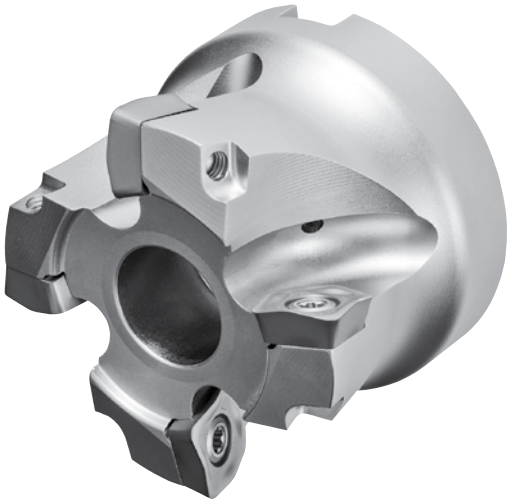
HIGH FEED MILLING		F2 - F25
MFH	MFH-RAPTOR	F2
MFH	MFH-RAPTOR MINI	F13
MFH	MFH-RAPTOR MICRO	F20

MFH-RAPTOR

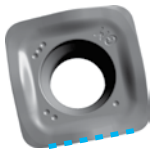
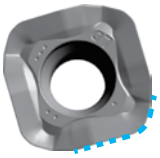
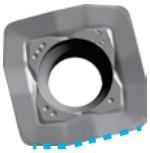
(Cutter Dia. Ø1.000" ~ Ø6.000")
(Cutter Dia. Ø25 ~ Ø160)

Anti-vibration Design for Increased Chip Evacuation and Shortened Cutting Times



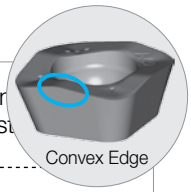


1 3 Different Insert Designs Offer a Variety of Machining Options

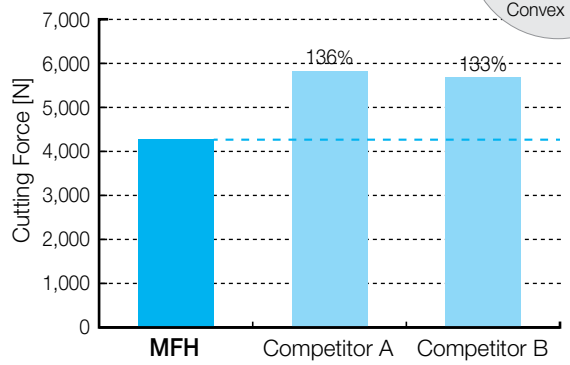
	GM (General Milling)	LD (Large D.O.C.)	FL (Wiper Edge)
Shape			
Applications	**1st Choice for General Purpose** Multiple Metalworking Processes	**1st Choice for Large D.O.C.** MAX D.O.C. = 0.197" (SOMT14) MAX D.O.C. = 0.138" (SOMT10) *Available for Scale Removal*	**Wiper Edge** Roughing and Finishing Even in Low Horsepower Machining Centers

2 Reduced Chattering with Convex Cutting Edge Design

Reduces Cutting Forces at Initial Impact with a Convex Helical Edge Design



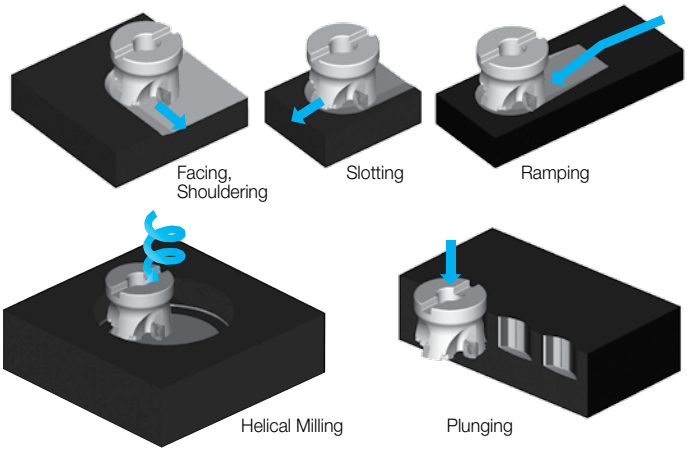
Width of cut ae is half of cutter diameter when cutting forces at initial contact are the greatest



Vc = 490 sfm, fz = 0.059 ipt, D.O.C. x ae = 0.059" x 1.240"
1049, Dry, Cutter Dia.Ø2.5"

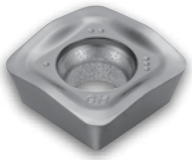
Resultant Force Shown

3 Wide Application Range for Multiple Metalworking Processes



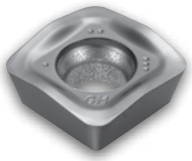
* **GM** chipbreaker is available for all of the above applications.
* **LD** and **FL** chipbreakers are not available for helical milling, plunging and contouring of rising wall.
(Refer to Page ➡ **F12**)

4 Fracture Resistant Grades for Stable Machining of Difficult-to-cut Material



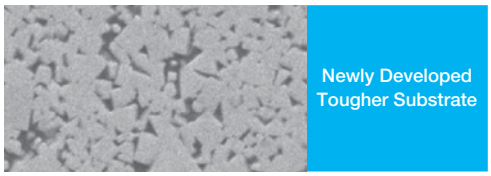
CA6535

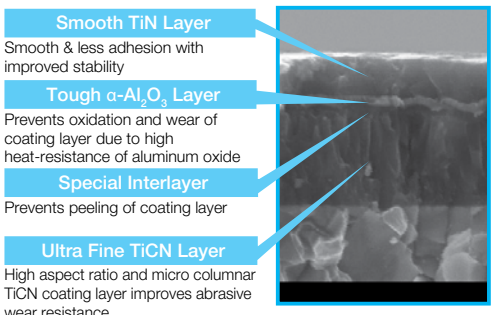
- For Ni-base heat resistant alloy and martensitic stainless steel
- High heat resistance and wear resistance with CVD coating
- Improved stability due to thin film coating technology

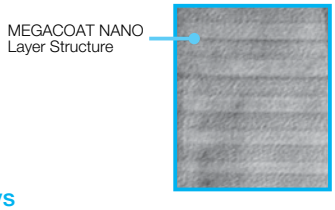


PR1535

- For titanium alloy and precipitation hardened stainless steel
- Stabilized milling operation and long tool life with Kyocera's MEGACOAT NANO coating technology
- Improved stability due to thin film coating technology

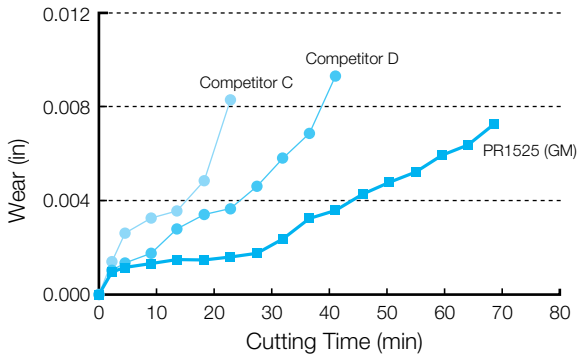






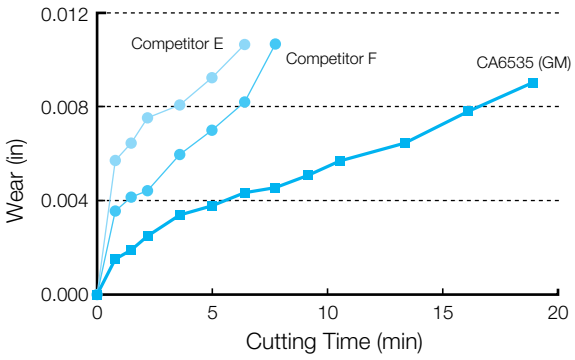
Wear Resistance Comparison

Alloy Tool Steel (D2)



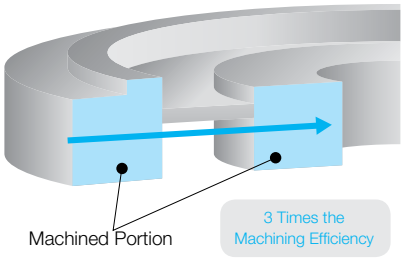
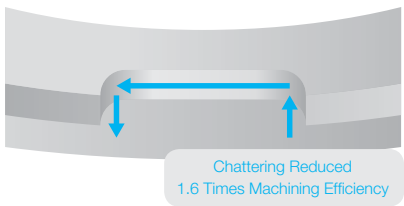
<Cutting Conditions> Vc = 490 sfm, fz = 0.059 ipt, D.O.C. × ae = 0.039" × 0.630", Dry

Ni-Base Heat-Resistant Alloys



<Cutting Conditions> Vc = 98 sfm, fz = 0.0315 ipt, D.O.C. × ae =0.039" × 1.575", Wet

Case Studies

SFVAF22B (Forged Alloy Steel)		304 (Stainless Steell)	
• Turbine Parts • Vc = 520 sfm • fz = 0.0461 ipt • D.O.C. × ae = 0.059" × max. 6.299" • Dry • MFH160R-14-8T (8 inserts) • SOMT140520ER-GM (PR1525)		• Clutch • Vc = 390 sfm • fz = 0.0472 ipt • D.O.C. × ae= 0.039" × 0.787" • Dry • MFH32-S32-10-2T (2 inserts) • SOMT100420ER-GM (PR1535)	
PR1525	**Chip Removal = 43.94in³/min**	**PR1535**	**Chip Removal = 3.54in³/min**
Competitor G	Chip Removal = 14.65in³/min	Competitor H	Chip Removal = 2.20in³/min
Small machining noise even at 3 times higher feed rate. Good edge condition without chipping and stable machining. (User Evaluation)		Competitor H caused chattering but MFH realized stable machining. Good edge condition and long tool life. (User Evaluation)	

MFH Face Mill (Inch Size)

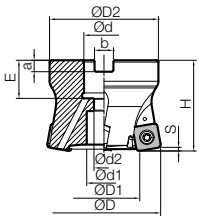


Fig.1

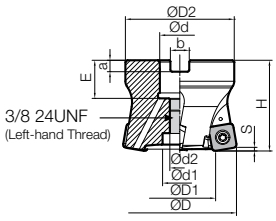


Fig.2

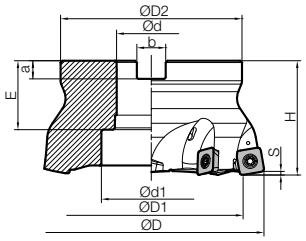


Fig.3

Toolholder Dimensions with SOMT10 Inserts (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)														Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
			ØD	ØD1			ØD2	Ød	Ød1	Ød2	H	E	a	b	S	*S_L	A.R.	R.R.				
				GM	LD	FL																
MFH 2000R-10-4T	●	4	2.000	1.331	1.510	1.469	1.750	0.750	0.669	0.433	1.969	0.947	0.187	0.313			+10°	-5°			0.4	10,000
2000R-10-5T	●	5	2.000	1.331	1.510	1.469	1.750	0.750	0.669	0.433	1.969	0.947	0.187	0.313			+10°	-5°			0.4	10,000
2500R-10-5T	●	5	2.500	1.831	2.010	1.969	2.250	0.750	0.669	0.433	1.969	0.750	0.187	0.313	0.059	0.138	+10°	-4°	Yes	Fig.1	0.7	8,800
2500R-10-6T	●	6	2.500	1.831	2.010	1.969	2.250	0.750	0.669	0.433	1.969	0.750	0.187	0.313			+10°	-4°			0.7	8,800
3000R-10-7T	●	7	3.000	2.331	2.510	2.469	2.750	1.000	0.866	0.551	2.480	1.063	0.236	0.382			+10°	-4°			1.3	7,600

Toolholder Dimensions with SOMT14 Inserts (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)														Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
			ØD	ØD1			ØD2	Ød	Ød1	Ød2	H	E	a	b	S	*S_L	A.R.	R.R.				
				GM	LD	FL																
NEW **MFH 2000R-14-4T**	●	4	2.000	1.094	1.330	1.291	1.750	0.750	0.500	3/8 24UNF	1.969	0.827	0.187	0.313			+10°	-10°	Yes	Fig.2	0.4	8,800
2500R-14-4T	●	4	2.500	1.594	1.830	1.791	2.250	0.750	0.669	0.433	1.969	0.750	0.187	0.313			+10°	-10°			0.6	7,400
2500R-14-5T	●	5	2.500	1.594	1.830	1.791	2.250	0.750	0.669	0.433	1.969	0.750	0.187	0.313			+10°	-10°			0.6	7,400
3000R-14-5T	●	5	3.000	2.094	2.330	2.291	2.750	1.000	0.866	0.551	2.480	1.063	0.236	0.382			+10°	-9°			1.2	6,400
3000R-14-6T	●	6	3.000	2.094	2.330	2.291	2.750	1.000	0.866	0.551	2.480	1.063	0.236	0.382	0.079	0.197	+10°	-9°	Yes	Fig.1	1.2	6,400
4000R-14-6T	●	6	4.000	3.094	3.330	3.291	3.750	1.500	1.299	0.866	2.480	1.181	0.394	0.626			+10°	-7°			2.3	5,600
4000R-14-7T	●	7	4.000	3.094	3.330	3.291	3.750	1.500	1.299	0.866	2.480	1.181	0.394	0.626			+10°	-7°			2.3	5,600
5000R-14-7T	●	7	5.000	4.094	4.330	4.291	3.750	1.500	2.047	-	2.480	1.496	0.394	0.626			+10°	-7°	Yes	Fig.3	2.9	4,800
6000R-14-8T	●	8	6.000	5.094	5.330	5.291	4.880	2.000	2.835	-	2.480	1.496	0.433	0.752			+10°	-6°	No		4.5	4,200

* Refer to LD dimensions in figure below

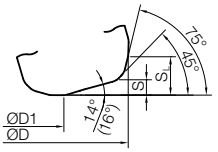
Spare Parts and Applicable Inserts (Inch Size)

Part Number	Spare Parts							Applicable Inserts ➡ B17, F10
	Clamp Screw	Wrench		Pre-Set Torque Wrench*1	Anti-seize Compound	Mounting Bolt	Mounting Screw	
		DTPM	TTP					
				NEW 				
MFH 2000R-10-4T	SB-4090TRPN	DTPM-15 Recommended Torque for Insert Clamp 3.5 N·m		PST-IP15	MP-1	HH3/8-1.25(H)	-	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
2000R-10-5T						HH3/8-1.25(H)		
2500R-10-5T						HH3/8-1.25(H)		
2500R-10-6T						HH3/8-1.25(H)		
3000R-10-7T						HH1/2-1.25(H)		
MFH 2000R-14-4T	SB-50120TRP	TTP-20 Recommended Torque for Insert Clamp 4.5 N·m		PST-IP20	MP-1	-	XNS610*2	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL
2500R-14-4T						HH3/8-1.25(H)	-	
2500R-14-5T						HH3/8-1.25(H)		
3000R-14-5T						HH1/2-1.25(H)		
3000R-14-6T						HH1/2-1.25(H)		
4000R-14-6T						-		
4000R-14-7T						-		
5000R-14-7T						-		
6000R-14-8T						-		

(H) Optional coolant thru bolt available.

Recommended Cutting Conditions ➡ **F11**

LD Chipbreaker Cutting Edge Dimensions



Angle in ( ) is for SOMT14 Type

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

*1 For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force. Pre-Set Torque Wrench sold separately.

*2 Differential screw (3/8-24UNF)

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com
U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

MFH Face Mill (Metric Size)

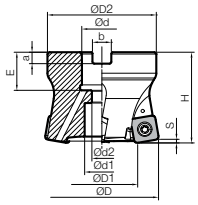


Fig.1

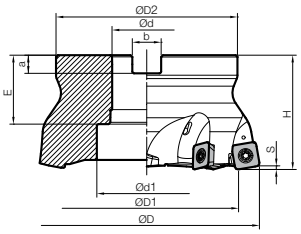


Fig.2

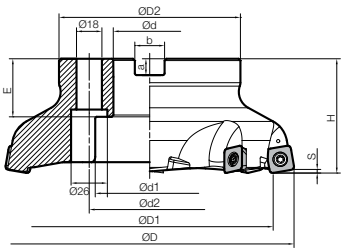


Fig.3

Toolholder Dimensions with SOMT10 Inserts (Metric Size)

	Part Number	Stock	No. of Inserts	Dimensions (mm)															Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
				ØD	ØD1			ØD2	Ød	Ød1	Ød2	H	E	a	b	S	*1S_L		A.R.	R.R.				
					GM	LD	FL																	
Inch Bore Dia.	**MFH 050R-10-4T**	○	4	50	33	37.5	36.5	47	0.875"	19	11	50	0.748"	0.197"	0.331"	1.5 *2(1.2)	3.5		+10°	-5°	Yes	Fig.1	0.4	10,000
	050R-10-5T	○	5	50	33	37.5	36.5	47	0.875"	19	11	50	0.748"	0.197"	0.331"				+10°	-5°			0.4	10,000
	063R-10-5T	○	5	63	46	50.5	49.5	60	0.875"	19	11	50	0.748"	0.197"	0.331"				+10°	-4°			0.7	8,800
	063R-10-6T	○	6	63	46	50.5	49.5	60	0.875"	19	11	50	0.748"	0.197"	0.331"				+10°	-4°			0.7	8,800
	080R-10-7T	○	7	80	63	67.5	66.5	76	1.250"	26	17	63	1.260"	0.315"	0.500"				+10°	-4°			1.3	7,600
Metric Bore Dia.	**MFH 050R-10-4T-M**	○	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 *2(1.2)	3.5		+10°	-5°	Yes	Fig.1	0.4	10,000
	050R-10-5T-M	○	5	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4				+10°	-5°			0.4	10,000
	063R-10-5T-22M	○	5	63	46	50.5	49.5	60	22	19	11	50	21	6.3	10.4				+10°	-4°			0.7	8,800
	063R-10-6T-22M	○	6	63	46	50.5	49.5	60	22	19	11	50	21	6.3	10.4				+10°	-4°			0.7	8,800
	063R-10-5T-27M	○	5	63	46	50.5	49.5	60	27	20	13	50	24	7.0	12.4				+10°	-4°			0.7	8,800
	063R-10-6T-27M	○	6	63	46	50.5	49.5	60	27	20	13	50	24	7.0	12.4				+10°	-4°			0.7	8,800
	080R-10-7T-M	○	7	80	63	67.5	66.5	76	27	20	13	63	24	7.0	12.4				+10°	-4°			1.6	7,600

Toolholder Dimensions with SOMT14 Inserts (Metric Size)

	Part Number	Stock	No. of Inserts	Dimensions (mm)															Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
				ØD	ØD1			ØD2	Ød	Ød1	Ød2	H	E	a	b	S	*1S_L		A.R.	R.R.				
					GM	LD	FL																	
Inch Bore Dia.	**MFH 063R-14-4T**	○	4	63	40	46	45	60	0.875"	19	11	50	0.748"	0.197"	0.331"				+10°	-10°		Fig.1	0.6	7,400
	063R-14-5T	○	5	63	40	46	45	60	0.875"	19	11	50	0.748"	0.197"	0.331"				+10°	-10°		Fig.1	0.6	7,400
	080R-14-5T	○	5	80	57	63	62	76	1.250"	26	17	63	1.260"	0.315"	0.500"				+10°	-8°		Fig.1	1.3	6,400
	080R-14-6T	○	6	80	57	63	62	76	1.250"	26	17	63	1.260"	0.315"	0.500"	2	5		+10°	-8°	Yes	Fig.1	1.3	6,400
	100R-14-6T	○	6	100	77	83	82	96	1.250"	26	17	63	1.260"	0.315"	0.500"				+10°	-7°		Fig.1	2.4	5,600
	100R-14-7T	○	7	100	77	83	82	96	1.250"	26	17	63	1.260"	0.315"	0.500"				+10°	-7°		Fig.1	2.4	5,600
	125R-14-7T	○	7	125	102	108	107	100	1.500"	55	-	63	1.496"	0.394"	0.625"				+10°	-7°		Fig.2	2.9	4,800
	160R-14-8T	○	8	160	137	143	142	100	2.000"	72	-	63	1.496"	0.433"	0.750"	2	5		+10°	-6°	No	Fig.2	3.9	4,200
Metric Bore Dia.	**MFH 063R-14-4T-22M**	○	4	63	40	46	45	60	22	19	11.0	50	21	6.3	10.4				+10°	-10°		Fig.1	0.6	7,400
	063R-14-5T-22M	○	5	63	40	46	45	60	22	19	11.0	50	21	6.3	10.4				+10°	-10°		Fig.1	0.6	7,400
	063R-14-4T-27M	○	4	63	40	46	45	60	27	20	13.0	50	24	7	12.4				+10°	-10°		Fig.1	0.6	7,400
	063R-14-5T-27M	○	5	63	40	46	45	60	27	20	13.0	50	24	7	12.4				+10°	-10°		Fig.1	0.6	7,400
	080R-14-5T-M	○	5	80	57	63	62	76	27	20	13.0	63	24	7	12.4	2	5		+10°	-8°	Yes	Fig.1	1.4	6,400
	080R-14-6T-M	○	6	80	57	63	62	76	27	20	13.0	63	24	7	12.4				+10°	-8°		Fig.1	1.4	6,400
	100R-14-6T-M	○	6	100	77	83	82	96	32	26	17.0	63	28	8	14.4				+10°	-7°		Fig.2	2.4	5,600
	100R-14-7T-M	○	7	100	77	83	82	96	32	26	17.0	63	28	8	14.4				+10°	-7°		Fig.2	2.4	5,600
	125R-14-7T-M	○	7	125	102	108	107	100	40	55	-	63	33	9	16.4				+10°	-7°		Fig.2	2.8	4,800
	160R-14-8T-M	○	8	160	137	143	142	100	40	68	66.7	63	32	9	16.4	2	5		+10°	-6°	No	Fig.3	3.7	4,200

*1 Refer to LD cutting edge dimensions in figure on page ➡ **F6**
*2 Dimension in ( ) is when mounting LD

Spare Parts and Applicable Inserts ➡ **F6**

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

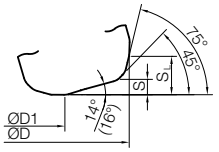
● Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Pre-Set Torque Wrench*	Spare Parts: Anti-seize Compound	Spare Parts: Arbor Bolt	Applicable Inserts ➡ B17, F10
		DTPM  TTP 				
MFH 050R-10-...	SB-4090TRPN	DTPM-15	PST-IP15	MP-1	HH10X30	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
050R-10-...-M						
063R-10-...						
063R-10-...-22M	Recommended Torque for Insert Clamp 3.5 N·m					
063R-10-...-27M					HH12X35	
080R-10-...					HH16X40	
080R-10-...-M					HH12X35	
063R-14-...	SB-50120TRP	TTP-20	PST-IP20	MP-1	HH10X30	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL
063R-14-...-22M						
063R-14-...-27M					HH12X35	
080R-14-...					HH16X40	
080R-14-...-M	Recommended Torque for Insert Clamp 4.5 N·m				HH12X35	
100R-14-...					HH16X40	
100R-14-...-M					-	
125R-14-...					-	
160R-14-...					-	

Recommended Cutting Conditions ➡ **F11**

Holders on Page ➡ **F5**

LD Chipbreaker
Cutting Edge Dimensions



Angle in ( ) is for SOMT14 Type

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

 **Coat Anti-Seize Compound (MP-1)** thinly on portion of taper and thread prior to installation.

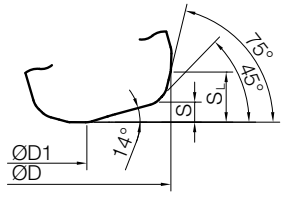
*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

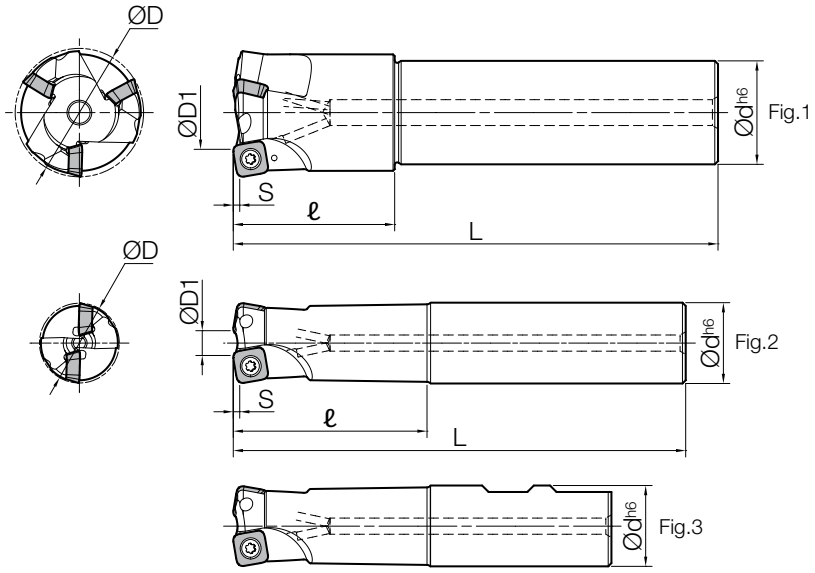
F HIGH FEED

MFH End Mill (Inch Size)

Standard (Cylindrical)

LD Chipbreaker
Cutting Edge Dimensions





Toolholder Dimensions with SOMT10 Inserts (Inch Size)

Part Number		Stock	No. of Inserts	Dimensions (in)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
				ØD	ØD1			Ød	L	ℓ	S	S_L	A.R.	R.R.				
					GM	LD	FL											
Standard Shank (Weldon)	MFH 1000-W100-10-2T	●	2	1.000	0.331	0.508	0.469	1.000	5.500	3.173	0.059	0.138	+10°	-5°	Yes	Fig.3	0.4	17,000
	1250-W125-10-2T	●	2	1.250	0.581	0.758	0.719	1.250	6.000	2.750			+10°	-5°			0.8	14,000
	1250-W125-10-3T	●	3	1.250	0.581	0.758	0.719	1.250	6.000	2.750			+10°	-5°			0.8	14,000
	1500-W150-10-3T	●	3	1.500	0.831	1.008	0.969	1.500	6.000	2.000			+10°	-5°			0.8	11,500
	1500-W150-10-4T	●	4	1.500	0.831	1.008	0.969	1.500	6.000	2.000			+10°	-5°			0.8	11,500
Long Shank (Cylindrical)	MFH 1000-S100-10-2T-8	●	2	1.000	0.331	0.508	0.469	1.000	8.000	4.750	0.059	0.138	+10°	-5°	Yes	Fig.2	0.8	17,000
	1250-S125-10-2T-8	●	2	1.250	0.581	0.758	0.719	1.250	8.000	4.750			+10°	-5°			0.8	14,000
	1500-S125-10-4T10	●	4	1.500	0.831	1.008	0.969	1.250	10.000	2.000			+10°	-5°		Fig.1	0.8	11,500

Spare Parts and Applicable Inserts (Inch Size)

Part Number	Spare Parts				Applicable Inserts
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	B17, F10
					
MFH...-10-...	SB-4075TRP Recommended Torque for Insert Clamp 3.5 N·m	DTPM-15	PST-IP15	MP-1	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL

Recommended Cutting Conditions ➡ **F11**

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

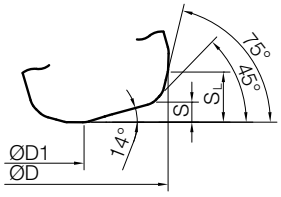
*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

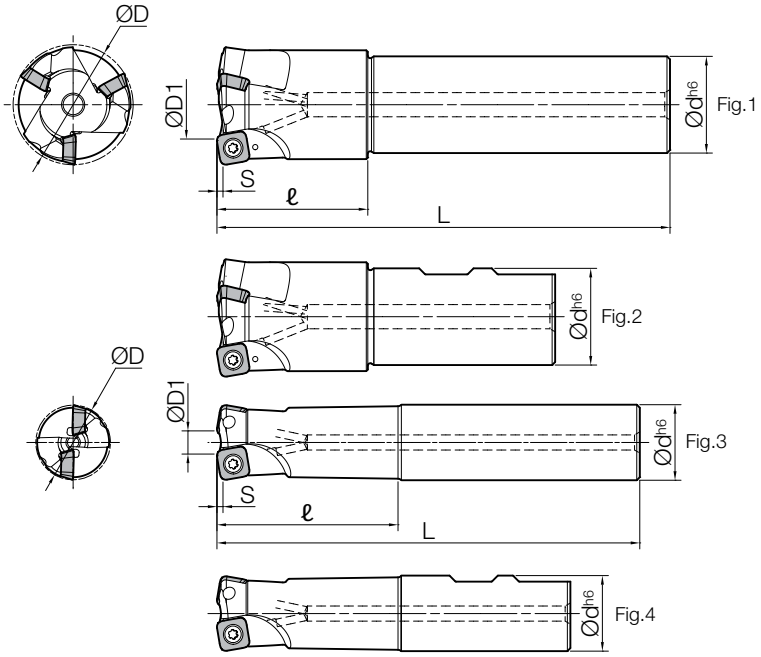
● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

MFH End Mill (Metric Size)

Standard (Cylindrical)

LD Chipbreaker
Cutting Edge Dimensions





Toolholder Dimensions with SOMT10 Inserts (Metric Size)

Part Number		Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
				ØD	ØD1			Ød	L	ℓ	S	S_L	A.R.	R.R.				
					GM	LD	FL											
Standard Shank (Cylindrical)	MFH 25-S25-10-2T	○	2	25	8	12.5	11.5	25	140	60	1.5 *(1.2)	3.5	+10°	-5°	Yes	Fig.3	0.4	17,000
	28-S25-10-2T	○	2	28	11	15.5	14.5	25	140	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	32	15	19.5	18.5	32	150	70						Fig.3	0.8	14,000
	35-S32-10-2T	○	2	35	18	22.5	21.5	32	150	50						Fig.1	0.8	13,000
	35-S32-10-3T	○	3	35	18	22.5	21.5	32	150	50						Fig.1	0.8	13,000
	40-S32-10-3T	○	3	40	23	27.5	26.5	32	150	50						Fig.1	0.9	11,500
	40-S32-10-4T	○	4	40	23	27.5	26.5	32	150	50						Fig.1	0.9	11,500
Standard Shank (Weldon)	MFH 25-W25-10-2T	○	2	25	8	12.5	11.5	25	117	60	1.5 *(1.2)	3.5	+10°	-5°	Yes	Fig.4	0.4	17,000
	32-W32-10-3T	○	3	32	15	19.5	18.5	32	131	70						Fig.4	0.7	14,000
	40-W32-10-3T	○	3	40	23	27.5	26.5	32	112	50						Fig.2	0.7	11,500
	40-W32-10-4T	○	4	40	23	27.5	26.5	32	112	50						Fig.2	0.7	11,500
Long Shank (Cylindrical)	MFH 25-S25-10-2T-200	○	2	25	8	12.5	11.5	25	200	120	1.5 *(1.2)	3.5	+10°	-5°	Yes	Fig.3	0.6	17,000
	28-S25-10-2T-200	○	2	28	11	15.5	14.5	25	200	40						Fig.1	0.7	15,500
	32-S32-10-2T-200	○	2	32	15	19.5	18.5	32	200	120						Fig.3	1.0	14,000
	35-S32-10-2T-200	○	2	35	18	22.5	21.5	32	200	50						Fig.1	1.4	13,000
	40-S32-10-4T-250	○	4	40	23	27.5	26.5	32	250	50						Fig.1	1.5	11,500
Extra Long Shank (Cylindrical)	MFH 25-S25-10-2T-300	○	2	25	8	12.5	11.5	25	300	180	1.5 *(1.2)	3.5	+10°	-5°	Yes	Fig.3	1.0	17,000
	28-S25-10-2T-300	○	2	28	11	15.5	14.5	25	300	40						Fig.1	1.1	15,500
	32-S32-10-2T-300	○	2	32	15	19.5	18.5	32	300	180						Fig.3	1.6	14,000
	35-S32-10-2T-300	○	2	35	18	22.5	21.5	32	300	50						Fig.1	1.7	13,000
	40-S32-10-4T-300	○	4	40	23	27.5	26.5	32	300	50						Fig.1	1.8	11,500

* Dimension in ( ) is when mounting LD

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts				Applicable Inserts
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	
					➡ B17, F10
MFH...-10-...	SB-4075TRP	DTPM-15	PST-IP15	MP-1	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
	Recommended Torque for Insert Clamp 3.5 N·m				

Recommended Cutting Conditions ➡ F11

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

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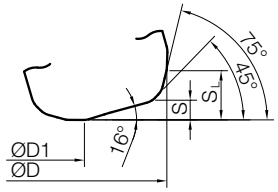
U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

MFH End Mill (Metric Size)

LD Chipbreaker
Cutting Edge Dimensions



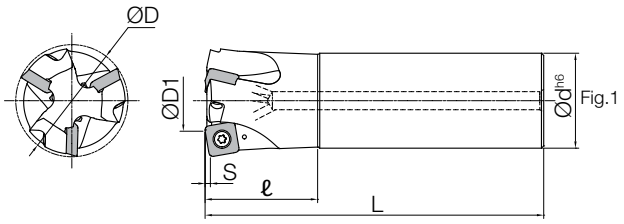


Fig.1

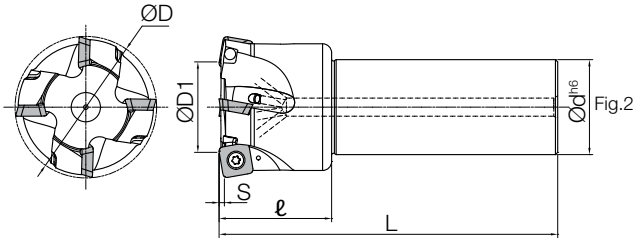


Fig.2

Toolholder Dimensions with SOMT14 Inserts (Metric Size)

Part Number		Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
				ØD	ØD1			Ød	L	ℓ	S	S_L	A.R.	R.R.				
					GM	LD	FL											
MFH	**50-S42-14-3T**	○	3	50	27	33	32	42	150	50	2	5	+10°	-10°	Yes	Fig.1	1.4	8,800
	63-S42-14-4T	○	4	63	40	46	45	42	150	50			+10°	-10°		Fig.2	1.7	7,400
	80-S42-14-5T	○	5	80	57	63	62	42	150	50			+10°	-8°		Fig.2	2.3	6,400

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts				Applicable Inserts ➡ **B17, F10**
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	
					
MFH...-14-...	SB-50120TRP	TTP-20	PST-IP20	MP-1	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL
	Recommended Torque for Insert Clamp 4.5 N·m				

Recommended Cutting Conditions ➡ **F11**

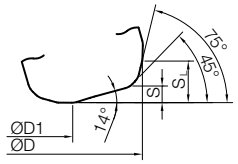
Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

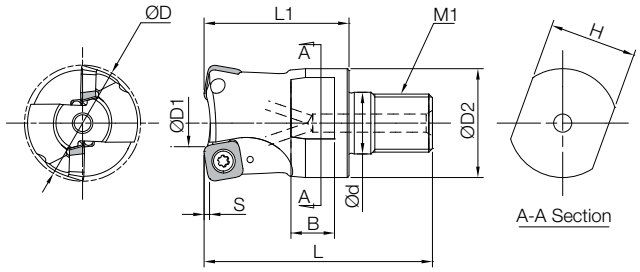
Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

MFH Modular End Mill (Metric Size)

LD Chipbreaker
Cutting Edge Dimensions





Toolholder Dimensions (Metric Size)

Part Number	Stock	No. of Inserts	Dimensions (mm)													Rake Angle (°)		Coolant Hole	Max RPM
			ØD	ØD1			ØD2	Ød	L	L1	M1	H	B	S	S_L	A.R.	R.R.		
				GM	LD	FL													
MFH 25-M12-10-2T	○	2	25	8	12.5	11.5	23	12.5	57	35	M12×P1.75	19	10	1.5 *(1.2)	3.5	+10°	-5°	Yes	17,000
28-M12-10-2T	○	2	28	11	15.5	14.5	23	12.5	57	35	M12×P1.75	19	10						15,500
32-M16-10-2T	○	2	32	15	19.5	18.5	30	17.0	63	40	M16×P2.0	24	12						14,000
32-M16-10-3T	○	3	32	15	19.5	18.5	30	17.0	63	40	M16×P2.0	24	12						14,000
35-M16-10-2T	○	2	35	18	22.5	21.5	30	17.0	63	40	M16×P2.0	24	12						13,000
35-M16-10-3T	○	3	35	18	22.5	21.5	30	17.0	63	40	M16×P2.0	24	12						13,000
40-M16-10-3T	○	3	40	23	27.5	26.5	30	17.0	63	40	M16×P2.0	24	12						11,500
40-M16-10-4T	○	4	40	23	27.5	26.5	30	17.0	63	40	M16×P2.0	24	12						11,500

* Dimension in ( ) is when mounting LD

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts				Applicable Inserts **Below**
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	
					
MFH...-10-...	SB-4075TRP	DTPM-15	PST-IP15	MP-1	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
	Recommended Torque for Insert Clamp 3.5 N·m				

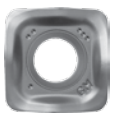
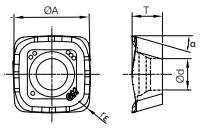
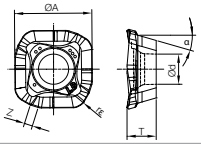
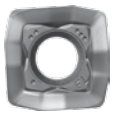
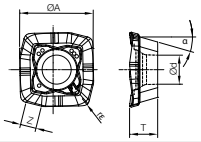
Recommended Cutting Conditions ➡ **F11**

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

Applicable Inserts (➡ B17)

Insert (Right-hand Shown)		Part Number	Dimensions (in)					Angle (°)	CVD Coated Carbide	MEGACOAT NANO		
			A	T	Ød	Z	rε	α	CA6535	PR1535	PR1525	PR1510
 General Purpose		**SOMT 100420ER-GM**	0.406	0.180	0.181	-	0.079	16°	●	●	●	●
		140520ER-GM	0.557	0.219	0.228				●	●	●	●
 Large D.O.C.		**SOMT 100420ER-LD**	0.411	0.180	0.181	0.035	0.079	16°	●	●	●	●
		140520ER-LD	0.581	0.219	0.228	0.063			●	●	●	●
 Wiper Edge		**SOMT 100420ER-FL**	0.411	0.180	0.181	0.055	0.079	16°	●	●	●	●
		140514ER-FL	0.574	0.219	0.228	0.122	0.055		●	●	●	●

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World Express (Shipping: 7-10 Business Days) : ○

◆ Recommended Cutting Conditions

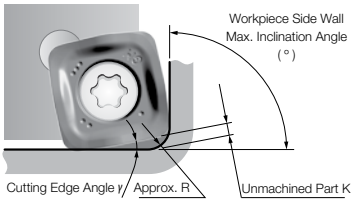
Chipbreaker	Workpiece	Holder Description and Feed Rate (fz: ipt)					Recommended Insert Grade (Vc: sfm)			
		End Mill Feed Rates			Face Mill Feed Rates		MEGACOAT NANO			CVD
		MFH1000... MFH25-...	MFH1250... MFH32-...	MFH1500... MFH40-...	MFH…R-10	MFH…-14	**PR1535**	**PR1525**	**PR1510**	**CA6535**
GM	Carbon Steel	① 0.020~0.032~0.039 ② 0.008~0.016~0.020	① 0.020~0.039~0.059 ② 0.012~0.028~0.039	① 0.020~0.047~0.071 ② 0.016~0.039~0.059	0.020~0.059~0.079		☆ 390~590~820	★ 390~590~820	-	-
	Alloy Steel	① 0.020~0.032~0.039 ② 0.008~0.016~0.020	① 0.020~0.039~0.059 ② 0.012~0.028~0.039	① 0.020~0.047~0.071 ② 0.016~0.039~0.059	0.020~0.059~0.079		☆ 330~520~720	★ 330~520~720	-	-
	Mold Steel (~40HRc)	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		☆ 260~460~590	★ 260~460~590	-	-
	Mold Steel (40~50HRc)	① 0.006~0.012~0.020 ② 0.006~0.008~0.010	① 0.008~0.020~0.032 ② 0.008~0.012~0.018	① 0.008~0.024~0.035 ② 0.008~0.020~0.028	0.008~0.028~0.039		☆ 200~330~430	★ 200~330~430	-	-
	Austenitic Stainless Steel	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		☆ 330~520~660	☆ 330~520~660	-	-
	Martensitic Stainless Steel	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		☆ 490~660~820	-	-	★ 590~790~980
	Precipitation Hardened Stainless Steel	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		★ 300~390~490	-	-	-
	Gray Cast Iron	① 0.020~0.032~0.039 ② 0.008~0.016~0.020	① 0.020~0.039~0.059 ② 0.012~0.028~0.039	① 0.020~0.047~0.071 ② 0.016~0.039~0.059	0.020~0.059~0.079		-	-	★ 390~590~820	-
	Nodular Cast Iron	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		-	-	★ 330~490~660	-
	Ni-base Heat Resistant Alloy	① 0.008~0.016~0.024 ② 0.006~0.008~0.012	① 0.008~0.020~0.035 ② 0.008~0.016~0.024	① 0.008~0.024~0.039 ② 0.008~0.020~0.032	0.008~0.032~0.047		☆ 70~100~160	-	-	★ 70~100~160
	Titanium Alloy	① 0.008~0.016~0.024 ② 0.006~0.008~0.012	① 0.008~0.020~0.035 ② 0.008~0.016~0.024	① 0.008~0.024~0.039 ② 0.008~0.020~0.032	0.008~0.032~0.047		★ 130~200~260	-	☆ 100~160~230	-
LD	Carbon Steel	① 0.020~0.032~0.039 ③ 0.002~0.004~0.008	① 0.020~0.039~0.059 ③ 0.002~0.006~0.012	① 0.020~0.047~0.071 ③ 0.002~0.008~0.012	① 0.020~0.059~0.079 ③ 0.002~0.008~0.012	④ 0.020~0.059~0.079 ⑤ 0.002~0.008~0.016	☆ 390~590~820	★ 390~590~820	-	-
	Alloy Steel	① 0.020~0.032~0.039 ③ 0.002~0.004~0.008	① 0.020~0.039~0.059 ③ 0.002~0.006~0.012	① 0.020~0.047~0.071 ③ 0.002~0.008~0.012	① 0.020~0.059~0.079 ③ 0.002~0.008~0.012	④ 0.020~0.059~0.079 ⑤ 0.002~0.008~0.016	☆ 330~520~720	★ 330~520~720	-	-
	Mold Steel (~40HRc)	① 0.020~0.028~0.032 ③ 0.002~0.003~0.006	① 0.020~0.032~0.047 ③ 0.002~0.004~0.008	① 0.020~0.039~0.063 ③ 0.002~0.006~0.008	① 0.020~0.047~0.071 ③ 0.002~0.006~0.008	④ 0.020~0.047~0.071 ⑤ 0.002~0.006~0.012	☆ 260~460~590	★ 260~460~590	-	-
	Mold Steel (40~50HRc)	① 0.008~0.012~0.020 ③ 0.001~0.002~0.004	① 0.008~0.020~0.032 ③ 0.001~0.003~0.006	① 0.008~0.024~0.035 ③ 0.001~0.004~0.006	① 0.008~0.028~0.039 ③ 0.001~0.004~0.006	④ 0.008~0.028~0.039 ⑤ 0.001~0.004~0.008	☆ 200~330~430	★ 200~330~430	-	-
	Austenitic Stainless Steel	① 0.020~0.028~0.032 ③ 0.002~0.003~0.006	① 0.020~0.032~0.047 ③ 0.002~0.004~0.008	① 0.020~0.039~0.063 ③ 0.002~0.006~0.008	① 0.020~0.047~0.071 ③ 0.002~0.006~0.008	④ 0.020~0.047~0.071 ⑤ 0.002~0.006~0.012	★ 330~520~660	☆ 330~520~660	-	-
	Martensitic Stainless Steel	① 0.020~0.028~0.032 ③ 0.002~0.003~0.006	① 0.020~0.032~0.047 ③ 0.002~0.004~0.008	① 0.020~0.039~0.063 ③ 0.002~0.006~0.008	① 0.020~0.047~0.071 ③ 0.002~0.006~0.008	④ 0.020~0.047~0.071 ⑤ 0.002~0.006~0.012	☆ 490~660~820	-	-	★ 590~790~980
	Precipitation Hardened Stainless Steel	① 0.020~0.028~0.032 ③ 0.002~0.003~0.006	① 0.020~0.032~0.047 ③ 0.002~0.004~0.008	① 0.020~0.039~0.063 ③ 0.002~0.006~0.008	① 0.020~0.047~0.071 ③ 0.002~0.006~0.008	④ 0.020~0.047~0.071 ⑤ 0.002~0.006~0.012	★ 300~390~490	-	-	-
	Gray Cast Iron	① 0.020~0.032~0.039 ③ 0.002~0.004~0.008	① 0.020~0.039~0.059 ③ 0.002~0.006~0.012	① 0.020~0.047~0.071 ③ 0.002~0.008~0.012	① 0.020~0.059~0.079 ③ 0.002~0.008~0.012	④ 0.020~0.059~0.079 ⑤ 0.002~0.008~0.016	-	-	★ 390~590~820	-
	Nodular Cast Iron	① 0.020~0.028~0.032 ③ 0.002~0.003~0.006	① 0.020~0.032~0.047 ③ 0.002~0.004~0.008	① 0.020~0.039~0.063 ③ 0.002~0.006~0.008	① 0.020~0.047~0.071 ③ 0.002~0.006~0.008	④ 0.020~0.047~0.071 ⑤ 0.002~0.006~0.012	-	-	★ 330~490~660	-
	Ni-base Heat Resistant Alloy	① 0.008~0.016~0.024 ③ 0.001~0.002~0.004	① 0.008~0.020~0.035 ③ 0.001~0.003~0.006	① 0.008~0.024~0.039 ③ 0.001~0.004~0.006	① 0.008~0.032~0.047 ③ 0.001~0.004~0.006	④ 0.008~0.032~0.047 ⑤ 0.001~0.004~0.008	☆ 70~100~160	-	-	★ 70~100~160
	Titanium Alloy	① 0.008~0.016~0.024 ③ 0.001~0.002~0.004	① 0.008~0.020~0.035 ③ 0.001~0.003~0.006	① 0.008~0.024~0.039 ③ 0.001~0.004~0.006	① 0.008~0.032~0.047 ③ 0.001~0.004~0.006	④ 0.008~0.032~0.047 ⑤ 0.001~0.004~0.008	★ 130~200~260	-	☆ 100~160~230	-
FL	Carbon Steel	① 0.020~0.032~0.039 ② 0.008~0.016~0.020	① 0.020~0.039~0.059 ② 0.012~0.028~0.039	① 0.020~0.047~0.071 ② 0.016~0.039~0.059	0.020~0.059~0.079		☆ 390~590~820	★ 390~590~820	-	-
	Alloy Steel	① 0.020~0.032~0.039 ② 0.008~0.016~0.020	① 0.020~0.039~0.059 ② 0.012~0.028~0.039	① 0.020~0.047~0.071 ② 0.016~0.039~0.059	0.020~0.059~0.079		☆ 330~520~720	★ 330~520~720	-	-
	Mold Steel (~40HRc)	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		☆ 260~460~590	★ 260~460~590	-	-
	Mold Steel (40~50HRc)	① 0.006~0.012~0.020 ② 0.006~0.008~0.010	① 0.008~0.020~0.032 ② 0.008~0.012~0.018	① 0.008~0.024~0.035 ② 0.008~0.020~0.028	0.008~0.028~0.039		☆ 200~330~430	★ 200~330~430	-	-
	Austenitic Stainless Steel	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		★ 330~520~660	☆ 330~520~660	-	-
	Martensitic Stainless Steel	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		☆ 490~660~820	-	-	★ 590~790~980
	Precipitation Hardened Stainless Steel	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		★ 300~390~490	-	-	-
	Gray Cast Iron	① 0.020~0.032~0.039 ② 0.008~0.016~0.020	① 0.020~0.039~0.059 ② 0.012~0.028~0.039	① 0.020~0.047~0.071 ② 0.016~0.039~0.059	0.020~0.059~0.079		-	-	★ 390~590~820	-
	Nodular Cast Iron	① 0.020~0.028~0.032 ② 0.008~0.012~0.016	① 0.020~0.032~0.047 ② 0.012~0.024~0.032	① 0.020~0.039~0.063 ② 0.016~0.032~0.047	0.020~0.047~0.071		-	-	★ 330~490~660	-
	Ni-base Heat Resistant Alloy	① 0.008~0.016~0.024 ② 0.006~0.008~0.012	① 0.008~0.020~0.035 ② 0.008~0.016~0.024	① 0.008~0.024~0.039 ② 0.008~0.020~0.032	0.008~0.032~0.047		☆ 70~100~160	-	-	★ 70~100~160
	Titanium Alloy	① 0.008~0.016~0.024 ② 0.006~0.008~0.012	① 0.008~0.020~0.035 ② 0.008~0.016~0.024	① 0.008~0.024~0.039 ② 0.008~0.020~0.032	0.008~0.032~0.047		★ 130~200~260	-	☆ 100~160~230	-

① For D.O.C. ≤ 0.039"
② For D.O.C. 0.040 - 0.059"
③ For D.O.C. 0.040 - 0.138"
④ For D.O.C. ≤ 0.079"
⑤ For D.O.C. 0.080 - 0.197"

★: 1st Recommendation ☆: 2nd Recommendation

- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
- The figure in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- Machining with CAT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
- Internal coolant is recommended for slotting applications
- For finishing, maximum recommended feed is f = 0.059 ipt for SOMT14-LD type, f = 0.035 ipt for SOMT10-LD type, f = 0.118 ipt for SOMT14-FL type, f = 0.055 ipt for SOMT10-FL type

Approximate Programming Radius Adjustment

Shape	Holder	Chipbreaker	Cutting Edge Angle γ (°)	Approx. R (in)	Unmachined Part K (in)	Max. Wall Angle (°)
	**MFH…-10-…**	GM	10°	0.118	0.034	90°
		LD	14°	0.148	0.027	65°
		FL	14°	0.118	0.035	80°
	MFH…-14-…	GM	10°	0.148	0.054	90°
		LD	16°	0.197	0.042	65°
		FL	13°	0.118	0.054	80°

Ramping Data

MFH…-10-…

Cutter Dia. ØD (in)	1.00"	-	1.25"	-	1.50"	2.00"	2.50"	3.00"
Cutter Dia. ØD (mm)	25mm	28mm	32mm	35mm	40mm	50mm	63mm	80mm
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-…

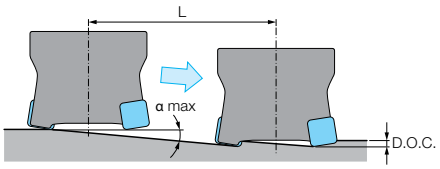
Cutter Dia. ØD (in)	2.00"	2.50"	3.00"	4.00"	5.00"	6.00"
Cutter Dia. ØD (mm)	50mm	63mm	80mm	100mm	125mm	160mm
Max. Ramping Angle α max (°)	2°	1.8°	1°	0.5°	0.4°	0.2°
tan α max	0.035	0.031	0.017	0.009	0.007	0.003

Ramping Guide

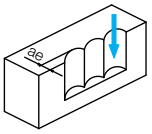
- Ramping angle should be under α max (maximum ramping angle) in the above cutting conditions
- Reduce recommended feed rate in cutting conditions above by 70%

Formula for Max. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{\text{D.O.C.}}{\tan \alpha \max}$$



Plunging



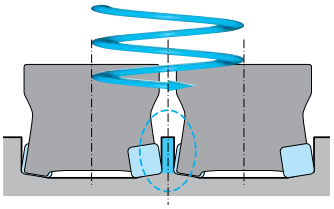
Insert Description	Maximum Width of Cut (ae)
SOMT10 Type	0.315"
SOMT14 Type	0.453"

- LD and FL chipbreakers are not available for plunging
- Reduce feed rate to fz ≤ 0.008ipt when plunging

Helical Milling

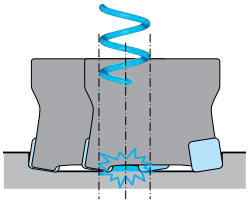
- For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

Exceeding Max. Machining Dia.



Center Core Remains

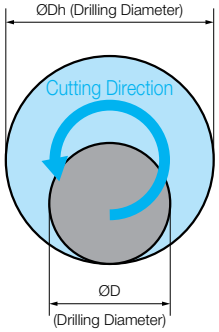
Under Min. Machining Dia.



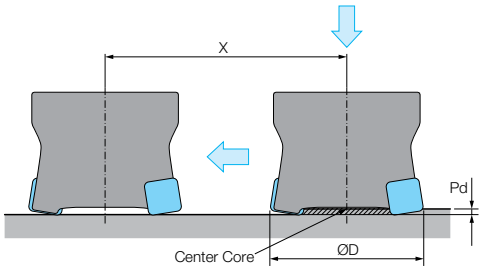
Center Core Hits Holder Body

Holder	Min. Drilling Dia.	Max. Drilling Dia.
MFH…-10-…	2×D–0.709"	2×D–0.079"
MFH…-14-…	2×D–0.984"	2×D–0.079"

- Keep machine depth per rotation less than max D.O.C. (S) in the cutter dimensions chart
- Use climb milling. (Refer to detail on right)
- Feed rates should be reduced to 50% of recommended cutting condition (Page ➡ **F11**)
- Use caution to eliminate incidences caused by producing long chips



Drilling



3D Machining

Chipbreaker	Ramping	Contouring (Rising Wall Angle)	Plunging	Helical Milling	Pocketing
GM	✓	✓ (90°)	✓	✓	✓
LD	✓	Limit (65°)	X	X	X
FL	✓	Limit (80°)	X	X	X

- Some applications are not available depending on chipbreaker.
- For FL and LD type, there is a limit of rising wall angle during contouring.

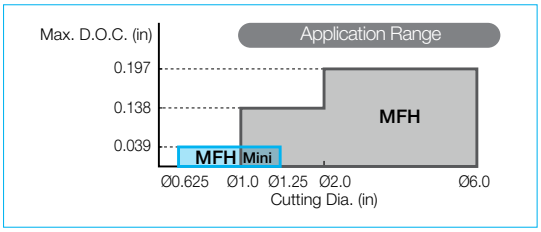
Holder	GM		LD		FL	
	Max. Drilling Depth (Pd)	X	Max. Drilling Depth (Pd)	X	Max. Drilling Depth (Pd)	X
MFH…-10-…	0.059"	D–0.709"	0.059"	D–0.551"	0.059"	D–0.591"
MFH…-14-…	0.079"	D–0.945"	0.079"	D–0.709"	0.079"	D–0.748"

[Drilling Depth]
See Max. Drilling Depth (Pd) in the above cutting conditions
Traversing after Drilling
① It is recommended to reduce feed by 25% of recommendation on Page ➡ **F11** until Center Core is removed
② Axial feed rate recommendation per revolution is 0.008 ipr while drilling

MFH-RAPTOR MINI

(Cutter Dia. Ø0.625" ~ Ø2.000")
(Cutter Dia. Ø16mm ~ Ø32mm)

Economical Inserts with 4 Cutting Edges High Feed Milling for Small Diameters and Small Machining Centers

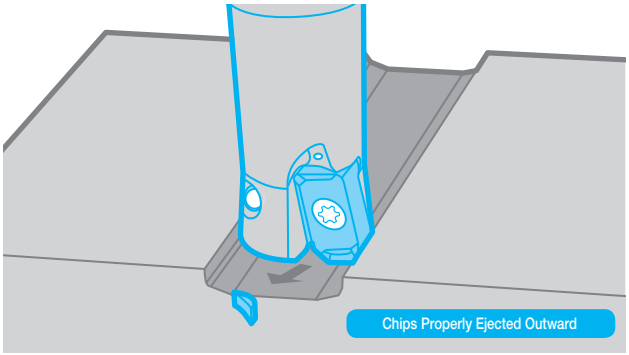


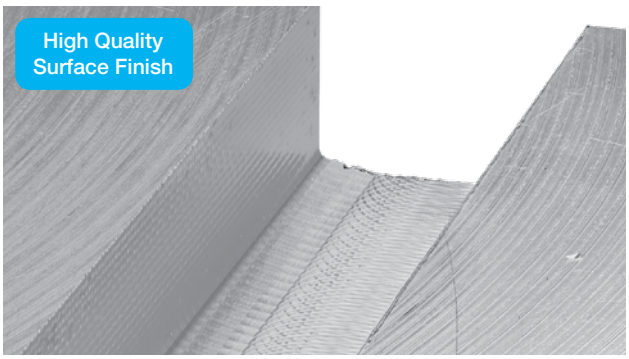
1 Good Chip Evacuation

MFH Mini Controls Chip Biting with Convex Cutting Edge

MFH Mini

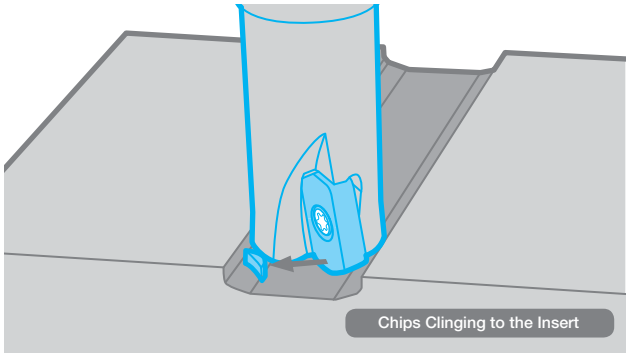
Good Chip Evacuation

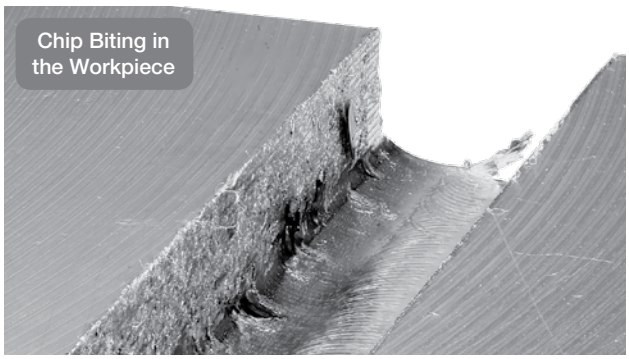




Competitor High Feed Cutter

Poor Chip Evacuation

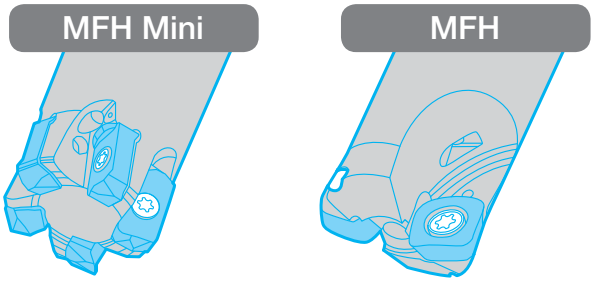




Cutting Conditions: Cutter Dia. Dc = Ø0.625" , Vc = 490 sfm, fz = 0.024 ipt, D.O.C. = 0.020" (20 Passes): Total 0.394" × 0.630", Dry Workpiece: Stainless Steel

2 Fine Pitch for Efficient Machining

Cutter Dia. 1.000" Type



5 Inserts
MFH1000-W100-03-5T47

2 Inserts
MFH1000-W100-10-2T

MFH Mini End Mill (Inch Size)

Standard (Cylindrical)

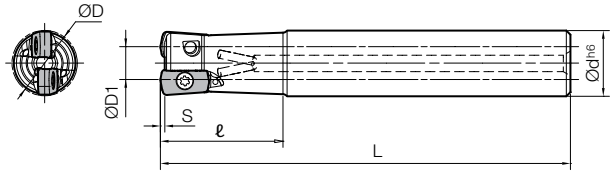


Fig.1

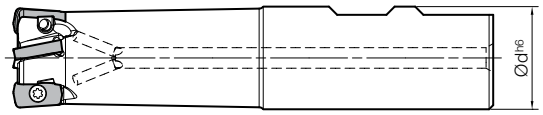


Fig.2

Toolholder Dimensions (Inch Size)

	Part Number	Stock	No. of Inserts	Dimensions (in)						Max. Ramping Angle	Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
				ØD	ØD1	Ød	L	ℓ	S	α	A.R.	R.R.				
Standard Shank (Weldon)	MFH 0625-W625-03-2T-3	●	2	0.625	0.310	0.625	3.196	1.250	0.039	2.8°	-10°	-15°	Yes	Fig.2	0.1	18,800
	0750-W750-03-3T-4	●	3	0.750	0.435	0.750	4.070	2.000	0.039	1.7°					0.2	15,700
	1000-W100-03-4T47	●	4	1.000	0.685	1.000	4.820	2.500	0.039	1.2°					0.4	13,400
	1000-W100-03-5T47	●	5	1.000	0.685	1.000	4.820	2.500	0.039	1.2°					0.4	13,400
	1250-W125-03-5T-5	●	5	1.250	0.935	1.250	5.070	2.750	0.039	0.8°					0.7	11,400
	1250-W125-03-6T-5	●	6	1.250	0.935	1.250	5.070	2.750	0.039	0.8°					0.7	11,400
Long Shank (Cylindrical)	MFH 0625-S625-03-2T-6	●	2	0.625	0.310	0.625	6.000	2.000	0.039	2.8°	-10°	-15°	Yes	Fig.1	0.2	18,800
	0750-S750-03-3T65	●	3	0.750	0.435	0.750	6.500	3.000	0.039	1.7°					0.3	15,700
	1000-S100-03-4T-7	●	4	1.000	0.685	1.000	7.000	4.000	0.039	1.2°					0.6	13,400
	1250-S125-03-5T-8	●	5	1.250	0.935	1.250	8.000	4.750	0.039	0.8°					1.1	11,400

Spare Parts and Applicable Inserts (Inch Size)

Part Number	Spare Parts				Applicable Inserts
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	
					B13, F17
MFH...-03-...	SB-3065TRP	DTPM-8	PST-IP8	MP-1	LOGU030310ER-GM
	Recommended Torque for Insert Clamp 1.2 N·m				

Recommended Cutting Conditions F18

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
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U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

MFH Mini End Mill (Metric Size)

Standard (Cylindrical)

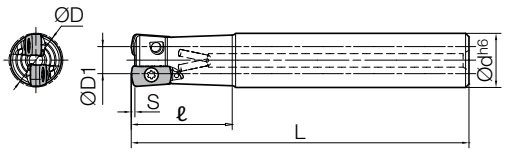


Fig.1

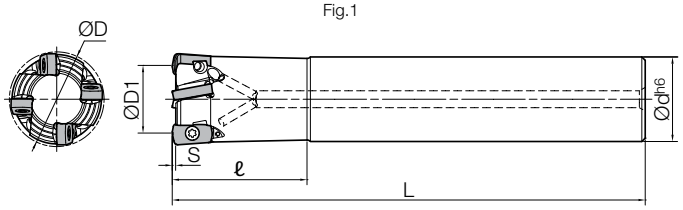


Fig.2

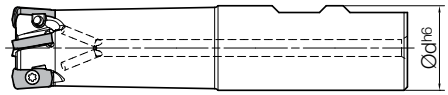


Fig.3

Toolholder Dimensions (Metric Size)

	Part Number		Stock	No. of Inserts	Dimensions (mm)						Max. Ramping Angle	Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max RPM
					ØD	ØD1	Ød	L	ℓ	S	α	A.R.	R.R.				
Standard Shank (Cylindrical)	MFH	16-S16-03-2T	○	2	16	8	16	100	30	1	2.8°	-10°	-15°	Yes	Fig.1	0.1	18,800
		17-S16-03-2T	○	2	17	9	16	100	20	1	2.5°				Fig.2	0.1	17,900
		18-S16-03-2T	○	2	18	10	16	100	20	1	2.1°					0.1	17,000
		20-S20-03-3T	○	3	20	12	20	130	50	1	1.7°				Fig.1	0.3	15,700
		20-S20-03-4T	○	4	20	12	20	130	50	1	1.7°					0.3	15,700
		22-S20-03-3T	○	3	22	14	20	130	30	1	1.4°				Fig.2	0.3	14,700
		22-S20-03-4T	○	4	22	14	20	130	30	1	1.4°					0.3	14,700
		25-S25-03-4T	○	4	25	17	25	140	60	1	1.2°				Fig.1	0.5	13,400
		25-S25-03-5T	○	5	25	17	25	140	60	1	1.2°					0.5	13,400
		28-S25-03-4T	○	4	28	20	25	140	40	1	1.0°				Fig.2	0.5	12,400
		28-S25-03-5T	○	5	28	20	25	140	40	1	1.0°					0.5	12,400
		32-S32-03-5T	○	5	32	24	32	150	70	1	0.8°				Fig.1	0.8	11,400
		32-S32-03-6T	○	6	32	24	32	150	70	1	0.8°					0.8	11,400
Standard Shank (Weldon)	MFH	16-W16-03-2T	○	2	16	8	16	79	30	1	2.8°	-10°	-15°	Yes	Fig.3	0.1	18,800
		20-W20-03-3T	○	3	20	12	20	101	50	1	1.7°					0.2	15,700
		20-W20-03-4T	○	4	20	12	20	101	50	1	1.7°					0.2	15,700
		25-W25-03-4T	○	4	25	17	25	117	60	1	1.2°					0.4	13,400
		25-W25-03-5T	○	5	25	17	25	117	60	1	1.2°					0.4	13,400
		32-W32-03-5T	○	5	32	24	32	131	70	1	0.8°					0.7	11,400
		32-W32-03-6T	○	6	32	24	32	131	70	1	0.8°					0.7	11,400
Long Shank (Cylindrical)	MFH	16-S16-03-2T-150	○	2	16	8	16	150	50	1	2.8°	-10°	-15°	Yes	Fig.1	0.2	18,800
		20-S20-03-3T-160	○	3	20	12	20	160	80	1	1.7°					0.3	15,700
		25-S25-03-4T-180	○	4	25	17	25	180	100	1	1.2°					0.6	13,400
		32-S32-03-5T-200	○	5	32	24	32	200	120	1	0.8°					1.1	11,400

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts				Applicable Inserts
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	
					➡ **B13, F17**
MFH...-03-...	SB-3065TRP	DTPM-8	PST-IP8	MP-1	LOGU030310ER-GM
	Recommended Torque for Insert Clamp 1.2 N·m				

Recommended Cutting Conditions ➡ **F18**

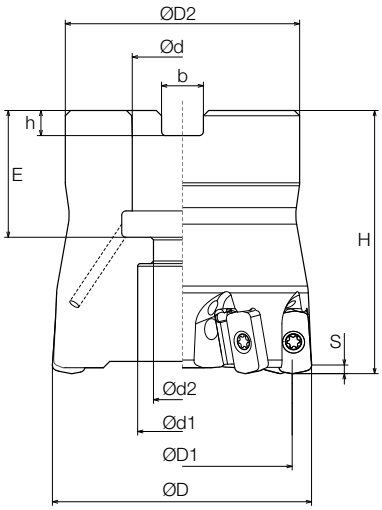
Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

MFH Mini Face Mill (Inch Size)



Toolholder Dimensions (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)											Rake Angle (°)		Coolant Hole	Weight (kg)	Max RPM
			ØD	ØD1	ØD2	Ød	Ød1	Ød2	H	E	a	b	S	A.R.	R.R.			
MFH 1500R-03-5T	●	5	1.500	1.185	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.039	-10°	-15°	Yes	0.2	10,200
1500R-03-6T	●	6	1.500	1.185	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.039	-10°	-15°	Yes	0.2	10,200
2000R-03-8T	●	8	2.000	1.685	1.750	0.750	0.669	0.433	1.968	0.947	0.188	0.312	0.039	-10°	-15°	Yes	0.5	8,600

Multiple step slot milling is NOT recommended for MFH-Mini face mill diameters above Ø1.3" due to a danger of re-cutting chips

Spare Parts and Applicable Inserts (Inch Size)

Part Number	Spare Parts					Applicable Inserts ➡ B13, F17
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	Arbor Bolt	
						
MFH1500-03-5T	SB-3065TRP	DTPM-8	PST-IP8	MP-1	HH1/4-0.75	LOGU030310ER-GM
MFH1500-03-6T	Recommended Torque for Insert Clamp 1.2 N·m				HH1/4-0.75	
MFH2000-03-8T					HH3/8-1.25	

Caution with Max. Revolution

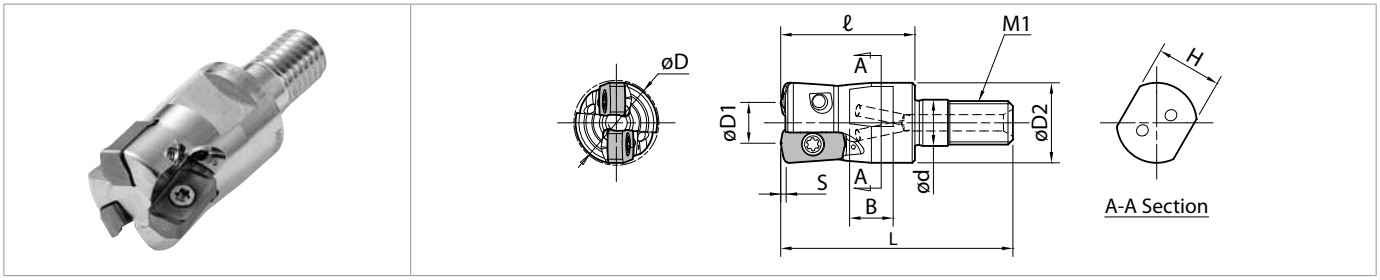
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Recommended Cutting Conditions ➡ **F18**

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

MFH Mini Modular End Mill



Toolholder Dimensions

Part Number	Stock	Unit	No. of Inserts	Dimensions										Max. Ramping Angle	Rake Angle (°)		Coolant Hole	Max RPM
				ØD	ØD1	ØD2	Ød	L	ℓ	M1 (mm)	H	B	S	α	A.R.	R.R.		
MFH 0625-M08-03-2T	●	inch	2	0.625	0.310	0.579	0.335	1.693	0.984	M8xP1.25	0.472	0.315	0.039	2.8°	-10°	-15°	Yes	18,800
0750-M10-03-3T	●		3	0.750	0.435	0.728	0.413	1.929	1.181	M10xP1.5	0.591	0.354	0.039	1.7°				15,700
1000-M12-03-4T	●		4	1.000	0.685	0.906	0.492	2.244	1.378	M12xP1.75	0.748	0.394	0.039	1.2°				13,400
1000-M12-03-5T	●		5	1.000	0.685	0.906	0.492	2.244	1.378	M12xP1.75	0.748	0.394	0.039	1.2°				13,400
1250-M16-03-5T	●		5	1.250	0.935	1.181	0.669	2.480	1.575	M16xP2	0.945	0.472	0.039	0.8°				11,400
1250-M16-03-6T	●		6	1.250	0.935	1.181	0.669	2.480	1.575	M16xP2	0.945	0.472	0.039	0.8°				11,400
MFH 16-M08-03-2T	○	mm	2	16	8	14.7	8.5	43	25	M8xP1.25	12	8	1	2.8°	-10°	-15°	Yes	18,880
17-M08-03-2T	○		2	17	9	14.7	8.5	43	25	M8xP1.25	12	8	1	2.5°				17,900
18-M08-03-2T	○		2	18	10	14.7	8.5	43	25	M8xP1.25	12	8	1	2.1°				17,000
20-M10-03-3T	○		3	20	12	18.7	10.5	49	30	M10xP1.5	15	9	1	1.7°				15,700
20-M10-03-4T	○		4	20	12	18.7	10.5	49	30	M10xP1.5	15	9	1	1.7°				15,700
22-M10-03-3T	○		3	22	14	18.7	10.5	49	30	M10xP1.5	15	9	1	1.4°				14,700
22-M10-03-4T	○		4	22	14	18.7	10.5	49	30	M10xP1.5	15	9	1	1.4°				14,700
25-M12-03-4T	○		4	25	17	23.0	12.5	57	35	M12xP1.75	19	10	1	1.2°				13,400
25-M12-03-5T	○		5	25	17	23.0	12.5	57	35	M12xP1.75	19	10	1	1.2°				13,400
28-M12-03-4T	○		4	28	20	23.0	12.5	57	35	M12xP1.75	19	10	1	1.0°				12,400
28-M12-03-5T	○		5	28	20	23.0	12.5	57	35	M12xP1.75	19	10	1	1.0°				12,400
32-M16-03-5T	○		5	32	24	30.0	17.0	63	40	M16xP2	24	12	1	0.8°				11,400
32-M16-03-6T	○		6	32	24	30.0	17.0	63	40	M16xP2	24	12	1	0.8°				11,400

* Dimension in ( ) is when mounting LD

Spare Parts and Applicable Inserts

Part Number	Spare Parts				Applicable Inserts **Below**
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	
					
MFH...-03-...	SB-3065TRP	DTPM-8	PST-IP8	MP-1	LOGU030310ER-GM
	Recommended Torque for Insert Clamp 1.2 N·m				

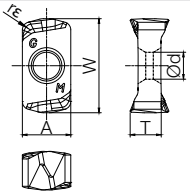
Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

Recommended Cutting Conditions ➔ **F18**

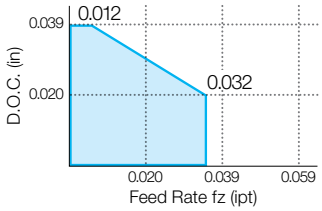
Applicable Inserts (➔ B13)

Insert		Part Number	Dimension (in)					MEGACOAT NANO			CVD
			A	T	Ød	W	rε	**PR1535**	**PR1525**	**PR1510**	**CA6535**
 General Purpose		**LOGU030310ER-GM**	0.244	0.156	0.136	0.469	0.039	●	●	●	●

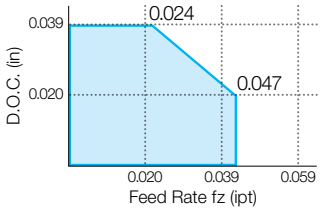
● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

MFH Mini Cutting Performance (GM Chipbreaker)

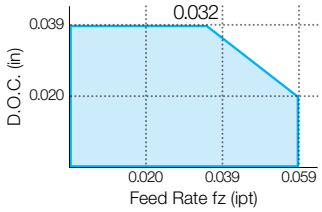
Fine Pitch End Mill



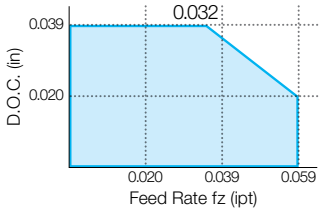
Standard Pitch End Mill
(Cutter Dia. 0.625" - 0.750")



Standard Pitch End Mill
(Cutter Dia. 1.000" - 1.250")



MFH Mini Face Mill
(Cutter Dia. 1.500" - 2.000")



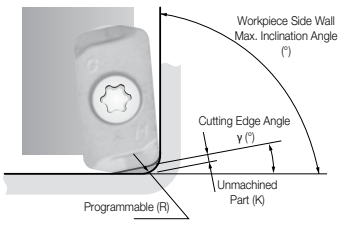
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Holder Description and Feed Rate (fz: ipt) *Recommended D.O.C. = 0.020" Reference Value								Recommended Insert Grade (Vc: sfm)			
		MFH0625...2T (MFH16...2T)	MFH0750...3T (MFH20...3T)	N/A (MFH20...4T)	MFH1000...4T (MFH25...4T)	MFH1000...5T (MFH25...5T)	MFH1250...5T (MFH32...5T)	MFH1250...6T (MFH32...6T)	MFH1500...5T/6T MFH2000...8T	MEGACOAT NANO			CVD
										PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel	0.008~**0.028**~0.047		0.008~**0.020**~0.031	0.008~**0.031**~0.059	0.008~**0.020**~0.031	0.008~**0.031**~0.059	0.008~**0.020**~0.031	0.008~**0.031**~0.059	☆ 390~**590**~820	★ 390~**590**~820	-	-
	Alloy Steel	0.008~**0.028**~0.047		0.008~**0.020**~0.031	0.008~**0.031**~0.059	0.008~**0.020**~0.031	0.008~**0.031**~0.059	0.008~**0.020**~0.031	0.008~**0.031**~0.059	☆ 330~**520**~720	★ 330~**520**~720	-	-
	Mold Steel (~40 HRc)	0.008~**0.020**~0.035		0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	☆ 260~**460**~590	★ 260~**460**~590	-	-
	Mold Steel (40~50 HRc)	0.008~**0.012**~0.020		0.008~**0.010**~0.012	0.008~**0.012**~0.024	0.008~**0.010**~0.012	0.009~**0.012**~0.024	0.008~**0.010**~0.012	0.008~**0.012**~0.024	☆ 200~**330**~430	★ 200~**330**~430	-	-
	Austenitic Stainless Steel	0.008~**0.020**~0.035		0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	★ 330~**520**~660	☆ 330~**520**~660	-	-
	Martensitic Stainless Steel	0.008~**0.020**~0.035		0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	☆ 490~**660**~820	-	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.008~**0.020**~0.035		0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	★ 300~**390**~490	-	-	-
	Gray Cast Iron	0.008~**0.028**~0.047		0.008~**0.020**~0.031	0.008~**0.031**~0.059	0.008~**0.020**~0.031	0.008~**0.031**~0.059	0.008~**0.020**~0.031	0.008~**0.031**~0.059	-	-	★ 390~**590**~820	-
	Nodular Cast Iron	0.008~**0.020**~0.035		0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	0.008~**0.016**~0.024	0.008~**0.024**~0.047	-	-	★ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.008~**0.012**~0.024		0.008~**0.010**~0.016	0.008~**0.016**~0.031	0.008~**0.010**~0.016	0.008~**0.016**~0.031	0.008~**0.010**~0.016	0.008~**0.016**~0.031	☆ 70~**100**~160	-	-	★ 70~**100**~160
	Titanium Alloy	0.008~**0.012**~0.024		0.008~**0.010**~0.016	0.008~**0.016**~0.031	0.008~**0.010**~0.016	0.008~**0.016**~0.031	0.008~**0.010**~0.016	0.008~**0.016**~0.031	★ 130~**200**~260	-	☆ 100~**160**~230	-

Standard Pitch End Mills | Fine Pitch End Mills | MFH Mini Face Mills ★: 1st Recommendation ☆: 2nd Recommendation

- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
- The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- Machining with CAT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
- Internal coolant is recommended for slotting applications

Approximate Programming Radius Adjustment

Shape	Holder	Chipbreaker	Cutting Edge Angle γ (°)	Programmable (R)	Unmachined Part (K)	Max. Wall Angle
	**MFH...-03-...**	GM	12°	0.063"	0.015"	90°

Ramping

Inch Size Standard and Modular End Mills and Mini Face Mills

Holder	Cutter Dia. Ø	0.625"	0.750"	1.000"	1.250"	1.500"	2.000"
MFH…-03-…	Max. Ramping Angle (°)	2.8°	1.7°	1.2°	0.8°	0.5°	0.4°
	tan α max	0.049	0.030	0.021	0.014	0.009	0.007

Metric Size Standard & Modular End Mills

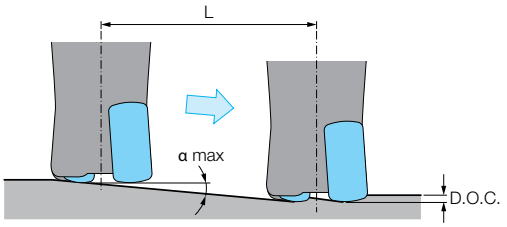
Holder	Cutter Dia. Ø	16mm	17mm	18mm	20mm	22mm	25mm	28mm	32mm
MFH…-03-…	Max. Ramping Angle (°)	2.8°	2.5°	2.1°	1.7°	1.4°	1.2°	1.0°	0.8°
	tan α max	0.049	0.042	0.037	0.030	0.024	0.021	0.017	0.014

- Recommended ramping angle is ≤ max (see chart above for recommended ramp angle)
- Reduce recommended feed rate by 70%

Multiple step slot milling is NOT recommended for MFH-Mini face mill diameters above Ø1.3" due to a danger of re-cutting chips

Formula for Max. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{\text{D.O.C.}}{\tan \alpha \text{ max}}$$

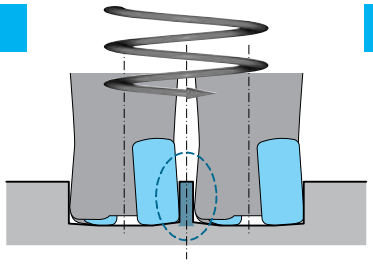


Helical Milling

- For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

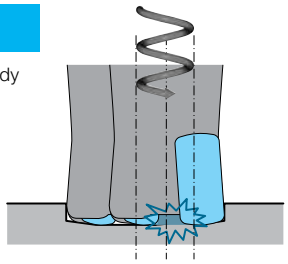
Exceeding Max. Machining Dia.

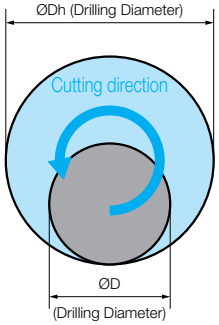
Center Core Remains



Under Min. Machining Dia.

Center Core Hits Holder Body

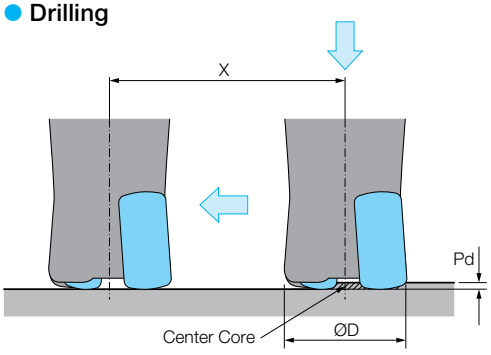




Holder	Min. Drilling Dia.	Max. Drilling Dia.
MFH…-03-…	2xØD–0.315"	2xØD–0.079"

- Keep machine depth per rotation less than max D.O.C. (0.039")
- Use climb milling. (Refer to detail on right)
- Feed rate should be reduced to 50% of recommended cutting condition (Page ➔ **F18**)
- Use caution to eliminate incidences caused by producing long chips

Drilling

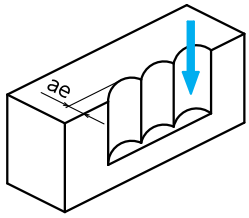


Holder	Max. Drilling Depth (Pd)	X
MFH…-03-…	0.039"	ØD–0.354"

Plunging After Drilling

- It is recommended to reduce feed by 25% of recommendation on Page ➔ **F18** until Center Core is removed
- Axial feed rate recommendation per revolution is 0.008ipr while drilling

Plunging



Insert Description	Maximum Width of Cut (ae)
LOGU03...	0.138"

- Reduce feed rate to fz ≤ 0.008 ipt when plunging

(Cutter Dia. Ø0.375" ~ Ø0.625")
(Cutter Dia. Ø8mm ~ Ø16mm)

MFH-RAPTOR MICRO

Durable Design Aids in Chatter Resistance
Maximum D.O.C. 0.020". Stable High Feed Machining on a Wide Range of Applications

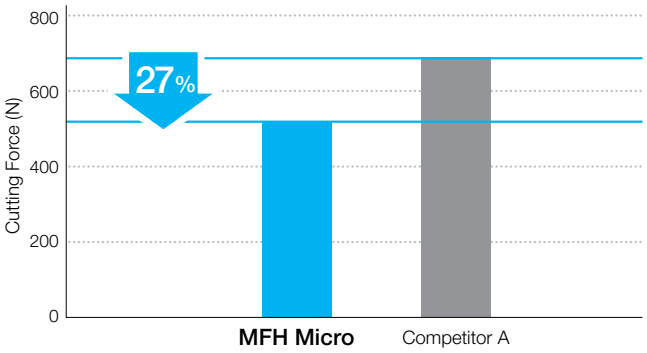
1 Stable Machining with Chattering Resistance

Molded Convex Cutting Edge Controls Initial Impact when Entering the Workpiece

Molded Convex Cutting Edge

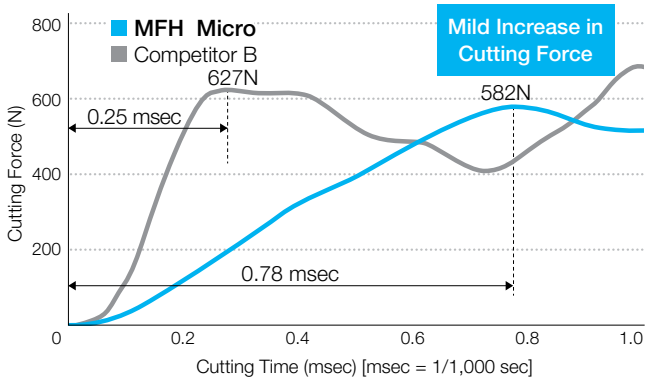
High Precision G Class Insert

Cutting Force Comparison (In-house Evaluation)



Cutting Conditions: Vc = 390 sfm, fz = 0.024 ipt, D.O.C. = 0.016"
Cutter Dia. Ø0.375", Slotting, Dry Workpiece: 1049

Increase in Cutting Force when Entering Work Piece
(In-house Evaluation)

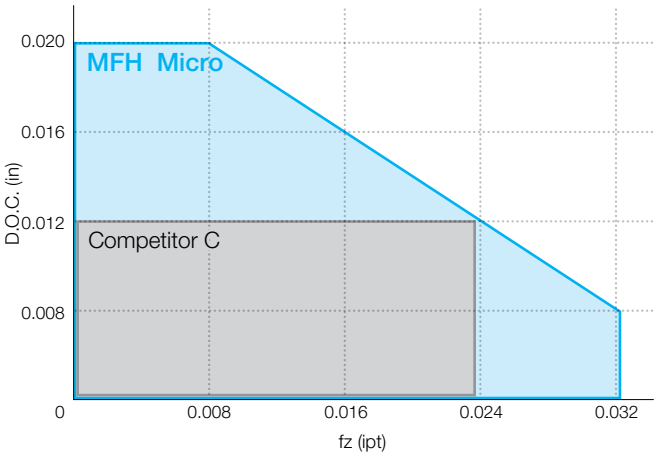


Cutting Conditions: Vc = 390 sfm, fz = 0.024 ipt, D.O.C. × ae = 0.016" × 0.197"
Cutter Dia. Ø0.375", Dry Workpiece: 1049

2 Wide Range of Machining Applications

Wide Range of Machining Applications at a Maximum Depth of Cut of 0.020"
Stable Machining Even with Small Machining Centers

Cutting Performance Map (Cutter Dia. Ø0.375")

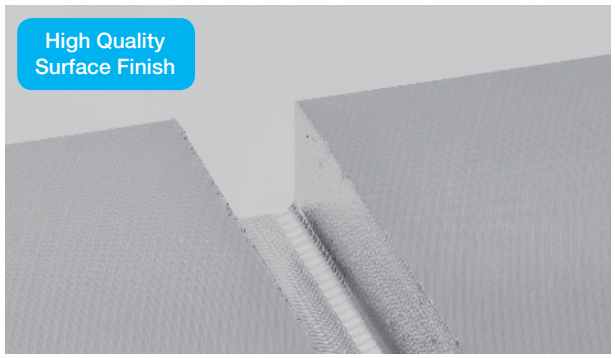


(In-house Evaluation)

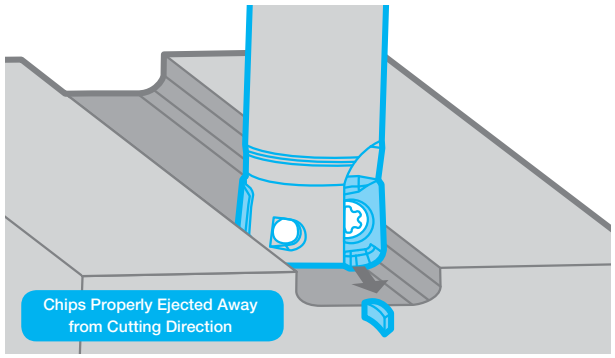
3 Good Chip Evacuation

Controls Chip Biting with Convex Cutting Edge

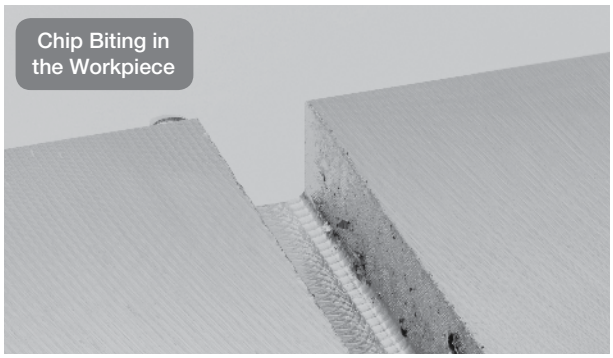
MFH Micro



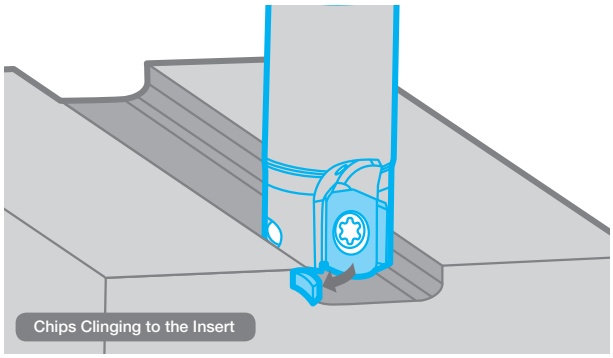
Good Chip Evacuation



Competitor F



Poor Chip Evacuation



Cutting Conditions: Cutter Dia. Dc = Ø0.375", Vc = 390 sfm, fz = 0.024 ipt,
D.O.C. = 0.016" (25 Passes) Total 0.394", Dry Workpiece: Structural Steel

(In-house Evaluation)

4 Replaces Solid End Mills to Reduce Machining Costs

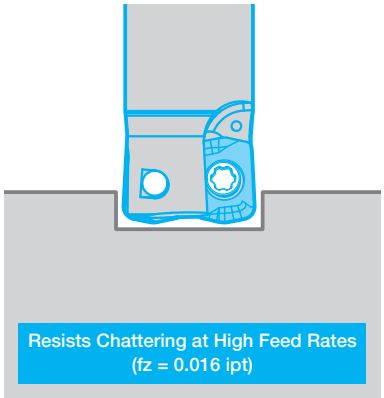
Suppresses Chattering and Increases Milling Efficiency

MFH Micro Compared to Solid End Mills

MFH Micro Q = 0.93in³/min

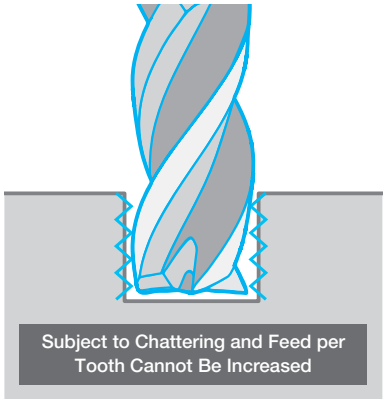
Vc = 490 sfm, fz = 0.016 ipt
D.O.C. × ae = 0.016" × 0.394", Dry
MFH10-S10-01-2T (2 Inserts)
LPGT010210ER-GM (PR1525)

1.2x
Machining Efficiency



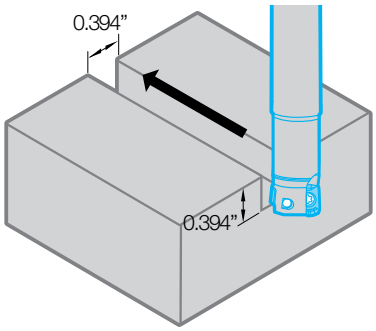
Solid End Mill Q = 0.74in³/min

Vc = 260 sfm, fz = 0.002 ipt
D.O.C. × ae = 0.012" × 0.394", Dry
Ø10mm (4 Flute)



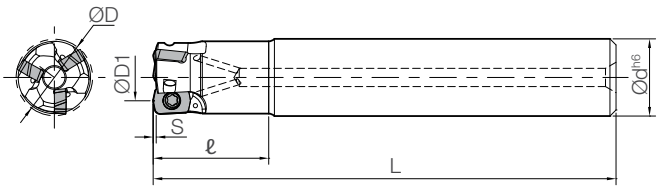
Mechanical Parts Slotting

Workpiece: 1049



(User Evaluation)

MFH Micro End Mill



MFH0500-S500-01-3T-3

Fig. 1

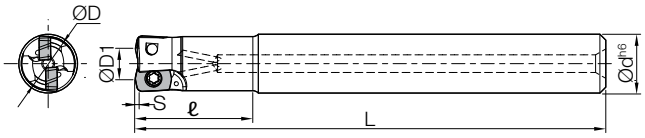


Fig. 2

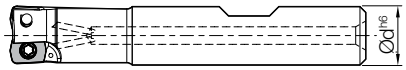


Fig. 3

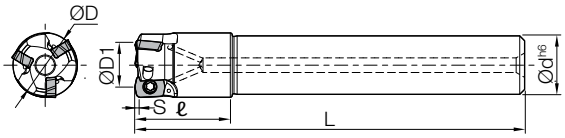


Fig. 4

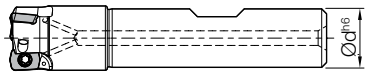


Fig. 5

Toolholder Dimensions (Inch Size)

Part Number		Stock	No. of Inserts	Dimensions (in)						Max. Ramping Angle	Rake Angle (°)	Coolant Hole	Drawing	Weight (kg)	Max RPM	Clamp Screw
				ØD	ØD1	Ød	L	ℓ	S	α	A.R.					
Standard Shank (Cylindrical)	MFH 0375-S375-01-1T-3	□	1	0.375	0.225	0.375	3.000	0.750	0.020	3.0°	+5°	Yes	Fig. 1	0.04	16,200	SB-1840TRP
	0500-S500-01-3T-3	●	3	0.500	0.350	0.500	3.000	0.750	0.020	2.0°				0.07	14,000	
	0625-S625-01-4T35	●	4	0.625	0.475	0.625	3.500	1.000	0.020	1.2°				0.12	11,400	

Toolholder Dimensions (Metric Size)

Part Number		Stock	No. of Inserts	Dimensions (mm)						Max. Ramping Angle	Rake Angle (°)	Coolant Hole	Drawing	Weight (kg)	Max RPM	Clamp Screw
				ØD	ØD1	Ød	L	ℓ	S	α	A.R.					
Standard Shank (Cylindrical)	MFH 08-S10-01-1T	○	1	8	4.2	10	75	16	0.5	4.0°	5°	Yes	Fig. 2	0.04	20,000	SB-1840TRP
	10-S10-01-2T	○	2	10	6.2	10	80	20	0.5	3.0°				0.04	16,200	
	12-S12-01-3T	○	3	12	8.2	12	80	20	0.5	2.0°				0.06	14,000	
	16-S16-01-4T	○	4	16	12.2	16	90	25	0.5	1.2°				0.12	11,400	
Oversize Shank (Cylindrical)	MFH 14-S12-01-3T	○	3	14	10.2	12	80	20	0.5	1.5°	5°	Yes	Fig. 4	0.07	12,500	
Standard Shank (Weldon)	MFH 08-W10-01-1T	○	1	8	4.2	10	58	16	0.5	4.0°	5°	Yes	Fig. 3	0.03	20,000	
	10-W10-01-2T	○	2	10	6.2	10	60	20	0.5	3.0°				0.03	16,200	
	12-W12-01-3T	○	3	12	8.2	12	65	20	0.5	2.0°				0.05	14,000	
	16-W16-01-4T	○	4	16	12.2	16	73	25	0.5	1.2°				0.10	11,400	
Oversize (Weldon)	MFH 14-W12-01-3T	○	3	14	10.2	12	65	20	0.5	1.5°	5°	Yes	Fig. 5	0.05	12,500	

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts				Applicable Inserts
	Clamp Screw	Wrench	Pre-Set Torque Wrench*	Anti-Seize Compound	
					➡ B13, F23
MFH...-01-...	SB-1840TRP	FTP-6	PST-IP6	MP-1	LPGT010210ER-GM

Recommended Cutting Conditions ➡ F23

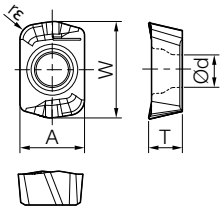
Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1)
thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

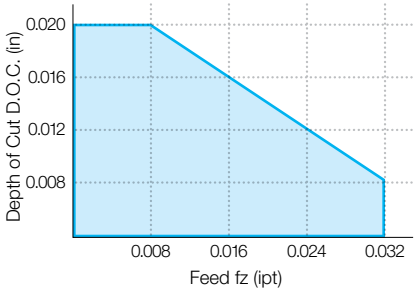
(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com
U.S. Stock Standard : ●
Made to Order / Quoted Item : □
World Express (Shipping: 7-10 Business Days) : ○

Applicable Inserts (B13)

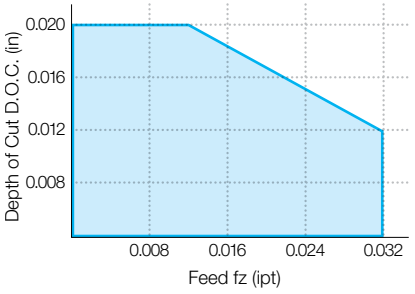
Insert		Part Number	Dimension (in)					MEGACOAT NANO		CVD
			A	T	Ød	W	rε	PR1535	PR1525	CA6535
 General Purpose		LPGT010210ER-GM	0.165	0.086	0.083	0.247	0.039	●	●	●

Cutting Performance

Cutter Dia: Ø0.375" ~ Ø0.500"
Cutter Dia: Ø8 ~ Ø12



Cutter Dia: Ø0.625"
Cutter Dia: Ø14 ~ Ø16



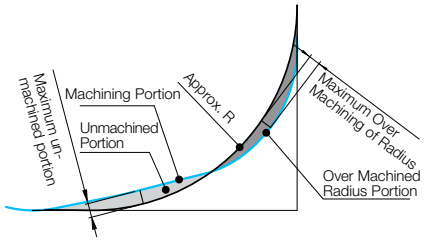
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	Holder Description and Feed Rate (fz: ipt) *Recommended D.O.C. = 0.012" Reference Value					Recommended Insert Grade (Vc: sfm)		
		MFH08-…-1T	MFH0375…-3T MFH10-…-2T	MFH0500…-3T MFH12-…-3T	MFH14-…-3T	MFH0625…-4T MFH16-…-4T	MEGACOAT NANO PR1535	MEGACOAT NANO PR1525	CVD CA6535
GM	Carbon Steel	0.008~**0.016**~0.024			0.008~**0.020**~0.031		☆ 390~**590**~820	★ 390~**590**~820	-
	Alloy Steel	0.008~**0.016**~0.024			0.008~**0.020**~0.031		☆ 330~**520**~720	★ 330~**520**~720	-
	Mold Steel (~40 HRc)	0.008~**0.012**~0.020			0.008~**0.016**~0.024		☆ 260~**460**~590	★ 260~**460**~590	-
	Mold Steel (40~50 HRc)	0.008~**0.010**~0.012			0.008~**0.010**~0.016		☆ 200~**330**~430	★ 200~**330**~430	-
	Austenitic Stainless Steel	0.008~**0.012**~0.020			0.008~**0.016**~0.024		★ 330~**520**~660	☆ 330~**520**~660	-
	Martensitic Stainless Steel	0.008~**0.012**~0.020			0.008~**0.016**~0.024		☆ 490~**660**~820	-	★ 590~**790**~980
	Precipitation Hardened Stainless Steel	0.008~**0.012**~0.020			0.008~**0.016**~0.024		★ 300~**390**~490	-	-
	Gray Cast Iron	0.008~**0.016**~0.024			0.008~**0.020**~0.031		-	★ 390~**590**~820	-
	Nodular Cast Iron	0.008~**0.012**~0.020			0.008~**0.016**~0.024		-	★ 330~**490**~660	-
	Ni-base Heat Resistant Alloy	0.008~**0.010**~0.012			0.008~**0.010**~0.016		☆ 70~**100**~160	-	★ 70~**100**~160
	Titanium Alloy	0.008~**0.010**~0.012			0.008~**0.010**~0.016		★ 130~**200**~260	-	-

★: 1st Recommendation ☆: 2nd Recommendation

- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
- The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- Internal coolant is recommended for slotting applications

Approximate Programming Radius Adjustment

Drawing	Programmable R (in)	Maximum Over Machining of Radius (in)	Maximum Unmachined Portion (in)
	**0.039**	0	0.0083
	0.047 (Recommended)	0	0.0067
	0.059	0.0032	0.0039
	0.079	0.0110	0.0004

Cutting Edge Angle: 12°

Ramping

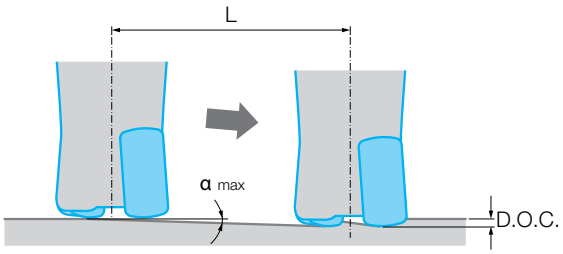
Holder	Cutter Dia. Ø	0.375"	0.500"	0.625"	8mm	10mm	12mm	14mm	16mm
MFH…-01-…	Max. Ramping Angle (°)	3.0°	2.0°	1.2°	4.0°	3.0°	2.0°	1.5°	1.2°
	tan α max	0.052	0.035	0.021	0.070	0.052	0.035	0.026	0.021

Decrease Ramping Angle if Chips Become Excessively Long

- Recommended ramping angle is ≤ max (see chart above for recommended ramp angle)
- Reduce recommended feed rate by 70%

Formula for Max. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{D.O.C.}{\tan \alpha \max}$$

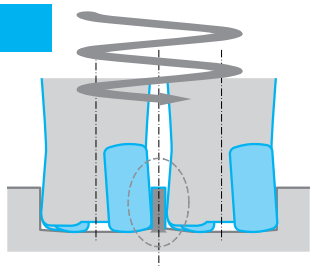


Helical Milling

- For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

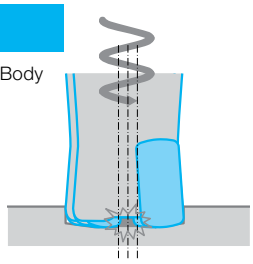
Exceeding Max. Machining Dia.

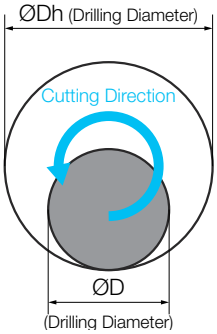
Center Core Remains



Under Min. Machining Dia.

Center Core Hits Holder Body

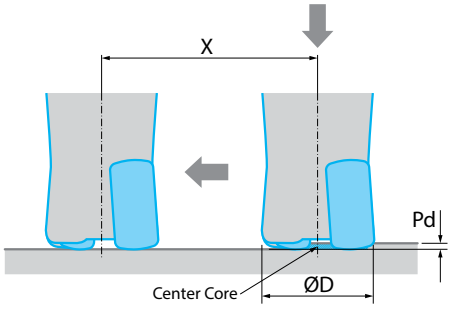




Holder	Min. Drilling Dia.	Max. Drilling Dia.
MFH…-01-…	2xØD–0.138"	2xØD–0.079"

- Keep machine depth per rotation less than max D.O.C. (0.020")
- Use climb milling. (Refer to detail on right)
- Feed rate should be reduced to 50% of recommended cutting condition (Page ➡ **F23**)
- Use caution to eliminate incidences caused by producing long chips

Drilling

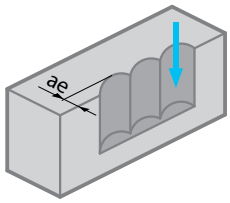


Holder	Min. Drilling Depth (Pd)	Min. Cutting Length X for Flat Bottom Surface
MFH…-01-…	0.020"	ØD-0.138"

Plunging After Drilling

- It is recommended to reduce feed by 25% of recommendation on Page ➡ **F23** until Center Core is removed
- Axial feed rate recommendation per revolution is 0.008ipr while drilling

Plunging



Insert Description	Maximum Width of Cut (ae)
LPGT01...	0.067"

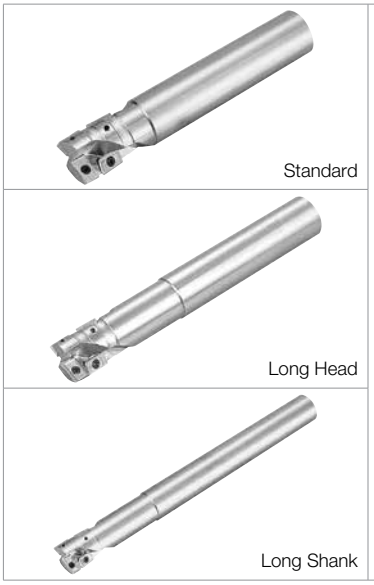
- Reduce feed rate to fz ≤ 0.008 ipt when plunging

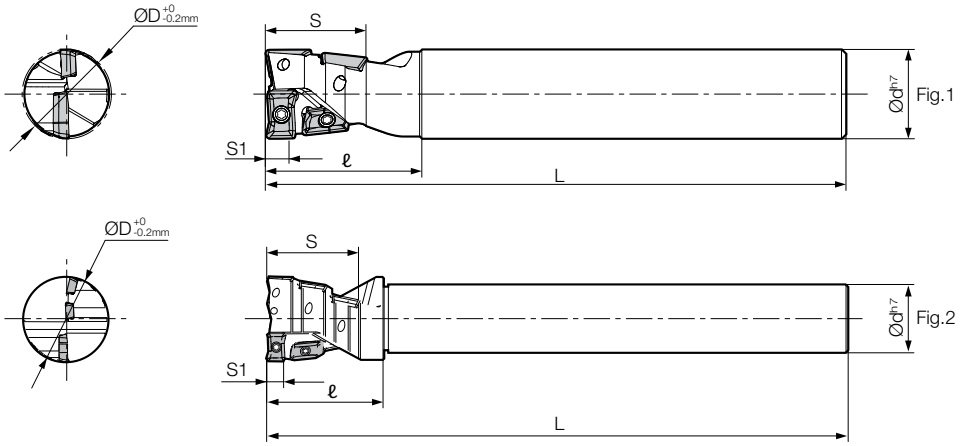
MULTI-FUNTION END MILLS

G1 - G7

Pocketing | Drilling | Shouldering | Deep Slotting | Facing

MEY End Mill





Toolholder Dimensions

	Part Number	Stock	Unit	No. of Inserts	No. of Flutes	Dimensions ØD	Dimensions Ød	Dimensions L	Dimensions ℓ	Dimensions S	Dimensions S1	Rake Angle (°) A.R.	Rake Angle (°) R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Anti-seize Compound
Standard	MEY 1000-S100-HG	●	inch	4	2	1.000	1.000	5.486	1.549	1.102	0.295	+13°	-11°	Fig.1	SB-3070TRG	DT-10	MP-1
	1250-S125-HG	●				1.250	1.250	5.858	1.921	1.417	0.374		-9°		SB-4070TRG	DT-15	
	1500-S125-HG	●		7		1.500		6.260	2.126	1.654	0.295		-11°	Fig.2	SB-3070TRG	DT-10	
	2000-S150-HG	●				1.984	1.500	6.649	2.712	2.126	0.374		-9°		SB-4070TRG	DT-15	
Standard	MEY 16-S16	○	mm	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	6.0	+13°	- 9°	Fig.1	SB-2555TRG	DT-8	
	21-S20	○				21											
	25-S25	○				25	25	140	40	28	7.5	+13°	-11°	Fig.1	SB-3070TRG	DT-10	
	26-S25	○				26											
	32-S32	○				32	32	150	50	36	9.5	+13°	- 9°	Fig.1	SB-4070TRG	DT-15	
	33-S32	○				33											
	40-S32	○		7		40	32	160	55	42	7.5	+13°	-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	
	20-S20-150H	○				20	20	150	53	22	6.0	+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	
	17-S16-190	○				17			31								
	20-S20-200	○				20	20	200	63	22	6.0	+13°	- 9°	Fig.1	SB-2555TRG	DT-8	
	21-S20-200	○				21			35								
	25-S25-220	○				25	25	220	80	28	7.5	+13°	-11°	Fig.1	SB-3070TRG	DT-10	
	26-S25-220	○				26			40								
	32-S32-230	○				32	32	230	90	36	9.5	+13°	- 9°	Fig.1	SB-4070TRG	DT-15	
	33-S32-230	○				33			50								
	40-S32-240	○		7		40		240	55	42	7.5	+13°	-11°	Fig.2	SB-3070TRG	DT-10	
	50-S42-250	○		7		50	42	250	70	54	9.5	+13°	- 9°	Fig.2	SB-4070TRG	DT-15	

S1 shows the edge length of the complete 2-insert part.

Applicable Inserts ➡ G3

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Applicable Inserts

Part Number	Applicable Inserts B19			
				
	Side Edge Insert	No. of Inserts	Center Edge Insert	No. of Inserts
MEY 1000-S100-HG	JOMT13T308ER-D	3	GOMT13T308ER-D	1
1250-S125-HG	JOMT160408ER-D	3	GOMT160408ER-D	1
1500-S125-HG	JOMT13T308ER-D	6	GOMT13T308ER-D	1
2000-S150-HG	JOMT160408ER-D	6	GOMT160408ER-D	1
MEY 16-S16(-...)	JOMT08T208ER-D	3	GOMT08T208ER-D	1
17-S16(-...)				
20-S20(-...)	JOMT100308ER-D	3	GOMT100308ER-D	1
21-S20(-...)				
25-S25(-...)	JOMT13T308ER-D	3	GOMT13T308ER-D	1
26-S25(-...)				
32-S32(-...)	JOMT160408ER-D	3	GOMT160408ER-D	1
33-S32(-...)				
40-S32(-...)	JOMT13T308ER-D	6	GOMT13T308ER-D	1
50-S42(-...)	JOMT160408ER-D	6	GOMT160408ER-D	1

Recommended Cutting Conditions

Workpiece Material	fz (ipt)		Recommended Insert Grade (Vc: sfm)		
	Drilling	Shouldering Slotting	MEGACOAT		PVD Coated Carbide
			PR1225	PR1210	PR830
Carbon Steel	0.003~0.006	0.002~0.010	★ 390~820	-	☆ 390~660
Alloy Steel	0.003~0.006	0.002~0.010	★ 330~720	-	☆ 330~590
Mold Steel	0.003~0.005	0.002~0.006	★ 260~590	-	☆ 260~490
Stainless Steel	0.003~0.005	0.002~0.006	★ 390~720	-	☆ 330~590
Cast Iron	0.002~0.008	0.002~0.010	-	★ 330~720	-

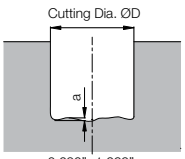
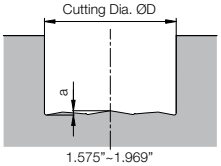
★: 1st Recommendation ☆: 2nd Recommendation

Drilling Precautions

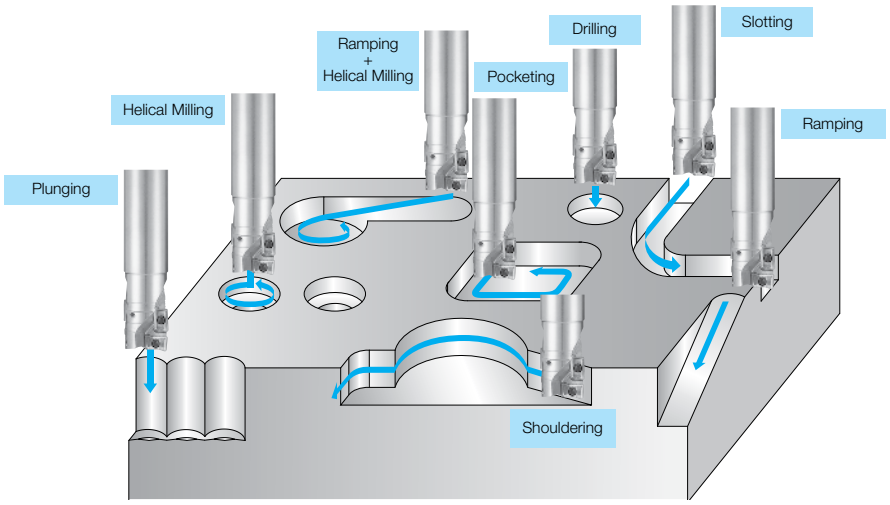
(1) Drilling conditions should be calculated as one flute effective.
(2) Use compressed air during drilling.
(3) Carbon Steel other than low carbon steel can be drilled to a depth of 0.5D without step feeding. For soft steel or sticky material such as stainless steel, step feed drilling (0.020"-0.039") is recommended.
(4) For stainless steel drilling, coolant is recommended.
(5) Please refer to the chart for maximum hole depth.

Cutting Dia. (ØD)	Max. Hole Depth
0.630" / Ø16mm	0.512" / 13mm
0.669" / Ø17mm	0.512" / 13mm
0.787" / Ø20mm	0.669" / 17mm
0.827" / Ø21mm	0.669" / 17mm
0.984" / Ø25mm	0.866" / 22mm
1.024" / Ø26mm	0.866" / 22mm
1.260" / Ø32mm	1.142" / 29mm
1.299" / Ø33mm	1.142" / 29mm
1.575" / Ø40mm	1.417" / 36mm
1.969" / Ø50mm	1.575" / 40mm

Drilled Hole Bottom Shape

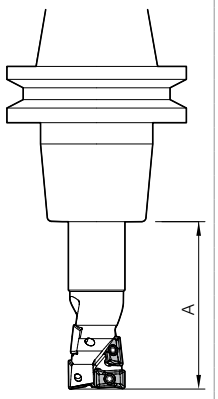
Cutting Dia.	a	Shape of the bottom
0.630" / 0.669" Ø16mm, Ø17mm	0.020" 0.50mm	
0.787" / 0.827" Ø20mm, Ø21mm	0.025" 0.64mm	
0.984" / 1.024" Ø25, Ø26	0.033" 0.85mm	
1.260" / 1.299" Ø32mm, Ø33mm	0.044" 1.12mm	
1.575" Ø40mm	0.061" 1.54mm	
1.969" Ø50mm	0.065" 1.65mm	

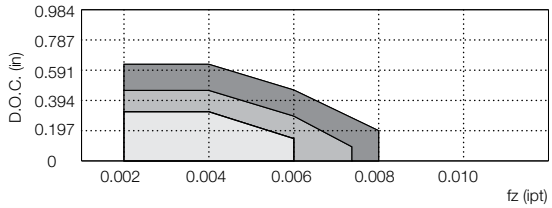
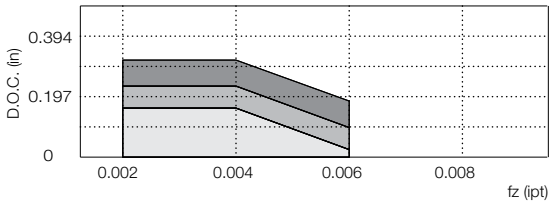
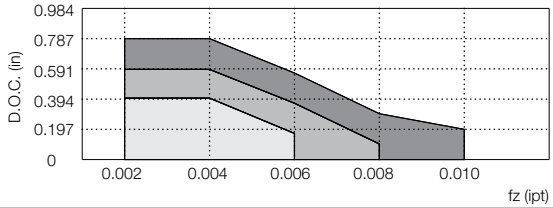
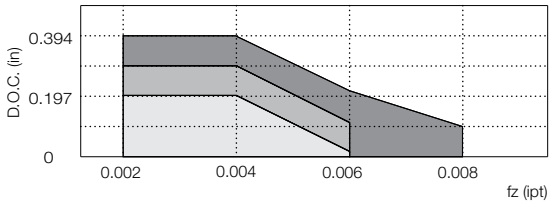
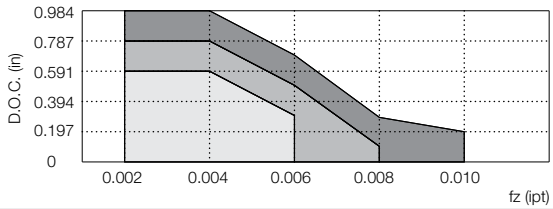
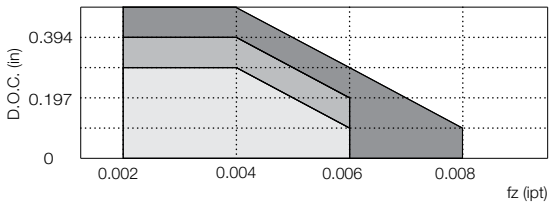
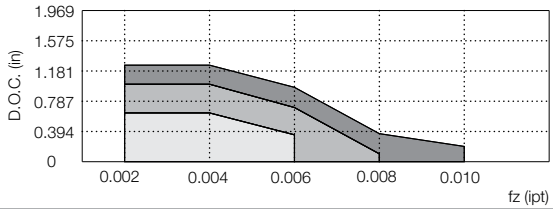
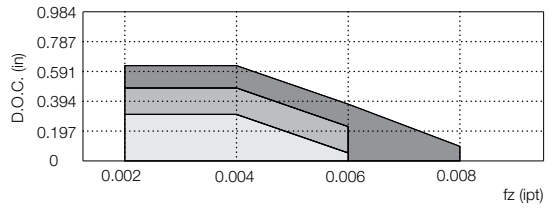
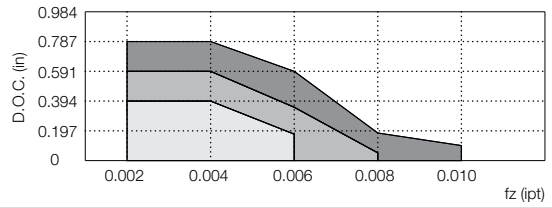
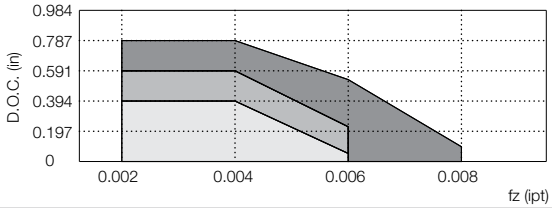
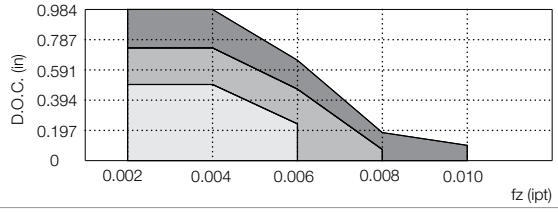
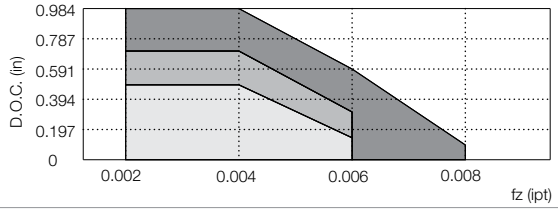
Examples of MEY Multi-function Cutting



● MEY Cutting Performance

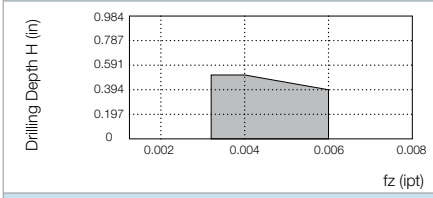
[Workpiece Material: 1049]

Cutting Dia.	Part Number	Overhang Length A (in)			Cutting Dia.	Part Number	Overhang Length A (in)			Shape
Ø16mm	**MEY16-S16**	1.220	[~2.402]	(Not Recommended)	1.000"	**MEY1000-S1000**	1.575	[~2.756]	(Not Recommended)	
	MEY16-S16-140H	-	~2.402	[~3.583]	Ø25mm	**MEY25-S25**	1.575	[~2.756]	(Not Recommended)	
	MEY16-S16-190	-	2.402	~3.583		**MEY25-S25-170H**	-	2.756	[~3.937]	
Ø17mm	**MEY17-S16**	1.220	[~2.402]	(Not Recommended)		**MEY25-S25-220**	-	~3.150	~3.937	
	MEY17-S16-190	1.220	~2.402	~3.583	Ø26mm	**MEY26-S25**	1.575	[~2.756]	(Not Recommended)	
Ø20mm	**MEY20-S20**	1.378	[~2.559]	(Not Recommended)		**MEY26-S25-220**	1.575	2.756	~3.937	
	MEY20-S20-150H	-	~2.559	[~3.740]	1.250"	**MEY1250-S125**	1.969	[~3.150]	(Not Recommended)	
	MEY20-S20-200	-	2.559	~3.740	Ø32mm	**MEY32-S32**	1.969	[~3.150]	(Not Recommended)	
Ø21mm	**MEY21-S20**	1.378	[~2.559]	(Not Recommended)		**MEY32-S32-180H**	-	~3.150	[~4.331]	
	MEY21-S20-200	1.378	~2.559	~3.740		**MEY32-S32-230**	-	3.543	~4.331]	
When using dimensions in [ ], be careful that the chucking amount is sufficient.					Ø33mm	**MEY33-S32**	1.969	[~3.150]	(Not Recommended)	
						MEY33-S32-230	1.969	~3.150	~4.331	
					1.500"	**MEY1500-S125**	2.165	[~3.346]	[~4.528]	
					Ø40mm	**MEY40-S32**	2.165	[~3.346]	[~4.528]	
						MEY40-S32-240	2.165	~3.346	~5.118	
					1.984"	**MEY2000-S150**	2.756	[~3.937]	[~5.118]	
					Ø50mm	**MEY50-S42**	2.756	[~3.937]	[~5.118]	
						MEY50-S42-250	2.756	~3.937	~5.118	

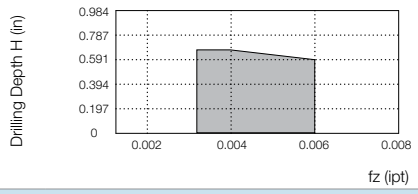
Part Number	■ Shouldering (Cutting Width ae = ØD/2) Note) ▭ Part ae = ØD/4	■ Slotting ■ Ramping and Helical Milling
MEY16-S16 **MEY17-S16**		
MEY20-S20 **MEY21-S20**		
MEY1000-S1000 **MEY25-S25** **MEY26-S25**		
MEY1250-S125 **MEY32-S32** **MEY33-S32**		
MEY1500-S125 **MEY40-S32**		
MEY2000-S150 **MEY50-S42**		

Drilling Depth [Standard / Long Head / Long Shank: 1049]

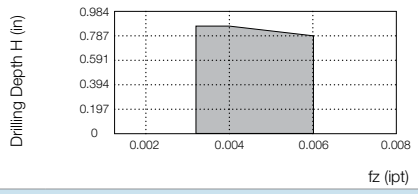
MEY16-S16 / MEY17-S16



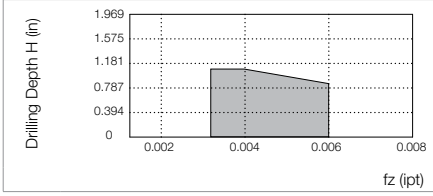
MEY20-S20 / MEY21-S20



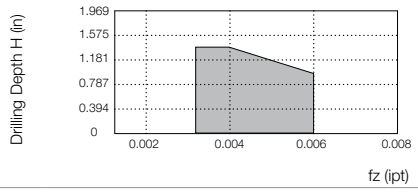
MEY1000-S100-HG
MEY25-S25 / MEY26-S25



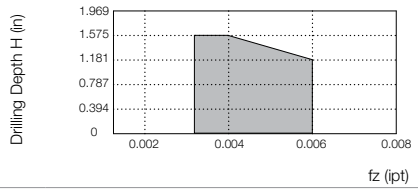
MEY1250-S125-HG
MEY32-S32 / MEY33-S32



MEY1500-S125-HG
MEY40-S32



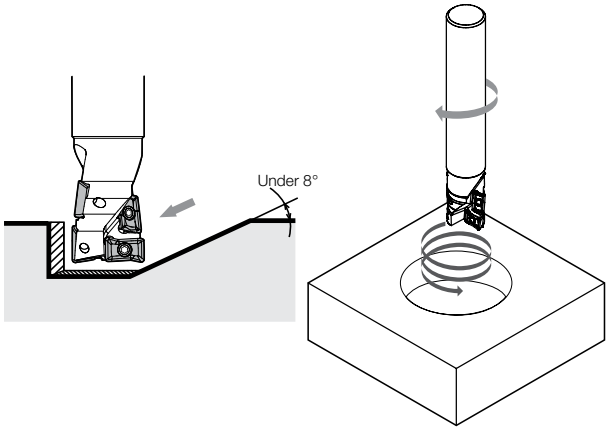
MEY2000-S150-HG
MEY50-S42



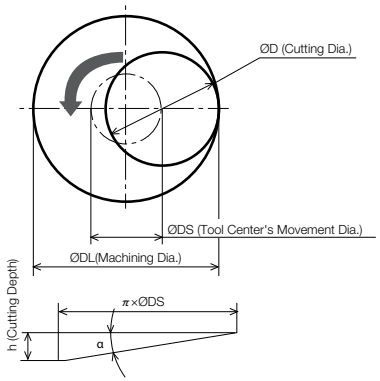
How to Use MEY Effectively

Ramping / Helical Milling

- Ramping angle is recommended to be under 8°.
- Plunge depth per revolution of helical milling should be set under 1/2 of the tool diameter.
  Use compressed air during machining.



Helical Milling Factors



How to find "ØDS"

ØDS=ØDL-ØD

How to find "h"

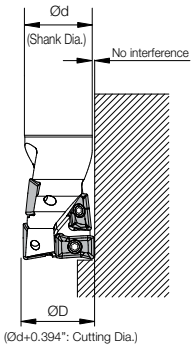
h=π×ØDS×tanα

(α should be under 8°)

Shouldering

- Tools with 0.039" larger cutting diameter than shank diameter are available.
- High wall shouldering is possible
- Lineup

Part Number	Unit	ØD	Ød
MEY1500-S125-HG	inch	1.500"	1.250"
MEY2000-S1500-HG		1.984"	1.500"
MEY17-S16	mm	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

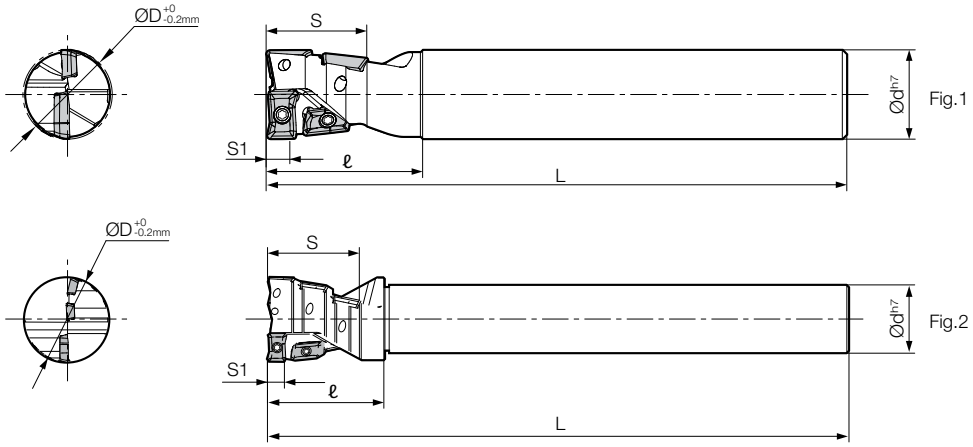


Pocketing | Drilling | Shouldering | Deep Slotting | Facing

MEZ-G End Mill


Standard


Long Shank / Long Head



Toolholder Dimensions

	Part Number	Stock	No. of Inserts	No. of Flutes	Dimensions (mm) ØD	Ød	L	ℓ	S	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts (B20)
Standard	MEZ 16-S16G	○	4	2	16	16	120	31	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6	NDMT 080208ER-D□
	20-S20G	○	4	2	20	20	130	33	21		-4°		SB-2555TRG	DT-8	NDMT 10T208ER-D□
	25-S25G	○	4	2	25	25	140	40	25		-5°		SB-3070TRG	DT-10	NEMT 120308ER-D□
	32-S32G	○	4	2	32	32	150	50	33		-2°		SB-4070TRG	DT-15	NEMT 16T308ER-D□
	40-S32G	○	7	2	39	32	160	55	39	+9°	-3°	Fig.2	SB-3070TRG	DT-10	NEMT 120308ER-D□
	50-S42G	○	7	2	49	42	170	70	51		-2°		SB-4070TRG	DT-15	NEMT 16T308ER-D□
Long Head	MEZ 16-S16-140HG	○	4	2	16	16	140	51	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6	NDMT 080208ER-D□
	20-S20-150HG	○	4	2	20	20	150	53	21		-4°		SB-2555TRG	DT-8	NDMT 10T208ER-D□
	25-S25-170HG	○	4	2	25	25	170	70	25		-5°		SB-3070TRG	DT-10	NEMT 120308ER-D□
	32-S32-180HG	○	4	2	32	32	180	80	33		-2°		SB-4070TRG	DT-15	NEMT 16T308ER-D□
Long Shank	MEZ 16-S16-190G	○	4	2	16	16	190	61	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6	NDMT 080208ER-D□
	20-S20-200G	○	4	2	20	20	200	63	21		-4°		SB-2555TRG	DT-8	NDMT 10T208ER-D□
	25-S25-220G	○	4	2	25	25	220	80	25		-5°		SB-3070TRG	DT-10	NEMT 120308ER-D□
	32-S32-230G	○	4	2	32	32	230	90	33		-2°		SB-4070TRG	DT-15	NEMT 16T308ER-D□
	40-S32-240G	○	7	2	39	32	240	55	39	+9°	-3°	Fig.2	SB-3070TRG	DT-10	NEMT 120308ER-D□
	50-S42-250G	○	7	2	49	42	250	70	51		-2°		SB-4070TRG	DT-15	NEMT 16T308ER-D□

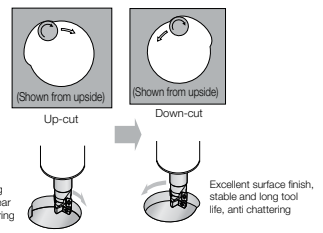
Recommended Cutting Conditions

Workpiece Material	fz (ipt) Drilling	fz (ipt) Shouldering Slotting	Recommended Insert Grade (Vc: sfm) Cermet TN100M	MEGACOAT PR1225	MEGACOAT PR1210	Carbide KW10
Carbon Steel	0.002~0.008	0.002~0.008	★ 390~660	★ 390~820	-	-
Alloy Steel	0.002~0.008	0.002~0.008	★ 330~590	★ 330~720	-	-
Mold Steel	0.002~0.005	0.002~0.006	★ 330~590	★ 260~590	-	-
Stainless Steel	0.002~0.005	0.002~0.006	☆ 390~660	★ 390~720	-	-
Cast Iron	0.002~0.008	0.002~0.008	-	-	★ 330~720	☆ 260~490
Non-ferrous Metals	0.002~0.008	0.002~0.008	-	-	-	★ 330~980

★: 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.

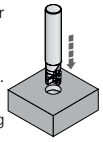
- Down-Cut milling is recommended for the improvement of tool life and surface finish.
- Compressed air is recommended.



How to Use the Silver Drill Mill MEZ-G Effectively

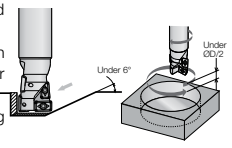
Drilling

- Step feeding is recommended for good chip control. (Depth approx. 1mm)
- Drill depth should be under 0.5D. (D:Drilling Dia.) Use compressed air when 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 when 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 type) N(D/E)MT...ER-DH (Tough Edge type)

G MULTI-FUNCTION

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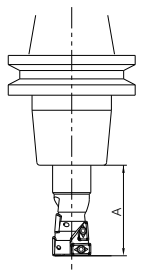
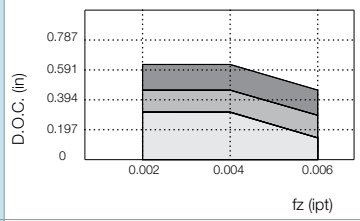
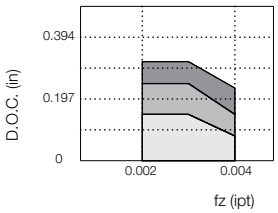
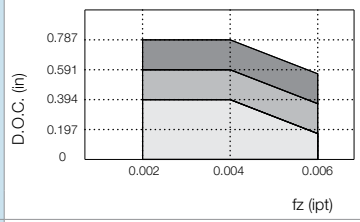
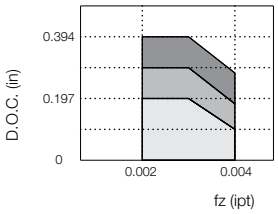
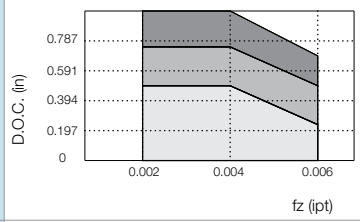
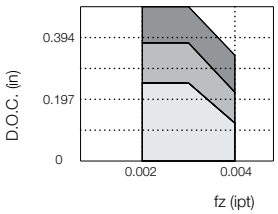
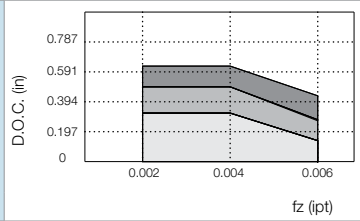
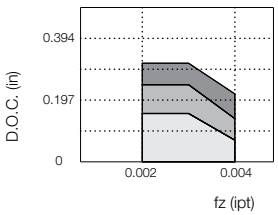
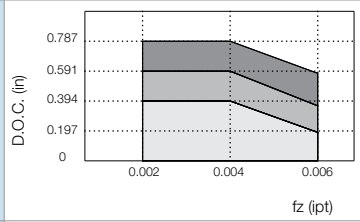
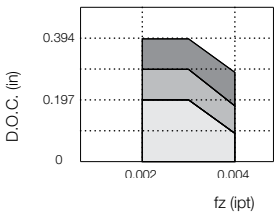
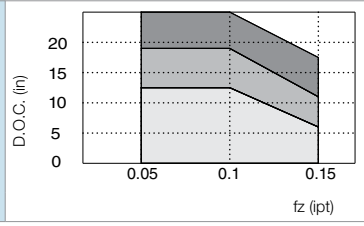
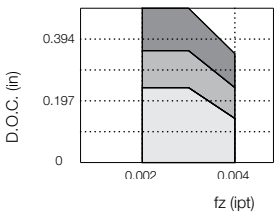
Cutting Performance of MEZ-G

[Workpiece Material: 1049]

Cutting Dia.	Part Number	Overhang Length A (in)			Cutting Dia.	Part Number	Overhang Length A (in)			Shape
Ø16	MEZ16-S16G	1.220	[~2.402]	(Not Recommended)	Ø32	MEZ32-S32G	1.969	[~3.150]	(Not Recommended)	
	MEZ16-S16-140HG	-	~2.402	[~3.583]		MEZ32-S32-180HG	-	3.150	[~4.331]	
	MEZ16-S16-190G	-	2.402	~3.583		MEZ32-S32-230G	-	3.543	~4.331	
Ø20	MEZ20-S20G	1.299	[~2.480]	(Not Recommended)	Ø39	MEZ40-S32G	2.165	[~3.346]	[~4.528]	
	MEZ20-S20-150HG	-	~2.480	[~3.661]		-	-	-	-	
	MEZ20-S20-200G	-	2.480	~3.661		MEZ40-S32-240G	2.165	~3.346	~4.528	
Ø25	MEZ25-S25G	1.575	[~2.756]	(Not Recommended)	Ø49	MEZ50-S42G	2.756	[~3.937]	[~5.118]	
	MEZ25-S25-170HG	-	2.756	[~3.937]		-	-	-	-	
	MEZ25-S25-220G	-	3.150	~3.937		MEZ50-S42-250G	2.756	~3.937	~5.118	

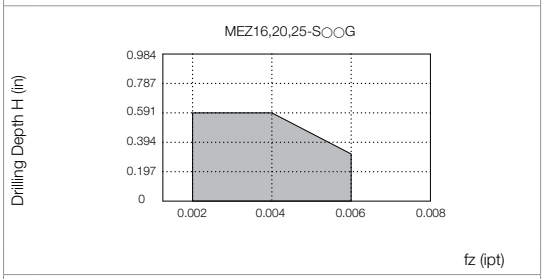
When using dimensions in [ ], be careful that the chucking amount is sufficient.

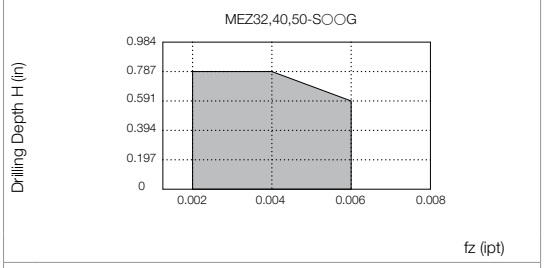
Shouldering / Slotting

Part Number	■ Shouldering (Cutting width ae = ØD/2) Note) ☐ Part ae = ØD/4	■ Slotting ■ Ramping and Helical Milling
MEZ16-S16G		
MEZ20-S20G		
MEZ25-S25G		
MEZ32-S32G		
MEZ40-S32G		
MEZ50-S42G		

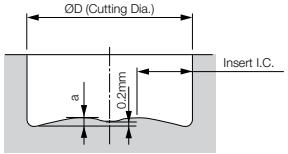
Drilling Depth

■ Drilling Depth
(Standard / Long Head / Long Shank)



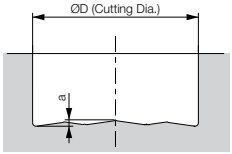


Shape of the bottom of the drilled hole
(Ø16mm~Ø49mm)



Ø16mm~Ø32mm

Cutting Dia.	Ø16mm	Ø20mm	Ø25mm	Ø32mm
a	0.30mm	0.33mm	0.38mm	0.45mm



Ø39mm,Ø49mm

Cutting Dia.	Ø39mm	Ø49mm
a	0.68mm	0.74mm

SLOT MILL

H1 - H27

MST SLOT MILL	H2 - H27
MSTA	H4
MSTB	H8
MSTC	H13

MST Slot Mill

MSTA
For Narrow Groove Widths
Self Clamping Type

Slot Width: 1.60 ~ 4.05mm

MSTB
For Medium Groove Widths
Semi-adjustable Width Type

Slot Width: 6.00 ~ 13.00mm

MSTC
For Wide Groove Widths
Full-adjustable Width Type

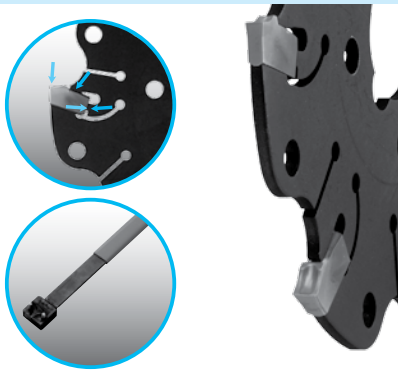
Slot Width: 14.00 ~ 23.30mm

Lineup of MST Series Slot Mills

Type	Applicable Inserts	Features	Slot Width (mm)													
			1.60	2.20 (2.25)	3.05	4.05	6.00	8.00	10.00	13.00	14.00	16.00	18.00	20.00	22.00	24.00
MSTA	SLT..	1.60~4.05mm Fixed	●	●	●	●										
MSTB	LNEU12..	6.00~13.00mm Semi-adjustable					←			→	* Adjustable in 0.50mm increments between 6.00mm and 13.00mm depending on combination of inserts					
MSTC	SP..10T3..	14.00~18.00mm Full-adjustable									←		→			* Adjustable between 14.00mm and 18.00mm
	SD..1204...	18.00~23.30mm Full-adjustable											←			→ * Adjustable between 18.00mm and 23.30mm

MSTA Slot Mill [Slot Width 1.6, 2.2 (2.25), 3.05, 4.05mm]

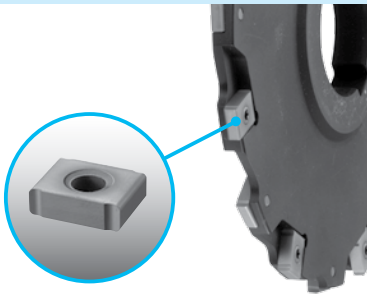
- **Self-clamping Type Slot Mill**
  MSTA Slot Mills have simple self-clamping system to allow for easy attachment by just installing the insert.
- **High Rigidity Clamping System**
  Owing to the highly rigid clamping system - with an end-stopper, the cutter enables high operability and stable slotting by maintaining an accurate edge position.
- **Double-Prism Clamping System**
  High replacement precision due to the clamping system with two prisms.
- **Easy Replacement**
  The replacement of inserts is easy and quick by using special wrench.



*Wrench Sold Separately

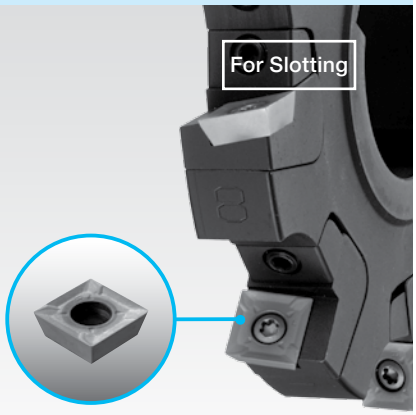
MSTB Slot Mill (Slot Width 6.0~13.0mm)

- **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.
- **Inserts have four edge and are, therefore, cost-effective**
- **Applicable to a variety of slotting by choosing different inserts**
  By changing the thickness of inserts, various slotting widths are possible up to a max of 13.00mm in 0.50mm increments.

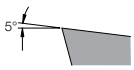
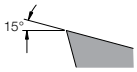
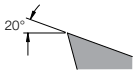


MSTC Slot Mill (Slot Width 14.0~23.3mm)

- Lay-down type inserts / fully 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 due to unique cam style adjustment mechanism
- Four-sided inserts are cost-effective
- Wide range of corner radii available
- When utilizing wiper edge insert, an excellent surface finish can be expected
- Numerous insert geometries and grades, are available for various types of workpiece machining



Insert Features

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 Nodular 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 Nodular Cast Iron.
- For medium speed machining.

PR0735

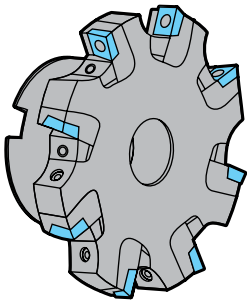
- TiN based PVD Coated Carbide
- For Stainless Steel, Heat Resistant Alloys, etc.
- For low to medium speed machining.

PR0110

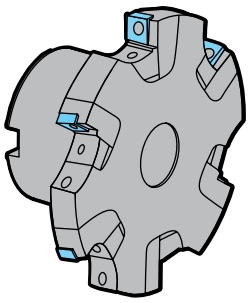
- TiB_2 based PVD Coated Carbide
- For Non-ferrous Metals such as Aluminum Alloys (Si<10%) and Titanium Alloys.
- For high speed machining.

With Boss

Right-hand



Left-hand

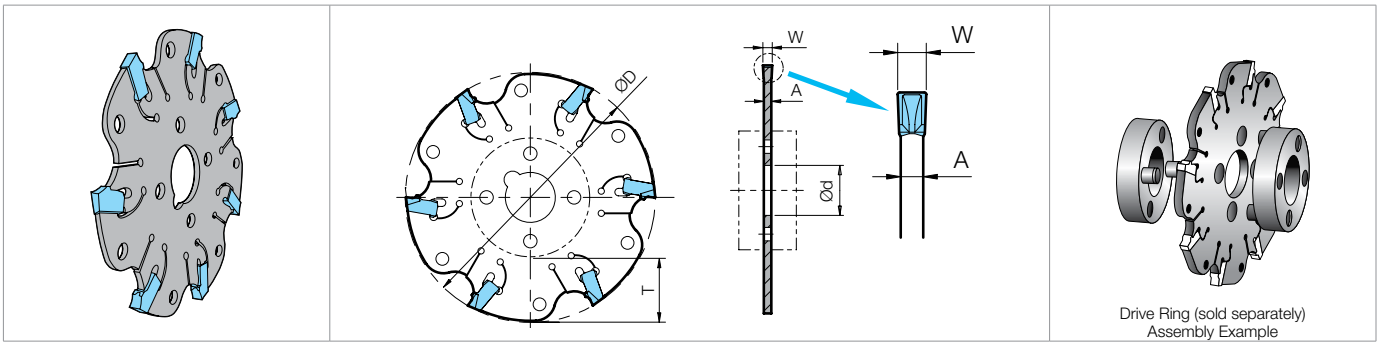


Slotting | Slotting | Cut-Off

Identification System

MSTA	○○○	N	○○○	–	○○	T
Self-clamping Type Slot Mill	Cutting Dia.	Neutral	Edge Width		No. of Flutes	

MSTA (Inch Size)



Toolholder Dimensions (Inch Size)

Part Number	Stock	Edge Width W (in)	Slot Depth T (in)	No. of Inserts	Dimensions (in) ØD	Ød (H7)	A	Weight (kg)	Max. RPM	Spare Parts Wrench	Applicable Inserts H6
MSTA 02N063-5T	○	0.063	0.625	5	2.500	0.625	0.051	0.03	5,100	MS-FRW1 (Wrench is not included. Please purchase it separately) • How to Use Wrench Ref. to Page H7	SLT16…
03N063-7T	○		0.875	7	3.000	0.625		0.04	4,000		
04N063-9T	○		1.063	9	4.000	1.000		0.07	3,200		
05N063-11T	○		1.375	11	5.000	1.250		0.10	2,600		
MSTA 03N089-7T	○	0.089	0.875	7	3.000	0.625	0.071	0.05	4,000		SLT22…
04N089-9T	○		1.063	9	4.000	1.000		0.08	3,200		
06N089-14T	○		1.438	14	6.000	1.250		0.30	2,000		
MSTA 02N126-4T	○	0.120	0.625	4	2.500	0.625	0.095	0.05	5,100		SLT30…
03N126-6T	○		0.875	6	3.000	0.625		0.08	4,000		
04N126-9T	○		1.063	9	4.000	1.000		0.13	3,200		
05N126-11T	○		1.375	11	5.000	1.250		0.20	2,600		
06N126-14T	○		1.438	14	6.000	1.250		0.35	2,000		
MSTA 03N164-6T	○	0.160	0.875	6	3.000	0.625	0.134	0.10	4,000		SLT40…
04N164-9T	○		1.063	9	4.000	1.000		0.15	3,200		
05N164-11T	○		1.375 (34.925mm)	11	5.000	1.250		0.25	2,600		

Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold separately. Please purchase two drive rings per one MSTA slot mill.
2. Do not exceed the max. revolution.
3. Do not operate cutter on reverse revolution.
4. Wrench (MS-FRW1) is not included. Please purchase it separately.

Applicable Arbor H27
Recommended Cutting Conditions H7

Drive Ring (Inch Size)

Shape	Part Number	Stock	Dimensions (in) Ød	ØD	A1	a	Ød1	Drawing	Applicable Toolholders
Fig.1	DR0625-1250A	○	0.625 (15.875mm)	1.250 (31.750mm)	0.315 (8mm)	0.130 (3.3mm)	0.158 (4mm)	Fig.1	MSTA 02N126-4T
Fig.2	DR0625-1250B	○	0.625 (15.875mm)	1.250 (31.750mm)	0.315 (8mm)	0.130 (3.3mm)	0.120 (3mm)	Fig.2	MSTA 02N063-5T
	DR0625-1250C	○						Fig.3	MSTA 03N○○○-○T
Fig.3	DR1000-1875	○	1.000 (25.400mm)	1.875 (47.625mm)	0.394 (10mm)	0.256 (6.5mm)	0.200 (5mm)	Fig.3	MSTA 04N○○○-○T
	DR1250-2250	○	1.250 (31.750mm)	2.250 (57.150mm)	0.394 (10mm)	0.319 (8.1mm)	0.240 (6mm)	Fig.3	MSTA 05N○○○-○T
	DR1250-3125	○	1.250 (31.750mm)	3.125 (79.375mm)	0.472 (12mm)	0.319 (8.1mm)	0.472 (12mm)	Fig.3	MSTA 06N○○○-○T

Wrenches and drive rings are sold in 1 piece per box.

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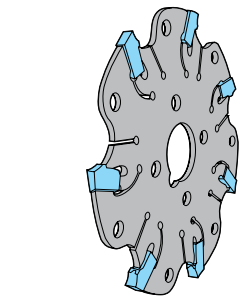
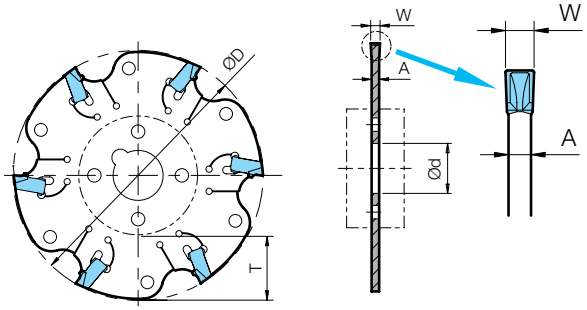
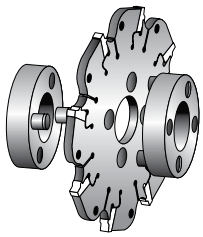
MSTA (Metric Size)







Drive Ring (sold separately)
Assembly Example

Toolholder Dimensions (Metric Size)

Part Number	Stock	Edge Width W (mm)	Slot Depth T (mm)	No. of Inserts	Dimensions (mm) ØD	Ød (H7)	A	Weight (kg)	Max. RPM	Spare Parts Wrench	Applicable Inserts ➡ H6
MSTA 63N16-5T	○	1.60	15	5	63	16	1.3	0.03	5,100	MS-FRW1 (Wrench is not included. Please purchase it separately) • How to use Wrench Ref. to page ➡ H7	SLT16…
80N16-7T	○		21	7	80	16		0.04	4,000		
100N16-9T	○		27	9	100	22		0.07	3,200		
125N16-11T	○		35	11	125	32		0.10	2,600		
MSTA 63N22-5T	○	2.20 (2.25)	15	5	63	16	1.8	0.03	5,100		SLT22…
80N22-7T	○		21	7	80	16		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		0.30	2,000		
MSTA 63N30-4T	○	3.00	15	4	63	16	2.4	0.05	5,100		SLT30…
80N30-6T	○		21	6	80	16		0.08	4,000		
100N30-9T	○		27	9	100	22		0.13	3,200		
125N30-11T	○		35	11	125	32		0.20	2,600		
160N30-14T	○		40	14	160	40		0.35	2,000		
MSTA 63N40-4T	○	4.00	15	4	63	16	3.4	0.06	5,100		SLT40…
80N40-6T	○		21	6	80	16		0.10	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		0.40	2,000		

Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold separately. Please purchase two drive rings per one MSTA slot mill.
2. Do not exceed the max. revolution.
3. Do not operate cutter on reverse revolution.
4. Wrench (MS-FRW1) is not included. Please purchase it separately.

Applicable Arbor ➡ H27
Recommended Cutting Conditions ➡ H7

Drive Ring (Metric Size)

Shape	Part Number	Stock	Dimensions (mm) Ød	ØD	A1	a	Ød1	Drawing	Applicable Toolholders
Fig.1	DR16-32A	○	16	32	8	4.1	3	Fig.2	MSTA 63N16-5T, 63N22-7T
Fig.2	DR16-32B	○	16	32	8	4.1	4	Fig.1	MSTA 63N30-4T, 63N40-4T
Fig.3	DR16-38	○	16	38	8	4.1	4	Fig.3	MSTA 80NOO-OT
	DR22-46	○	22	46	10	6.1	5	Fig.3	MSTA 100NOO-OT
	DR32-55	○	32	55	10	8.1	6	Fig.3	MSTA 125NOO-OOT
	DR40-80	○	40	80	12	10.1	12	Fig.3	MSTA 160NOO-OOT

Wrenches and drive rings are sold in 1 piece per box.

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

Insert Identification System

SLT	16	–	15	S	KB
①	②		③	④	⑤

① Insert Symbol

② Edge Width

Symbol	Edge Width
16	1.60mm
22	2.20mm(2.25mm)
30	3.05mm
40	4.05mm

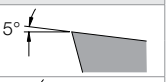
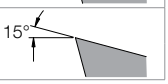
③ Corner-R (rε)

Symbol	Corner-R (rε)
15	0.15mm
20	0.20mm

④ Edge Preparation

Symbol	Edge Preparation
S	Chamfer + R-honed

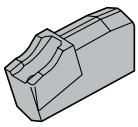
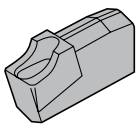
⑤ Chipbreaker Symbol

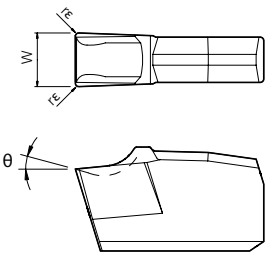
Symbol	Rake Angle
KB	5° 
KD	15° 

Applicable Inserts (SLT)

Usage Classification
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel	●	○
M	Stainless Steel	○	●
K	Cast Iron	○	
N	Non-ferrous Metals		
S	Heat-resistant Alloys		●
	Titanium Alloy		

Insert	Part Number		Dimensions (mm) W	Dimensions (mm) rε	Rake Angle (°) θ	CVD Coated Carbide CA0835	PVD Coated Carbide PR0735	Applicable Toolholder
	SLT	16-15SKB	1.60 +0.00 -0.10	0.15	5°	○	○	H4-H5
		22-20SKB	2.20 +0.08 -0.05	0.20	5°	○	○	
		30-20SKB	3.05 +0.15 -0.00			●	●	
		40-20SKB	4.05 +0.15 -0.00			○	○	
 Low Cutting Force	SLT	16-15SKD	1.60 +0.00 -0.10	0.15	15°	○	○	
		22-20SKD	2.25 +0.15 -0.00	0.20	15°	○	○	
		30-20SKD	3.05 +0.15 -0.00			○	○	
		40-20SKD	4.05 +0.15 -0.00			○	○	



Chipbreaker Selection

KB Chipbreaker ··· General Purpose Chipbreaker for Steel and Cast Iron
KD Chipbreaker ··· Low Cutting Force Chipbreaker for Stainless Steel

Feature of Insert Grades

CA0835

- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Nodular Cast Iron.
- For medium to high speed machining.

PR0735

- TiN base PVD Coated Carbide
- For Stainless Steel, Heat-Resistant Alloys, etc.
- For low to medium speed machining.

Inserts are sold in 10 piece boxes.

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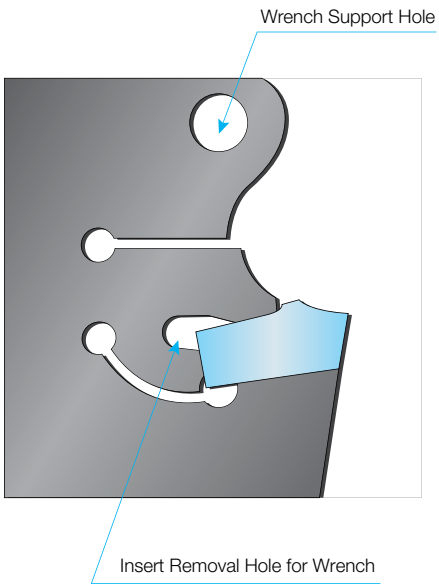
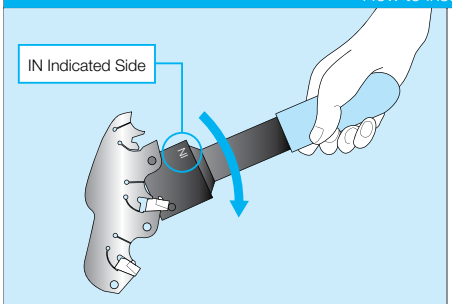
Set up

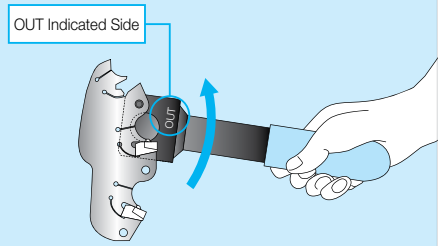


How to install inserts



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 remove inserts



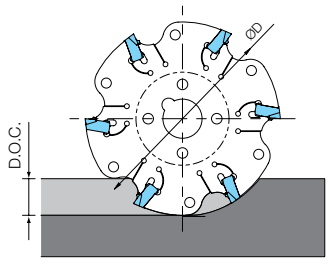
1. Insert one of the pins on the wrench (on OUT indicated side) into the wrench support hole, and insert other pin into the insert removal hole.
2. Insert can be removed by rotating the wrench counter clock wise. (A magnet is installed on OUT indicated side.)

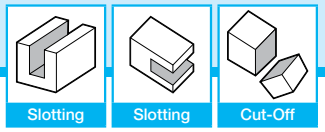
Note) Use appropriate wrench for set up.

Recommended Cutting Conditions

Workpiece Material		Hardness (HRC)	Recommended Insert Grade (Vc: sfm)		fz (ipt)				Notes
			CVD Coated Carbide	PVD Coated Carbide	Edge Width				
			CA0835	**PR0735**	0.063" 1.60mm	0.087" (0.089") 2.20mm (2.25mm)	0.118" 3.00mm	0.157" 4.00mm	
Low Carbon Steel	1010~1025	20	820~1020	660~820	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	Coolant
Carbon Steel	1030~1059, 1060 Annealed	29	520~620	430~520	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
	1030~1059, 1060 Heat Treated	37	460~590	360~490	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
Alloy Steel	Annealed	28	460~590	360~490	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
	Heat Treated	41	390~520	330~430	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
High Carbon Alloy	D2, H13, etc.	42	330~460	260~390	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
Stainless Steel	304, 316, etc. Austenitic	33	490~620	260~390	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
	403, 410, etc. Martensitic	45	460~590	200~260	0.001~0.004	0.002~0.005	0.002~0.006	0.003~0.007	
Gray Cast Iron	NO.45~NO.60	38	520~660	-	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	Dry
Nodular Cast Iron	60-40-18~70-50-05	25	430~520	-	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	
	80-60-03~120-90-02	37	360~460	-	0.001~0.005	0.002~0.006	0.002~0.007	0.003~0.008	

Note) 1. Use down-cut machining.
2. If D.O.C. is under 1/10 of Cutter Dia.(ØD), it is possible to increase feed per tooth (fz) 40%.





Identification System

MSTB Slot Mill

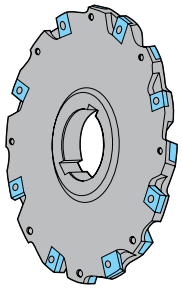
Inch Size

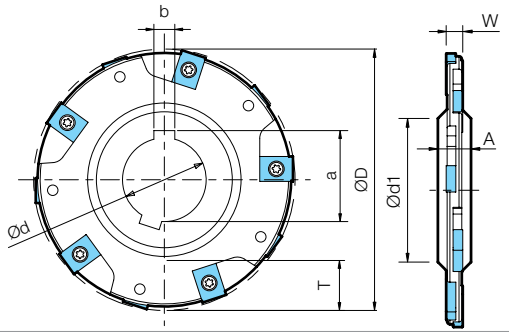
MSTB	○○○○	A	N	○○○	–	○	T
Slot Mill with Up-right Insert	Cutting Dia. (inch)	A : Without Boss	N : Neutral	Edge Width (inch)		No. of Flutes	

Metric Size

MSTB	○○○	A	N	○○○○	–	○	T
Slot Mill with Up-right Insert	Cutting Dia. (mm)	A : Without Boss S : With Boss	N : Neutral	Edge Width (mm)		No. of Flutes	

MSTB Without Boss





In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Inch Size)

Part Number	Stock	Edge Width (inch)		Slot Depth	No. of Inserts	No. of Edge Lines H11	Dimensions (inch)						Weight (kg)	Max. RPM
		W (Min.)	W (Max.)	T (inch)			ØD	Ød (H7)	Ød1	A	a	b		
MSTB 3000AN250-4T	○	0.250	0.289	0.625	8	4	3.000	1.000	1.500	0.500	1.106	0.250	0.3	9,470
4000AN250-5T	○	0.250	0.289	0.935	10	5	4.000	1.250	1.880	0.500	1.386	0.312	0.3	8,200
5000AN250-6T	○			1.435	12	6	5.000						0.7	7,300
6000AN250-8T	○	0.250	0.289	1.750	16	8	6.000	1.500	2.250	0.500	1.665	0.375	1.0	6,700
MSTB 4000AN312-5T	○	0.312	0.351	0.966	10	5	4.000	1.250	1.880	0.500	1.386	0.312	0.5	7,400
5000AN312-6T	○			1.466	12	6	5.000						0.8	6,600
6000AN312-8T	○	0.312	0.351	1.781	16	8	6.000	1.500	2.250	0.500	1.665	0.375	1.1	6,000
MSTB 4000AN375-3T	○	0.375	0.414	1.000	9	3	4.000	1.250	1.880	0.500	1.386	0.312	0.5	7,400
5000AN375-4T	○			1.500	12	4	5.000						0.8	6,600
6000AN375-5T	○	0.375	0.414	1.812	15	5	6.000	1.500	2.250	0.500	1.665	0.375	1.3	6,000
MSTB 4000AN500-3T	○	0.500	0.539	1.060	9	3	4.000	1.250	1.880	0.500	1.386	0.312	0.6	4,900
5000AN500-4T	○			1.560	12	4	5.000						1.1	4,400
6000AN500-5T	○	0.500	0.539	1.875	15	5	6.000	1.500	2.250	0.500	1.665	0.375	1.7	4,000

Toolholder Dimensions (Metric Size)

Part Number	Stock	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines H11	Dimensions (mm)						Weight (kg)	Max. RPM
		W (Min.)	W (Max.)	T (mm)			ØD	Ød (H7)	Ød1	A	a	b		
MSTB 80AN0607-4T	○	6	7	15.0	8	4	80	27	44	12	29.8	7	0.3	9,240
100AN0607-5T	○	6	7	21.0	10	5	100	32	52	12	34.8	8	0.4	8,270
125AN0607-6T	○	6	7	28.0	12	6	125	40	63	12	43.5	10	0.7	7,390
160AN0607-8T	○			45.5	16	8	160						1.1	6,540
MSTB 80AN0809-4T	○	8	9	16.0	8	4	80	27	44	12	29.8	7	0.4	9,240
100AN0809-5T	○	8	9	22.0	10	5	100	32	52	12	34.8	8	0.5	8,270
160AN0809-8T	○	8	9	45.5	16	8	160	40	63	12	43.5	10	1.3	6,540
MSTB 125AN1011-4T	○	10	11	30.0	12	4	125	40	63	12	43.5	10	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	40	63	12	43.5	10	1.6	6,540

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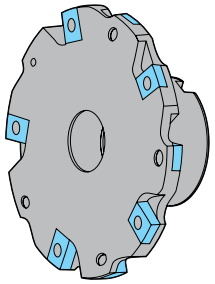
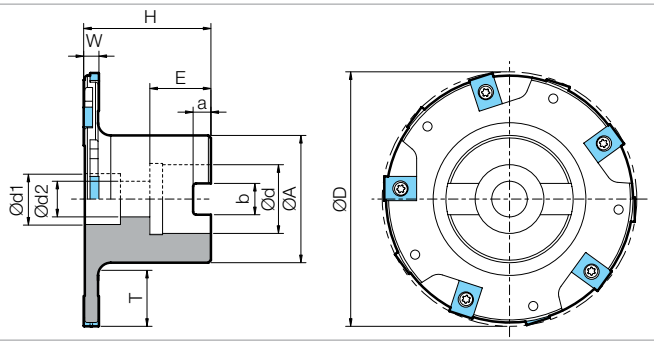
World Express (Shipping: 7-10 Business Days) : ○

MSTB With Boss





Toolholder Dimensions

Part Number	Stock	Unit	Edge Width W (Min.)	Edge Width W (Max.)	Slot Depth T	No. of Inserts	No. of Edge Lines	Dimensions ØD	Ød (H7)	ØA	H (Min.)	E	a	b	Ød1	Ød2	Weight (kg)	Max. RPM
MSTB 2500SN250-3T	○	inch	0.250	0.289	0.550	6	3	2.500	0.750	1.580	1.875	0.075	0.220	0.332	-	0.406	0.5	10,400
2500SN312-3T	○		0.312	0.351	0.550	6	3	2.500	0.750	1.580	1.875	0.075	0.220	0.332	-	0.406	0.6	9,400
MSTB 80SN0607-4T	○	mm	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	7.0	12.4	20	14	1.0	8,270
160SN0607-8T	○				41	16	8	160	40	70		28	9.0	16.4	33	22	1.9	6,540
MSTB 80SN0809-4T	○		8	9	16	8	4	80	22	40	50	23	6.3	10.4	18	12	0.8	9,240
100SN0809-5T	○				21	10	5	100	27	50		24	7.0	12.4	20	14	1.2	8,270
160SN0809-8T	○				41	16	8	160	40	70		28	9.0	16.4	33	22	2.2	6,540
MSTB 125SN1011-4T	○		10	11	26	12	4	125	40	70	50	28	9.0	16.4	33	22	2.0	7,390
160SN1011-5T	○				43	15	5	160									2.5	6,540

Note) H (Min.) dimension shows case of minimum edge width.

Spare Parts and Applicable Inserts

		Part Number	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Arbor Bolt	Applicable Inserts ➡ H10-H11
Without Boss	Inch Sizes	MSTB ○○○○AN250-○T	SE-40055TR	TT-15L	MP-1	-	LN12...
		MSTB ○○○○AN312-○T	SE-40068TR	TT-15L	MP-1	-	
		MSTB ○○○○AN375-○T					
		MSTB ○○○○AN500-○T	SE-40090TR	TT-15L	MP-1	-	
Without Boss	Metric Sizes	MSTB ○○○AN0607-○T	SE-40050TRN	TT-15L	MP-1	-	
		MSTB ○○○AN0809-○T	SE-40068TR	TT-15L	MP-1	-	
		MSTB ○○○AN1011-○T					
		160AN1213-5T	SE-40090TR	TT-15L	MP-1	-	
With Boss		MSTB 80SN0607-4T	SE-40050TRN	TT-15L	MP-1	HH10X35	
		100SN0607-5T	SE-40050TRN	TT-15L	MP-1	HH12X35	
		160SN0607-8T	SE-40050TRN	TT-15L	MP-1	HH20X40	
		MSTB 80SN0809-4T	SE-40068TR	TT-15L	MP-1	HH10X35	
		100SN0809-5T	SE-40068TR	TT-15L	MP-1	HH12X35	
		160SN0809-8T	SE-40068TR	TT-15L	MP-1	HH20X40	
		MSTB ○○○SN1011-○T	SE-40068TR	TT-15L	MP-1	HH20X40	

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Applicable Arbor ➡ **H27**

Recommended Cutting Conditions ➡ **H12**

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

Insert Identification System

LNEU	12	35	–	03	S
①	②	③		④	⑤

① Insert Symbol

② Insert Length

Symbol	Insert Length
12	12.70mm

③ Edge Width

Symbol	Edge Wdth
35	3.50mm
40	4.00mm

④ Corner-R (rε)

Symbol	Corner-R (rε)
03	0.30mm
04	0.40mm

⑤ Edge Preparation

Symbol	Edge Preparation
S	Chamfer + R-honed

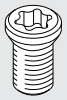
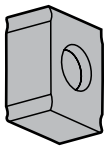
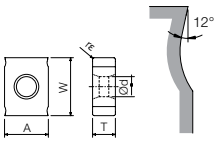
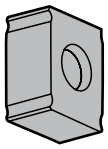
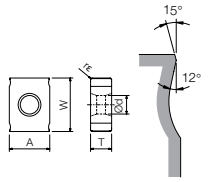
Applicable Inserts (LN)

(mm)

Part Number	W	A
LNEU12	12.7	9.52

Usage Classification
● : 1st Choice
○ : 2nd Choice

		PR0725
P	Carbon Steel / Alloy Steel	●
M	Stainless Steel	●
K	Cast Iron	○
N	Non-ferrous Metals	
S	Heat-resistant Alloys	●
	Titanium Alloy	○

Insert		Part Number	Usable Edges	Dimensions (mm) T	Ød	rε	PVD Coated Carbide PR0725	Applicable Clamp Screw 	Applicable Toolholders
 Honed		LNEU 1245-04	4	4.5	4.2	0.4	○	SE-40068TR	➡ H8-H9
		1245-08	4	4.5	4.2	0.8	○		
		1250-04	4	5.0	4.2	0.4	○	SE-40080TR	
		1250-08	4	5.0	4.2	0.8	○		
		1255-04	4	5.5	4.2	0.4	○	SE-40090TR	
		1255-08	4	5.5	4.2	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	○		
		1245-08S	4	4.5	4.2	0.8	○	SE-40068TR	
		1250-04S	4	5.0	4.2	0.4	○		
		1250-08S	4	5.0	4.2	0.8	○	SE-40080TR	

Notes) 1. Please select the applicable clamp screw depending on each insert part number.
2. Ref. to page ➡ **H11** for insert description and applicable clamp screw depending on edge width.

Recommended Cutting Conditions ➡ **H12**

Feature 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 medium speed machining.

Inserts are sold in 10 piece boxes.

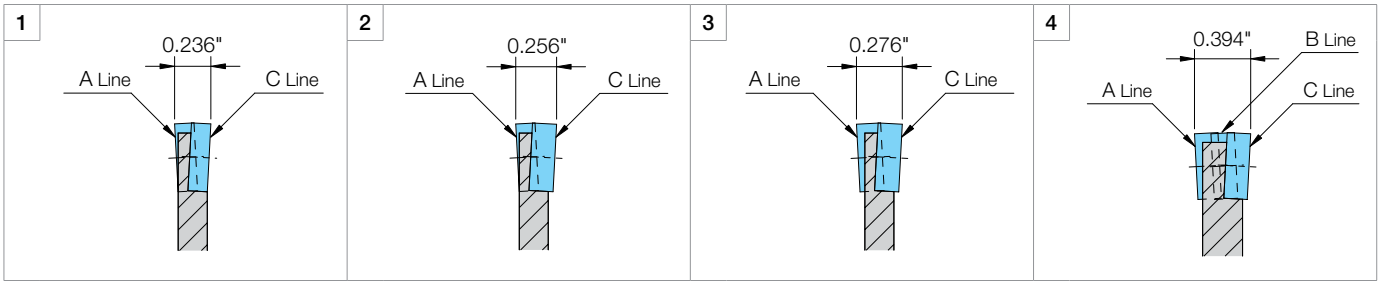
(Customer Service) **800.823.7284 - Option 1**
(Technical Support) **800.823.7284 - Option 2**
Visit us online at **KyoceraPrecisionTools.com**

Combination of Applicable Inserts

	Part Number	Clamp Screw (Standard attachment parts)	Edge Width		A Line		B Line		C Line		Wrench for Clamp Screw	Tightening Torque (N·m)
			mm	inch	Applicable Inserts	Clamp Screw	Applicable Inserts	Clamp Screw	Applicable Inserts	Clamp Screw		
Inch Size	**MSTB ○○○AN250-○T**	SE-40055TR	-	0.250	LNEU1240..	SE-40055TR	-	-	LNEU1240..	SE-40055TR	TT-15L	3
				0.270					LNEU1245..	SE-40068TR		
				0.289	LNEU1245..	SE-40068TR	-	-				
	MSTB ○○○AN312-○T	SE-40068TR	-	0.312	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
				0.332					LNEU1250..	SE-40080TR		
				0.351	LNEU1250..	SE-40080TR	-	-				
	MSTB ○○○AN375-○T	SE-40068TR	-	0.375	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
				0.395					LNEU1250..	SE-40080TR		
				0.414	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○AN500-○T	SE-40090TR	-	0.500	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
				0.520					LNEU1260...	SE-40100TR		
				0.539	LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				
Metric Size	**MSTB ○○○AN0607-○T**	SE-40050TRN	6.0	-	LNEU1235..	SE-40050TRN	-	-	LNEU1235..	SE-40050TRN		
	○○○SN0607-○T		6.5						LNEU1240..	SE-40055TR		
			7.0		LNEU1240..	SE-40055TR						
	MSTB ○○○AN0809-○T	SE-40068TR	8.0	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
	○○○SN0809-○T		8.5						LNEU1250..	SE-40080TR		
			9.0		LNEU1250..	SE-40080TR						
	MSTB ○○○AN1011-○T	SE-40068TR	10.0	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
	○○○SN1011-○T		10.5						LNEU1250..	SE-40080TR		
			11.0		LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○AN1213-○T	SE-40090TR	12.0	-	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
			12.5						LNEU1260...	SE-40100TR		
			13.0		LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				

* For clamp screw, above listed “Standard attachment parts” are included. 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 1.00mm (0.039") with the combination of inserts.

1. In the case of MSTB○○○AN0607-○T the width (W) is 6.00mm (0.236") by installing LNEU1235 on both A line and C line.
2. By replacing C line only with LNEU1240 the width (W) is 6.50mm (0.256").
3. By replacing A line and C line with LNEU1240 the width (W) is 7.00mm (0.276").
4. If the slotting width (edge width) is 10.00mm (0.394") or more, 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 inserts.
2) Use proper clamp screws for applicable inserts on the basis of the above chart.
3) The Slot width (edge width) of MSTB Slot Mills is adjustable by a maximum of 1.00mm (0.039") with the combination of inserts.

Bottom Cutting Shape of MSTB Slot Mill

Slot bottom shape will be (Fig.1) convex shape.

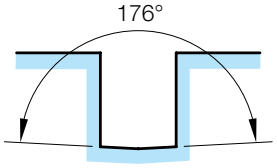
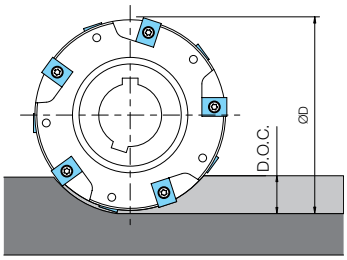


Fig.1 Convex bottom shape

Recommended Cutting Conditions

Workpiece Material		Hardness (HRC)	Recommended Insert Grade (Vc: sfm)	fz (ipt)		Notes
			PVD Coated Carbide	Insert Thickness		
			PR0725	0.138"~0.157" 3.50mm~4.00mm	0.177"~0.236" 4.50mm~6.00mm	
Low Carbon Steel	1010~1025	20	560~690	0.003~0.008	0.004~0.009	Dry
Carbon Steel	1030~1059, 1060 Annealed	29	330~460	0.003~0.008	0.004~0.009	
	1030~1059, 1060 Heat Treated	37	300~390	0.003~0.008	0.004~0.009	
Alloy Steel	Annealed	28	300~390	0.003~0.008	0.004~0.009	
	Heat Treated	41	260~360	0.002~0.007	0.003~0.008	
High Carbon Alloy	D2, H13, etc.	41	230~300	0.002~0.007	0.003~0.008	
Stainless Steel	304, 316, etc. Austenitic	33	360~460	0.002~0.007	0.003~0.008	Coolant
	403, 410, etc. Martensitic	45	330~390	0.002~0.007	0.003~0.008	
Heat-resistant Alloys	Inconel 718, etc.	37.7	50~100	0.002~0.007	0.003~0.008	
Titanium Alloys	Ti-6Al-4V, etc.	40	70~160	0.002~0.007	0.003~0.008	
Gray Cast Iron	NO.45~NO.60	38	360~430	0.003~0.009	0.004~0.010	Dry
Nodular Cast Iron	60-40-18~70-50-05	25	260~330	0.003~0.009	0.004~0.010	
	80-60-03~120-90-02	37	230~300	0.003~0.009	0.004~0.010	

Note) 1. Use down-cut machining.
2. If D.O.C. is under 1/10 of Cutter Dia.(ØD), it is possible to increase feed per tooth (fz) 40%.



Identification System

MSTC Slot Mill

Inch Size

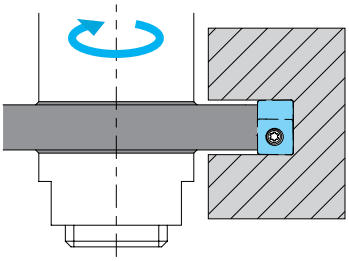
MSTC	○○○	A	N	○○○–○○○	–	○○
Slot Mill with Lay-down Type	Cutting Dia. (inch)	A : Without Boss S : With Boss	N : Neutral R : Right-hand L : Left-hand	Edge Width (inch)		Applicable Inserts 10 : SP..10T3.. 12 : SD..1204..

Metric Size

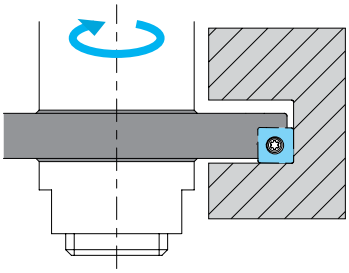
MSTC	○○○	A	N	○○○○	–	○○	–	○○	T
Slot Mill with Lay-down Type	Cutting Dia. (mm)	A : Without Boss S : With Boss	N : Neutral R : Right-hand L : Left-hand	Edge Width (mm)		Applicable Inserts 10 : SP..10T3.. 12 : SD..1204..		No. of Flutes	

Cutting Direction of MSTC Slot Mill

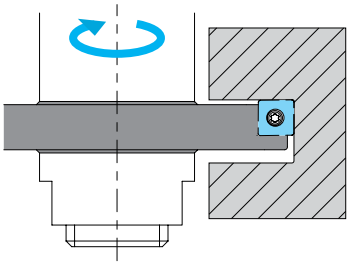
AN Type (Slotting)



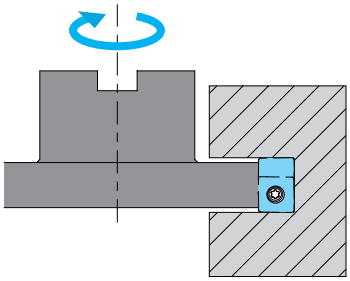
AR Type (Lower Surface Machining)



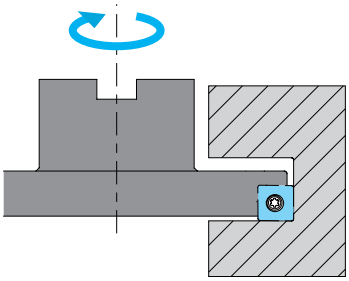
AL Type (Upper Surface Machining)



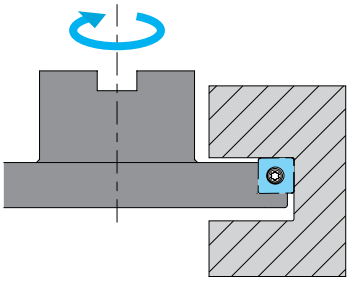
SN Type (Slotting)

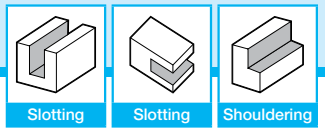


SR Type (Lower Surface Machining)

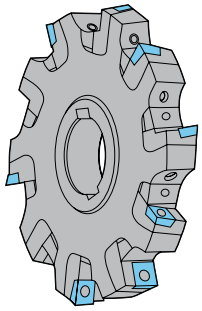


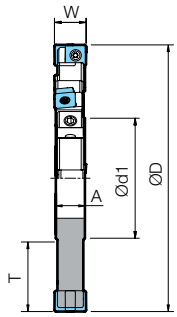
SL Type (Upper Surface Machining)

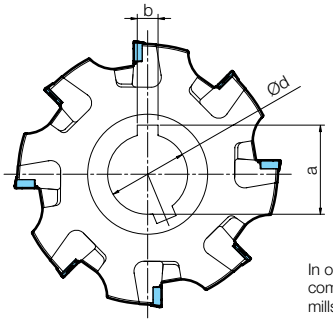




MSTC Without Boss Neutral







In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Inch Size)

Part Number	Stock	Edge Width (inch)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimensions (inch)						Weight (kg)	Max. RPM
		W (Min.)	W (Max.)	T (inch)			ØD	Ød (H7)	Ød1	A	a	b		
MSTC 400AN551-630-10	○	0.551	0.630	1.030	6	3	4.000	1.250	1.880	0.545	1.386	0.312	0.6	17,100
500AN551-630-10	○	0.551	0.630	1.345	8	4	5.000	1.500	2.250	0.545	1.665	0.375	0.9	15,300
600AN551-630-10	○			1.845	10	5	6.000						1.4	14,000
MSTC 500AN630-709-10	○	0.630	0.709	1.345	8	4	5.000	1.500	2.250	0.624	1.665	0.375	1.1	15,300
600AN630-709-10	○			1.845	10	5	6.000						1.6	14,000
MSTC 500AN709-813-12	○	0.709	0.813	1.331	8	4	5.000	1.500	2.250	0.716	1.665	0.375	1.1	10,300
600AN709-813-12	○			1.831	10	5	6.000						1.7	9,400
MSTC 500AN813-917-12	○	0.813	0.917	1.331	8	4	5.000	1.500	2.250	0.820	1.665	0.375	1.3	10,300
600AN813-917-12	○			1.831	10	5	6.000						2.0	9,400

Toolholder Dimensions (Metric Size)

Part Number	Stock	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimensions (mm)						Weight (kg)	Max. RPM
		W (Min.)	W (Max.)	T (mm)			ØD	Ød (H7)	Ød1	A	a	b		
MSTC 100AN1416-10-3T	○	14.0	16.0	25.9	6	3	100	32	46.8	13.9	34.8	8	0.5	17,250
125AN1416-10-4T	○	14.0	16.0	34.4	8	4	125	40	54.8	13.9	43.5	10	0.8	15,450
160AN1416-10-5T	○			51.9	10	5	160						1.5	13,650
MSTC 125AN1618-10-4T	○	16.0	18.0	34.4	8	4	125	40	54.8	15.9	43.5	10	1.0	15,450
160AN1618-10-5T	○			51.9	10	5	160						1.8	13,650
MSTC 125AN1820-12-4T	○	18.0	20.7	34.0	8	4	125	40	54.8	18.2	43.5	10	1.0	10,350
160AN1820-12-5T	○			51.5	10	5	160						1.8	9,150
MSTC 125AN2123-12-4T	○	21.0	23.3	34.0	8	4	125	40	54.8	20.8	43.5	10	1.2	10,350
160AN2123-12-5T	○			51.5	10	5	160						2.1	9,150

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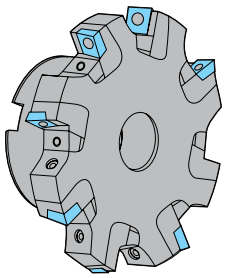
MSTC With Boss Neutral (Metric Size)



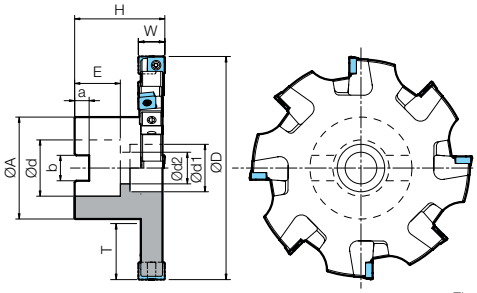


Fig.1

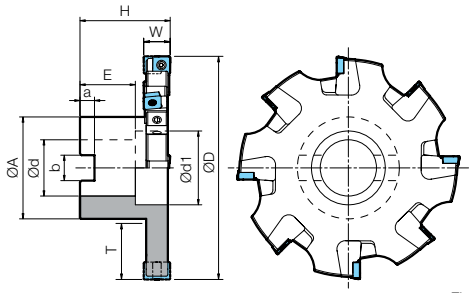


Fig.2

Toolholder Dimensions (Metric Size)

Part Number	Stock	Edge Width (mm) W (Min.)	Edge Width (mm) W (Max.)	Slot Depth T (mm)	No. of Inserts	No. of Edge Lines	Dimensions (mm) ØD	Ød (H7)	ØA	H (Min.)	E	a	b	Ød1	Ød2	Drawing	Weight (kg)	Max. RPM
MSTC 100SN1416-10-3T	○	14.0	16.0	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	Fig.1	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	○	16.0	18.0	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	○	18.0	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

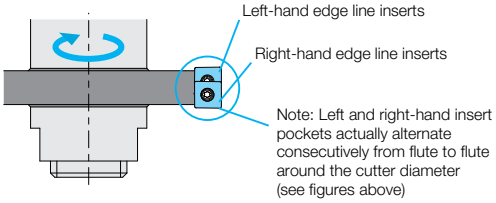
Note) H (Min.) dimension shows case of minimum of edge width.

Recommended Cutting Conditions ➔ H24

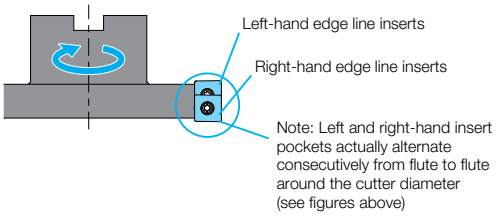
Applicable Insert Installation Method (Inch Sizes / Metric Sizes)

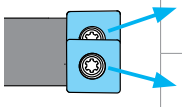
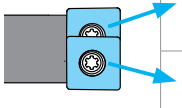
When installing handed inserts, it is necessary to equip same number of right-hand and left-hand inserts as shown in "No. of Edge Lines" respectively. Install left-hand inserts in left edge line pockets and right-hand inserts in right edge line pockets. Note that left and right-hand edge line pockets differentiate consecutively from flute to flute around the cutter diameter.

MSTC...AN... (Without Boss)



MSTC...SN... (With boss)



Part Number	Insert Location Indication	Applicable Inserts ➔ H22-H23 With hand	Applicable Inserts ➔ H22-H23 Neutral
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 (Inch Sizes / Metric Sizes)

- For spare parts, ref. to page ➔ H20

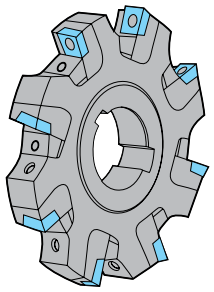
Slot Width (Edge Width) Adjustment

- Ref. to page ➔ H24-H26

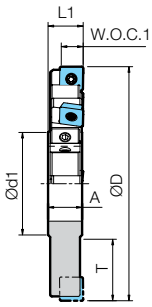
Applicable Arbor

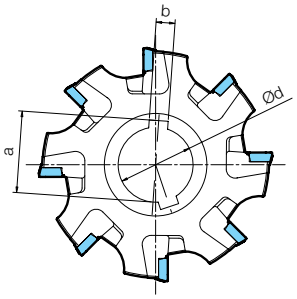
- Ref. to page ➔ H27

MSTC 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 (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)									Weight (kg)	Max. RPM
			ØD	Ød (H7)	Ød1	A	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	a	b		
MSTC 500AR709-813-12	○	8	5.000	1.500	2.250	0.716	0.712	0.764	1.331	0.461	1.665	0.375	1.1	10,300
600AR709-813-12	○	10	6.000						1.831				1.7	9,400

Toolholder Dimensions (Metric Size)

Part Number	Stock	No. of Inserts	Dimensions (mm)									Weight (kg)	Max. RPM
			ØD	Ød (H7)	Ød1	A	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	a	b		
MSTC 160AR1416-10-10T	○	10	160	40	54.8	13.9	13.9	14.9	51.9	9.1	43.5	10	1.5	13,650
MSTC 125AR1820-12-8T	○	8	125	40	54.8	18.2	18.1	19.4	34.0	11.7	43.5	10	1.0	10,350
160AR1820-12-10T	○	10	160						51.5				1.8	9,150

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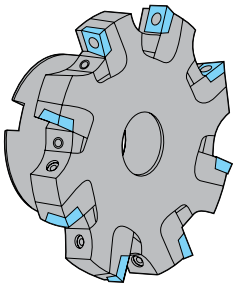
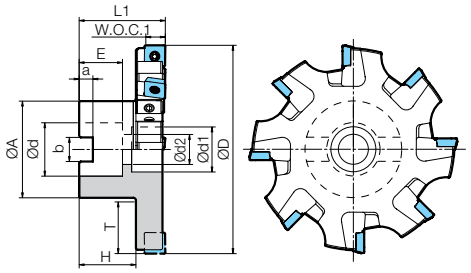
MSTC With Boss Right-hand





● Right-hand Shown Fig.1

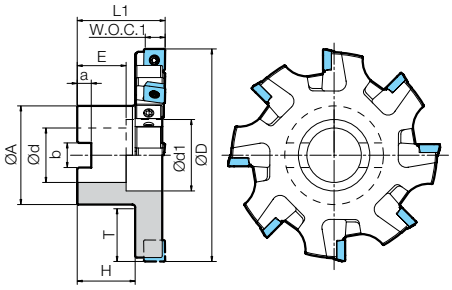


Fig.2

Toolholder Dimensions (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)												Drawing	Weight (kg)	Max. RPM
			ØD	Ød (H7)	ØA	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	E	a	b	Ød1	Ød2			
MSTC 500SR709-813-12	○	8	5.000	1.25	2.88	2.041	2.093	0.997	0.461	0.75	0.319	0.5	1.05	0.656	Fig.1	2.1	10,300
600SR709-813-12	○	10	6.000	1.5	3.81			1.032		0.972	0.394	0.626	2.5	-	Fig.2	2.9	9,400

Toolholder Dimensions (Metric Size)

Part Number	Stock	No. of Inserts	Dimensions (mm)													Drawing	Weight (kg)	Max. RPM
			ØD	Ød (H7)	ØA	H	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	E	a	b	Ød1	Ød2			
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

Applicable Inserts (Inch Sizes / Metric Sizes)

Part Number	Applicable Inserts ➡ H22-H23	
	With hand	Neutral
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 ➡ **H24**

Spare Parts (Inch Sizes / Metric Sizes)

- For spare parts, ref. to page ➡ **H21**

Slot Width (Edge Width) Adjustment

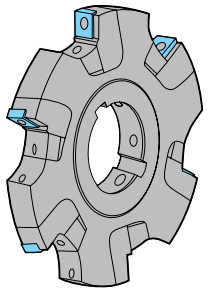
- Ref. to page ➡ **H24-H26**

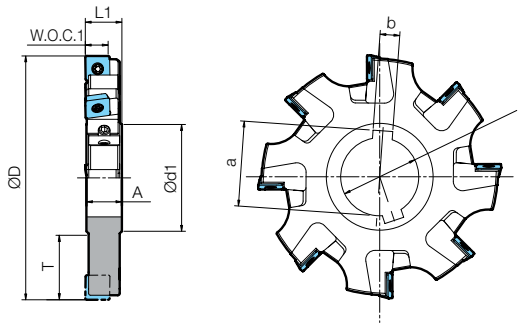
Applicable Arbor

- Ref. to page ➡ **H27**

Shouldering | Back Side Milling

MSTC 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 (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)									Weight (kg)	Max. RPM
			ØD	Ød (H7)	Ød1	A	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	a	b		
MSTC 500AL709-813-12	○	8	5.000	1.500	2.250	0.716	0.712	0.764	1.331	0.461	1.665	0.375	1.1	10,300
600AL709-813-12	○	10	6.000						1.831				1.7	9,400

Toolholder Dimensions (Metric Size)

Part Number	Stock	No. of Inserts	Dimensions (mm)									Weight (kg)	Max. RPM
			ØD	Ød (H7)	Ød1	A	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	a	b		
MSTC 125AL1820-12-8T	○	8	125	40	54.8	18.2	18.1	19.4	34.0	11.7	43.5	10	1.0	10,350
160AL1820-12-10T	○	10	160						51.5				1.8	9,150

H SLOT MILLS

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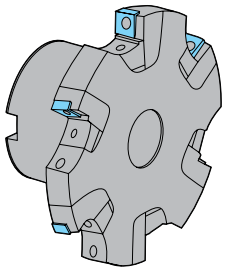
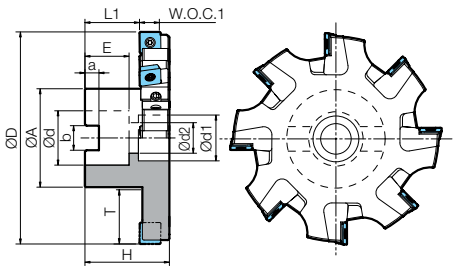
MSTC With Boss Left-hand





● Left-hand Shown

Fig.1

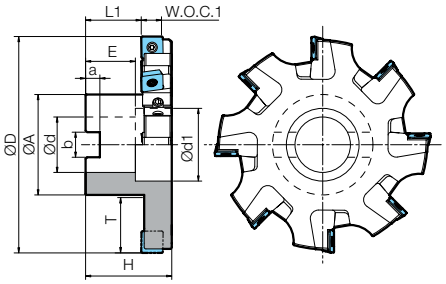


Fig.2

Toolholder Dimensions (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)												Drawing	Weight (kg)	Max. RPM
			ØD	Ød (H7)	ØA	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	E	a	b	Ød1	Ød2			
MSTC 500SL709-813-12	○	8	5.000	1.250	2.880	1.280	1.332	0.997	0.461	0.750	0.319	0.500	1.050	0.656	Fig.1	2.1	10,300
600SL709-813-12	○	10	6.000	1.500	3.810			1.032		0.972	0.394	0.626	2.500	-	Fig.2	2.9	9,400

Toolholder Dimensions (Metric Size)

Part Number	Stock	No. of Inserts	Dimensions (mm)												Drawing	Weight (kg)	Max. RPM
			ØD	Ød (H7)	ØA	H	L1 (Min.)	L1 (Max.)	T	W.O.C.1 (Max.)	E	a	b	Ød1	Ød2			
MSTC 125SL1820-12-8T	○	8	125	32	58	50	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

Applicable Inserts (Inch Sizes / Metric Sizes)

Part Number	Applicable Inserts ➡ H22-H23	
	With hand	Neutral
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 ➡ **H24**

Spare Parts (Inch Sizes / Metric Sizes)

- For spare parts, ref. to page ➡ **H21**

Slot Width (Edge Width) Adjustment

- Ref. to page ➡ **H24-H26**

Applicable Arbor

- Ref. to page ➡ **H27**

Spare Parts (Inch Sizes / Metric Sizes)

		Part Number	Spare Parts										
			Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Arbor Bolt
			Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
													
Without Boss	Inch Size	MSTC 400AN551-630-10	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 500AN551-630-10	C90SP1416-10R	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 600AN551-630-10											
		MSTC 500AN630-709-10	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 600AN630-709-10											
		MSTC 500AN709-813-12	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		MSTC 600AN709-813-12											
		MSTC 500AN813-917-12	C90SD2023-12R	C90SD2023-12L	WC-20	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		MSTC 600AN813-917-12											
	Metric Size	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	C90SP1416-10R	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 160AN1416-10-5T											
		MSTC 125AN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 160AN1618-10-5T											
		MSTC 125AN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		MSTC 160AN1820-12-5T											
		MSTC 125AN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		MSTC 160AN2123-12-5T											
With Boss	Metric Size	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	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	HH16X35
		MSTC 160SN1618-10-5T											-
		MSTC 125SN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	HH16X35
		MSTC 160SN1820-12-5T											-
		MSTC 125SN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	HH16X35
		MSTC 160SN2123-12-5T											-

 **Coat Anti-Seize Compound (MP-1)** thinly on portion of taper and thread prior to installation.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (N·m)	5~6	1.5	4

MSTC SLOT MILL (HALF SIDE)

Spare Parts (Inch Sizes / Metric Sizes)

Part Number			Spare Parts										
			Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Arbor Bolt
			Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
													
Without Boss	Inch Size	MSTC 500AR709-813-12	C90SD1820-12R	-	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		600AR709-813-12											
		MSTC 500AL709-813-12	-	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		600AL709-813-12											
	Metric Size	MSTC 160AR1416-10-10T	C90SP1416-10R	-	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 125AR1820-12-8T	C90SD1820-12R	-	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		160AR1820-12-10T											
		MSTC 125AL1820-12-8T	-	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	-
		160AL1820-12-10T											
With Boss	Inch Size	MSTC 500SR709-813-12	C90SD1820-12R	-	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	HH16X35
		600SR709-813-12											-
		MSTC 500SL709-813-12	-	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	HH16X35
		600SL709-813-12											-
	Metric Size	MSTC 125SR1820-12-8T	C90SD1820-12R	-	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	HH16X35
		160SR1820-12-10T											-
		MSTC 125SL1820-12-8T	-	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	TH-3L	LW-3	DTP-15	MP-1	HH16X35
		160SL1820-12-10T											-

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (N·m)	5~6	1.5	4

Insert Identification System

① Shape	
Symbol	Shape
S	Square

③ Tolerance			
Symbol	Class		
	Corner Height	Thickness	I.C. Size
C	±0.013mm	±0.025mm	±0.025mm
E	±0.025mm		

⑤ Edge Length
S
ℓ

⑦ Corner-R (rε)	
Symbol	Corner-R (rε)
16	1.60mm
12	1.20mm
08	0.80mm

⑨ Hand of Tool	
Symbol	Hand of Tool
N	Neutral
L	Left-hand
R	Right-hand

S	P	C	T	10	T3	08	E	R	-	SD
①	②	③	④	⑤	⑥	⑦	⑧	⑨		⑩

② Relief Angle	
Symbol	Relief Angle
D	15°
P	11°

④ Hole / Chipbreaker	
Symbol	Shape
T	Single-sided Chipbreaker, with Hole

⑥ Thickness	
Symbol	Thickness
T3	3.97mm
04	4.76mm

⑧ Edge Preparation	
Symbol	Edge Preparation
E	Honed
F	Sharp Edge
S	Chamfer + R-honed

⑩ Chipbreaker Symbol	
Symbol	Rake Angle
SB	5°
SD	15°
SE	20°

Applicable Inserts (SP..10T3)

(in)

Part Number	A	T	Ød	α
SP..10T3	0.394	5/32	0.134	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 Alloy		●	○

Insert (Right-handed Insert Shown)		Part Number	Usable Edges	Dimensions (in)		CVD Coated Carbide	PVD Coated Carbide	
				rε	Z (Wiper Edge)	CA0835	PR0725	PR0110
		SPCT 10T316EN-SD	4	0.063	-		○	
With Wiper Edge		SPCT 10T308E□-SD	4	0.031	0.098		○	
		10T312E□-SD	4	0.047	0.071		○	
Sharp Edge		SPCT 10T316FN-SE	4	0.063	-			○
Sharp Edge / With Wiper Edge		SPCT 10T308F□-SE	4	0.031	0.106			○
		10T312F□-SE	4	0.047	0.087			○
With Wiper Edge		SPET 10T308E□-SB	4	0.031	0.106	○	○	
Tough Edge / With Wiper Edge		SPET 10T308S□-SB	4	0.031	0.106	○	○	

Inserts are sold in 10 piece boxes.

H SLOT MILLS

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com
U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

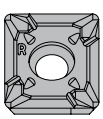
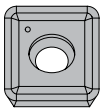
Applicable Inserts (SD..1204)

(in)

Part Number	A	T	Ød	α
SD..1204	1/2	3/16	0.173	15°

Usage Classification
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel	●	●	
M	Stainless Steel	○	●	
K	Cast Iron	○	●	
N	Non-ferrous Metals			●
S	Heat-resistant Alloys		●	
	Titanium Alloy		●	○

Insert (Right-handed Insert Shown)	Part Number	Usable Edges	Dimensions (in)		CVD Coated Carbide	PVD Coated Carbide	
			rε	Z (Wiper Edge)	CA0835	PR0725	PR0110
	SDCT 120416EN-SD	4	0.063	-		○	
 With Wiper Edge	SDCT 120408E℞-SD	4	0.031	0.098		○	
	120412E℞-SD	4	0.047	0.071		○	
 Sharp Edge	SDCT 120416FN-SE	4	0.063	-			○
 Sharp Edge / With Wiper Edge	SDCT 120408F℞-SE	4	0.031	0.106			○
	120412F℞-SE	4	0.047	0.075			○
 With Wiper Edge	SDET 120408E℞-SB	4	0.031	0.098	○	○	
	120412E℞-SB	4	0.047	0.071	○	○	
	SDET 120416SN-SB	4	0.063	-	○	○	
 Tough Edge / With Wiper Edge	SDET 120408S℞-SB	4	0.031	0.098	○	○	

Feature of Insert Grades

CA0835

- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron.
- For medium 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 medium 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

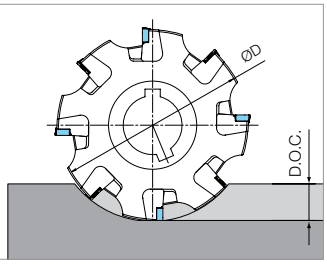
Inserts are sold in 10 piece boxes.

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

◆ Recommended Cutting Conditions (CA0835 / PR0725 / PR0110)

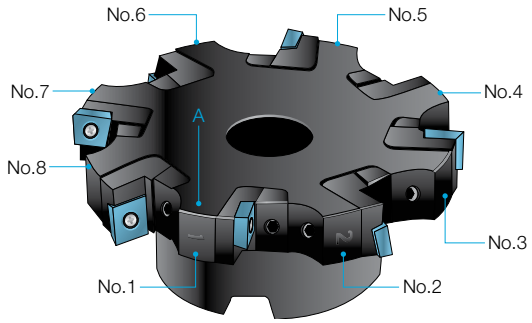
Workpiece Material		Hardness (HB)	Recommended Insert Grade (Vc: sfm)			fz (ipt)				Notes
			CVD Coated Carbide	PVD Coated Carbide		Chipbreaker				
			CA0835	**PR0725**	**PR0110**	EN-SD ER-SD EL-SD	ER-SB EL-SB	SN-SB SR-SB SL-SB	FN-SE FR-SE FL-SE	
Low Carbon Steel	1010~1025	20	820~1020	560~690	-	0.003~0.008	0.004~0.009	0.006~0.012	-	Dry
Carbon Steel	1030~1059, 1060 Annealed	29	520~620	330~460	-	0.003~0.008	0.004~0.009	0.006~0.012	-	
	1030~1059, 1060 Heat Treated	37	460~590	300~390	-	0.003~0.008	0.004~0.009	0.006~0.012	-	
Alloy Steel	Annealed	28	460~590	300~390	-	0.003~0.008	0.004~0.009	0.006~0.012	-	
	Heat Treated	41	390~520	260~360	-	0.002~0.007	0.003~0.008	0.005~0.010	-	
High Carbon Alloy	D2, H13, etc.	41	360~430	230~300	-	0.002~0.007	0.003~0.008	0.005~0.010	-	
Stainless Steel	304, 316, etc. Austenitic	33	520~660	360~460	-	0.002~0.007	0.003~0.008	0.005~0.010	-	Coolant
	403, 410, etc. Martensitic	45	490~590	330~390	-	0.002~0.007	0.003~0.008	0.005~0.010	-	
Heat-resistant Alloys	Inconel 718, etc.	37.7	-	50~100	-	0.002~0.007	0.003~0.008	0.005~0.010	-	
Titanium Alloys	Ti-6Al-4V, etc.	40	-	70~160	-	0.002~0.007	0.003~0.008	0.005~0.010	-	
Gray Cast Iron	NO.45~NO.60	38	520~660	360~430	-	0.003~0.009	0.004~0.010	0.006~0.014	-	Dry
Nodular Cast Iron	60-40-18~70-50-05	25	430~520	260~330	-	0.003~0.009	0.004~0.010	0.006~0.014	-	
	80-60-03~120-90-02	37	360~460	230~300	-	0.003~0.009	0.004~0.010	0.006~0.014	-	
Non-ferrous Metals		-	-	-	2460~3120	-	-	-	0.003~0.008	

Note) 1. Use down-cut machining.
2. If D.O.C. is under 1/10 of Cutter Dia.(ØD), it is possible to increase feed per tooth (fz) 40%.

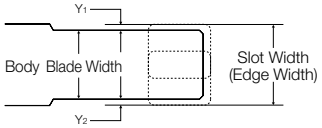


Slot Width (Edge Width) Adjustment of MSTC Slot Mills

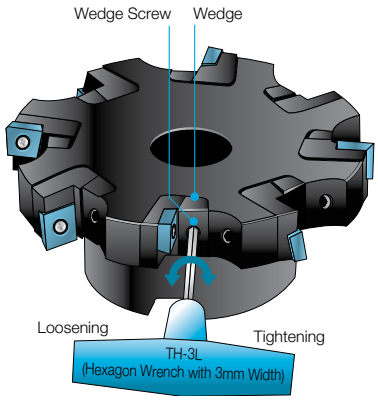
Slot Width (Edge Width) Measurement



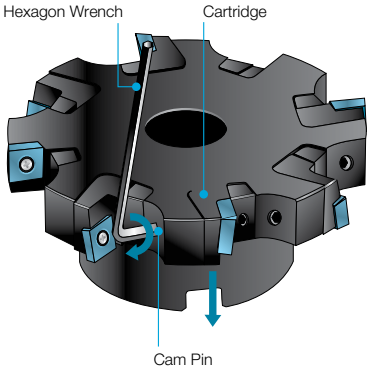
① Please check slot mill insert location number.
(The insert location number is marked on the slot mill body.)
② Set up the slot mill on length measuring equipment such as tool presetters.
③ Place the side A of the slot mill body near the insert position No.1 to "0 (zero)" the length measuring equipment.
④ Move the length measuring equipment to the insert corner and measure the step (Y_1) between side A and the corner of insert No.1.
⑤ Likewise, on the other side, measure the step between the slot mill body and the insert corner (Y_2), and you will obtain the slot width (edge width).



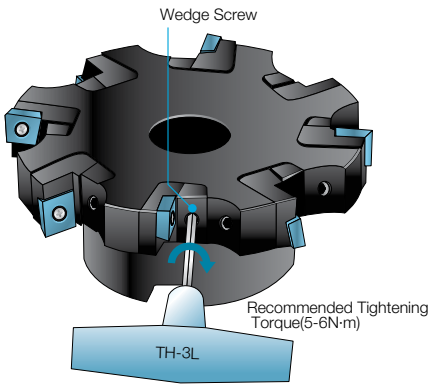
Changing the Slot Width (Edge Width)



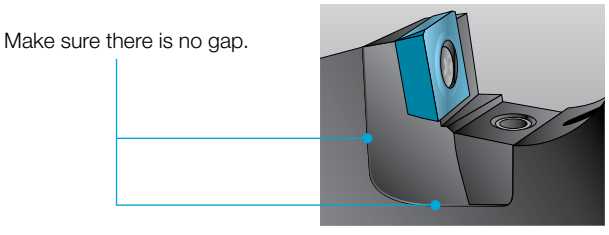
① Set up the slot mill on length measuring equipment such as tool presetters.
② Insert a 3mm Hexagon Wrench (TH-3L) into the wedge screw.
③ Turn TH-3L counterclockwise to loosen the Wedge.
④ Turn TH-3L clockwise by the torque of 1 N·m to tighten the wedge lightly and make the wedge contact the cartridge 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.

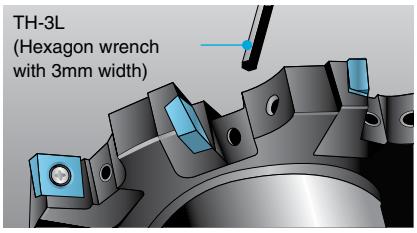


⑨ Insert TH-3L into the Wedge Screw.
⑩ Tighten the Wedge Screw by the torque of 5-6N·m.
(Use a torque wrench to get the correct torque.)
⑪ Make sure there is no gap between the Cartridge and the Slot Mill body.

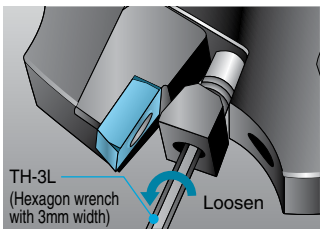


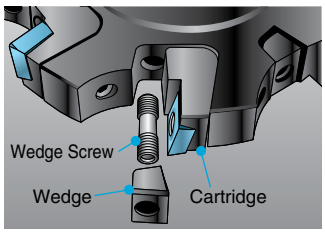
Replacement of the Cartridge

Follow the instructions below to replace the Cartridge.



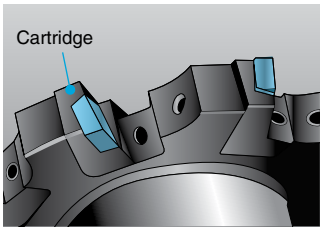
(1) Insert Hexagon wrench with 3mm width (TH-3L) into the Wedge Screw. TH-3L

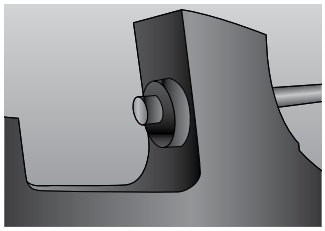




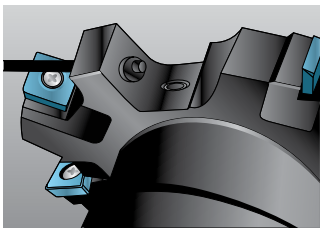
(2) Loosen the Wedge Screw.

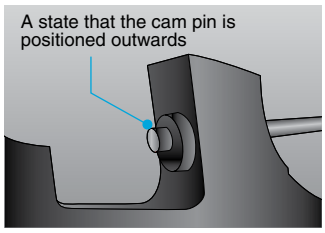
(3) Remove the Wedge Screw and Wedge.



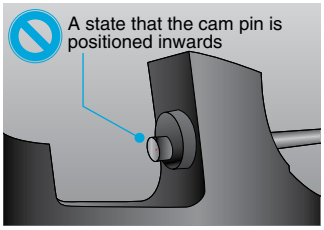


(4) Remove the Cartridge.

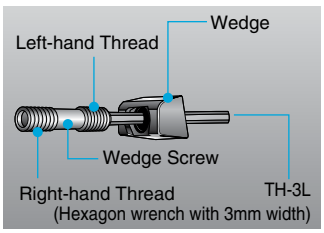


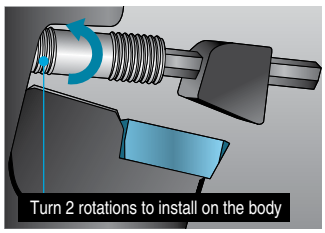


(5) Before replacing the Cartridge, make sure that the Cam Pin is positioned radially-outwards.



(6) If the Cam Pin is in the position shown in the left diagram, assembling the Cartridge is not possible.

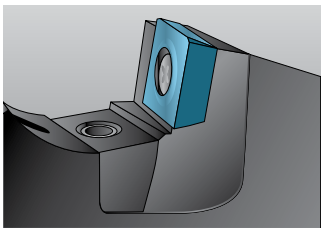




(7) Place the wedge so that its larger slant surface faces toward the Cartridge.

(8) Turn the Wedge Screw two times 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).

MST SLOT MILL APPLICABLE ARBOR

BT Shank

Type	Ref. to Page	Toolholder Part Number	Bore Dia. (Ød)	BT Shank				
				BIG	MST	NIKKEN	SHOWA	NT TOOL
Without Boss	H4	MSTA 02N..	0.625" (15.875mm)			BT○○-SCA15.875..	BT○○-SCA15.875..	BT○○-SCA15.875..
		03N..	0.625" (15.875mm)			BT○○-SCA15.875..	BT○○-SCA15.875..	BT○○-SCA15.875..
		04N..	1.000" (25.400mm)	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..
		05N..	1.250" (31.750mm)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
		06N..	1.250" (31.750mm)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
	H5	MSTA 63N..	16mm			BT○○-SCA16..		BT○○-SCA16..
		80N..	16mm			BT○○-SCA16..		BT○○-SCA16..
		100N..	22mm			BT○○-SCA22..		BT○○-SCA22..
		125N..	32mm			BT○○-SCA32..		BT○○-SCA32..
		160N..	40mm			BT○○-SCA40..		BT○○-SCA40..
	H8	MSTB 3000AN..	1.000" (25.400mm)	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..
		4000AN..	1.250" (31.750mm)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
		5000AN..	1.250" (31.750mm)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
		6000AN..	1.500" (38.100mm)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
		MSTB 80AN..	27mm			BT○○-SCA27..		BT○○-SCA27..
		100AN..	32mm			BT○○-SCA32..		BT○○-SCA32..
		125AN..	40mm			BT○○-SCA40..		BT○○-SCA40..
		160AN..	40mm			BT○○-SCA40..		BT○○-SCA40..
	H14 H16 H18	MSTC 400A○..	1.250" (31.750mm)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
		500A○..	1.500" (38.100mm)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
		600A○..	1.500" (38.100mm)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
		MSTC 100A○..	32mm			BT○○-SCA32..		BT○○-SCA32..
		125A○..	40mm			BT○○-SCA40..		BT○○-SCA40..
		160A○..	40mm			BT○○-SCA40..		BT○○-SCA40..
With Boss	H9	MSTB 80SN..	22mm	BBT○○-FMC22..		BT○○-FMC22..	BT○○-FMC22..	BT○○-FMC22..
		100SN..	27mm	BBT○○-FMC27..		BT○○-FMC27..	BT○○-FMC27..	BT○○-FMC27..
		125SN..	40mm	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..
		160SN..	40mm	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..
	H15 H17 H19	MSTC 100S○..	27mm	BBT○○-FMC27..		BT○○-FMC27..	BT○○-FMC27..	BT○○-FMC27..
		125S○..	32mm	BBT○○-FMC32..		BT○○-FMC32..	BT○○-FMC32..	BT○○-FMC32..
		160S○..	40mm	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..

Straight Shank

Type	Ref. to Page	Toolholder Part Number	Bore Dia. (Ød)	Straight Shank				
				BIG	MST	NIKKEN	SHOWA	NT TOOL
Without Boss	H4	MSTA 02N..	0.625" (15.875mm)				ST○○-SCA15.875..	
		03N..	0.625" (15.875mm)				ST○○-SCA15.875..	
		04N..	1.000" (25.400mm)		S○○-SCA25.4..	K○○-SCA25.4..	ST○○-SCA25.4..	
		05N..	1.250" (31.750mm)				ST○○-SCA31.75..	
		06N..	1.250" (31.750mm)				ST○○-SCA31.75..	
	H5	MSTA 63N..	16mm					
		80N..	16mm					
		100N..	22mm					
		125N..	32mm					
		160N..	40mm					
	H8	MSTB 3000AN..	1.000" (25.400mm)		S○○-SCA25.4..	K○○-SCA25.4..	ST○○-SCA25.4..	
		4000AN..	1.250" (31.750mm)				ST○○-SCA31.75..	
		5000AN..	1.250" (31.750mm)				ST○○-SCA31.75..	
		6000AN..	1.500" (38.100mm)				ST○○-SCA38.1..	
		MSTB 80AN..	27mm					
		100AN..	32mm					
		125AN..	40mm					
		160AN..	40mm					
	H14 H16 H18	MSTC 400A○..	1.250" (31.750mm)				ST○○-SCA31.75..	
		500A○..	1.500" (38.100mm)				ST○○-SCA38.1..	
		600A○..	1.500" (38.100mm)				ST○○-SCA38.1..	
		MSTC 100A○..	32mm					
		125A○..	40mm					
		160A○..	40mm					

These tables are created, based on companies' catalogues and publications, and not officially approved by those companies.

RADIUS & BALL-NOSE MILLS

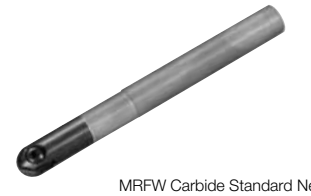
J1 - J27

Finishing Contouring / Profiling | Finishing Pocketing

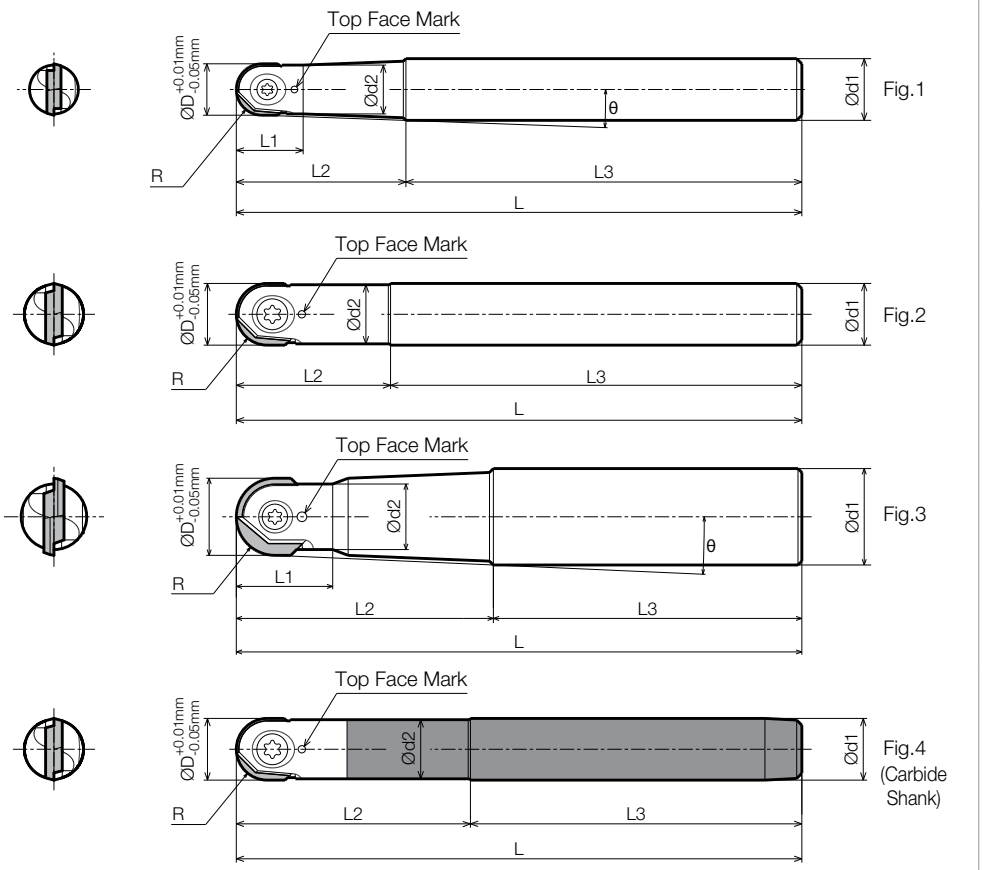
MRF (Steel Shank) / MRFW (Carbide Shank)


MRF Standard Neck


MRF Long Neck


MRFW Carbide Standard Neck


MRFW Carbide Long Neck



● Top Face Shown

● Toolholder Dimensions (Metric Size)

	Part Number		Stock	No. of Inserts	Dimensions (mm)									Drawing	Spare Parts			Applicable Inserts ➡ B21
					R	ØD	Ød1	Ød2	L	L1	L2	L3	θ		Clamp Screw	Wrench	Anti-seize Compound	
Standard Neck	MRF	08-S12	○	1	4.0	8	12	7.5	100	10	22	78	6°20'	Fig.1	SC-30067	DT-8	MP-1	RDFG08FR
		10-S12	○	1	5.0	10	12	9.5	100	13	25	75	3°	Fig.1	SC-35085	DT-10		RDFG10FR
		12-S12	○	1	6.0	12	12	11.5	110	-	30	80	-	Fig.2	SC-40100	DT-15		RDFG12FR
		16-S20	○	1	8.0	16	20	14.0	130	20	50	80	2°50'	Fig.1	SC-50130	DT-20		RDFG16FR
		20-S25	○	1	10.0	20	25	17.0	140	25	60	80	3°	Fig.3	SC-60160	TT-25		RDFG20FR
		25-S32	○	1	12.5	25	32	22.0	150	31	70	80	3°30'	Fig.3	SC-60210	TT-30		RDFG25FR
Long Neck	MRF	08-S12-130	○	1	4.0	8	12	7.5	130	10	50	80	2°30'	Fig.1	SC-30067	DT-8	MP-1	RDFG08FR
		10-S16-150	○	1	5.0	10	16	9.5	150	15	50	100	3°50'	Fig.1	SC-35085	DT-10		RDFG10FR
		12-S16-160	○	1	6.0	12	16	11.5	160	16	60	100	2°10'	Fig.1	SC-40100	DT-15		RDFG12FR
		16-S20-160	○	1	8.0	16	20	14.0	160	20	65	95	2°	Fig.1	SC-50130	DT-20		RDFG16FR
		20-S25-180	○	1	10.0	20	25	17.0	180	25	80	100	2°10'	Fig.3	SC-60160	TT-25		RDFG20FR
		25-S32-200	○	1	12.5	25	32	22.0	200	31	90	110	2°40'	Fig.3	SC-60210	TT-30		RDFG25FR
Carbide Standard Neck	MRFW	08-S08	○	1	4.0	8	8	7.4	100	-	30	70	-	Fig.4	SC-30067	DT-8	MP-1	RDFG08FR
		10-S10	○	1	5.0	10	10	9.5	100	-	35	65	-	Fig.4	SC-35085	DT-10		RDFG10FR
		12-S12	○	1	6.0	12	12	11.5	110	-	45	65	-	Fig.4	SC-40100	DT-15		RDFG12FR
Carbide Long Neck	MRFW	08-S08-130	○	1	4.0	8	8	7.4	130	-	65	65	-	Fig.4	SC-30067	DT-8	MP-1	RDFG08FR
		10-S10-140	○	1	5.0	10	10	9.5	140	-	75	65	-	Fig.4	SC-35085	DT-10		RDFG10FR
		12-S12-150	○	1	6.0	12	12	11.5	150	-	85	65	-	Fig.4	SC-40100	DT-15		RDFG12FR

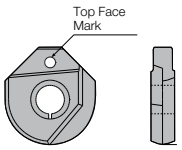
- θ (Toolholder's interference angle) is the angle formed by the tangential line from insert dia. to toolholder's shank dia.

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

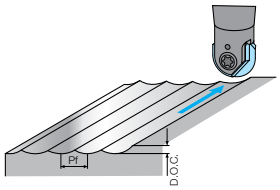
U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Applicable Inserts (B21)

Insert		Part Number
	 ● Top Face Shown	RDFG 08FR 10FR 12FR 16FR 20FR 25FR

- Align the Top Face Mark of both insert and toolholder.

Recommended Depth of Cut

	Part Number	Depth of Cut (in) D.O.C.	Depth of Cut (in) Pf	Applications
Standard Neck	MRF08-S12	0.008 (Max 0.012)	0.031	
	MRF10-S12	0.008	0.039	
	MRF12-S12	0.020	0.047	
	MRF16-S20	0.020	0.063	
	MRF20-S25	0.039	0.079	
	MRF25-S32	0.039	0.098	
Long Neck	MRF08-S12-130	0.008 (Max 0.012)	0.031	
	MRF10-S16-150	0.008	0.039	
	MRF12-S16-160	0.020	0.047	
	MRF16-S20-160	0.020	0.063	
	MRF20-S25-180	0.039	0.079	
	MRF25-S32-200	0.039	0.098	
Carbide Standard Neck	MRFW08-S08	0.008 (Max 0.012)	0.031	
	MRFW10-S10	0.008	0.039	
	MRFW12-S12	0.020	0.047	
Carbide Long Neck	MRFW08-S08-130	0.008 (Max 0.012)	0.031	
	MRFW10-S10-140	0.008	0.039	
	MRFW12-S12-150	0.020	0.047	

For Ø8mm, Holder may be broken because of overload if D.O.C. exceeds 0.012".

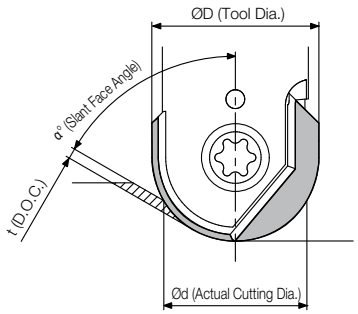
Recommended Cutting Conditions (At Cutting Dia. ØD)

Workpiece Material	Insert Grades	Vc (sfm)	fz (ipt)	Ø8mm Vc (sfm) (RPM)	Ø8mm fz (ipt) Vf (ipm)	Ø10mm Vc (sfm) (RPM)	Ø10mm fz (ipt) Vf (ipm)	Ø12mm Vc (sfm) (RPM)	Ø12mm fz (ipt) Vf (ipm)
Carbon Steel	PR915	330~660	0.004~0.012	490 (5,970)	0.008 (94.095)	490 (4,770)	0.008 (75.197)	490 (3,980)	0.008 (62.598)
Alloy Steel	PR915	260~590	0.004~0.012	430 (5,170)	0.008 (81.496)	430 (4,140)	0.008 (65.354)	430 (3,450)	0.008 (54.331)
Mold Steel	PR915	160~490	0.004~0.008	330 (3,980)	0.006 (46.850)	330 (3,180)	0.006 (37.402)	330 (2,650)	0.006 (31.496)
Stainless Steel	PR915	160~490	0.004~0.008	330 (3,980)	0.006 (46.850)	330 (3,180)	0.006 (37.402)	330 (2,650)	0.006 (31.496)
Cast Iron	PR915	330~660	0.008~0.016	490 (5,970)	0.012 (140.945)	490 (4,770)	0.012 (112.598)	490 (3,980)	0.012 (94.095)

Workpiece Material	Insert Grades	Vc (sfm)	fz (ipt)	Ø16mm Vc (sfm) (RPM)	Ø16mm fz (ipt) Vf (ipm)	Ø20mm Vc (sfm) (RPM)	Ø20mm fz (ipt) Vf (ipm)	Ø25mm Vc (sfm) (RPM)	Ø25mm fz (ipt) Vf (ipm)
Carbon Steel	PR915	330~660	0.004~0.012	490 (2,980)	0.008 (46.850)	490 (2,390)	0.008 (37.402)	490 (1,910)	0.008 (29.921)
Alloy Steel	PR915	260~590	0.004~0.012	430 (2,590)	0.008 (40.551)	430 (2,070)	0.008 (32.677)	430 (1,660)	0.008 (25.984)
Mold Steel	PR915	160~490	0.004~0.008	330 (1,990)	0.006 (23.622)	330 (1,590)	0.006 (18.898)	330 (1,270)	0.006 (14.961)
Stainless Steel	PR915	160~490	0.004~0.008	330 (1,990)	0.006 (23.622)	330 (1,590)	0.006 (18.898)	330 (1,270)	0.006 (14.961)
Cast Iron	PR915	330~660	0.008~0.016	490 (2,980)	0.012 (70.472)	490 (2,390)	0.012 (56.299)	490 (1,910)	0.012 (45.276)

Actual Cutting Speed (Vd) Conversion Coefficient Table

Vd varies depending on D.O.C. and slant face angle.
Vd can be obtained by dividing the conversion coefficient into the recommended cutting speed.

Model	Tool Dia. (ØD)		Ø8mm		Ø10mm		Ø12mm	
	D.O.C. (t: in)		0.004"	0.008"	0.004"	0.008"	0.008"	0.020"
	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. (ØD)		Ø16mm		Ø20mm		Ø25mm	
	D.O.C. (t: in)		0.008"	0.020"	0.020"	0.039"	0.020"	0.039"
	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, D.O.C. = 0.039", slant face angle 90°: The actual cutting speed Vd for carbon steel machining, when Vc is 490sfm at the full cutter diameter, Vd can be obtained by calculating: Vd = 490 ÷ 4.48 = 109.4sfm

Shouldering | Facing

RAD-8 (MRW)

The MRW Radius Cutter Lowers Cutting Costs and Increases Efficiency

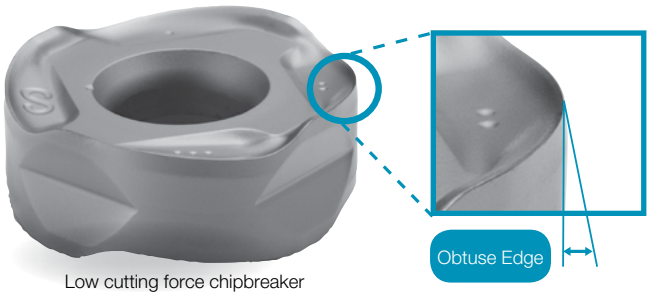
The double-faced inserts improve milling in a wide variety of materials

Advantages

Economical 8-edge Insert

Combined Sharpness & Cutting Edge Strength

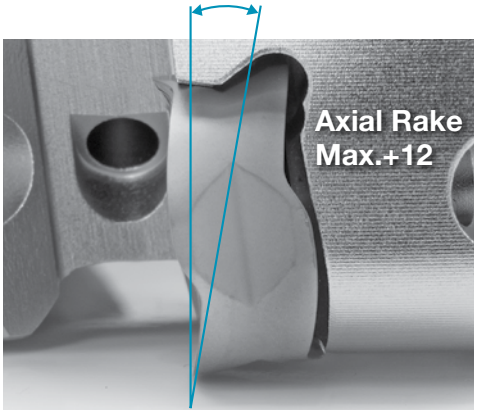
Improved edge strength due to obtuse edge

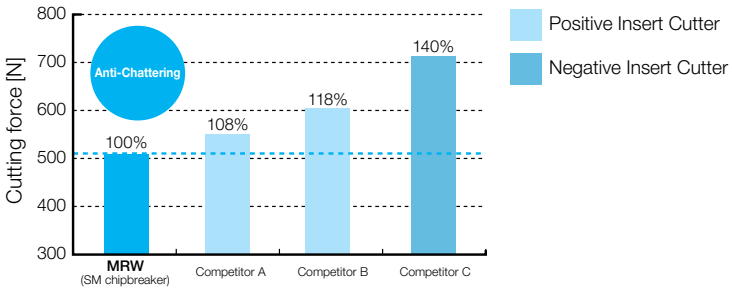


Low cutting force chipbreaker

Helical Cutting Edge Design with Maximum Axial Rake 12°

Lower cutting forces equivalent to positive inserts

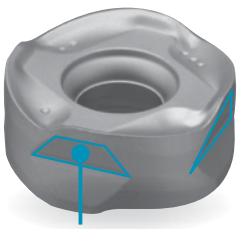




< Cutting Condition >
Vc = 390 sfm, D.O.C. × ae = 0.039" × 1.575", fz = 0.008 ipt
304 Stainless Steel, Cutter Ø2.000"

Flat Lock Structure Holds Insert Firmly

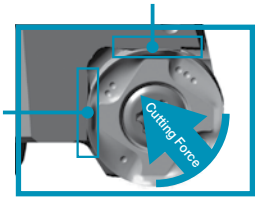
Prevents insert rotation during machining to provide stable cutting



Wide and flat binding face

Flat Lock Structure

Wide Flat Binding Face
- Receives even cutting forces
- Prevents insert rotation



J RADIUS / BALL-NOSE

Longer tool life with a wide insert lineup including 4 grades and 3 chipbreakers!

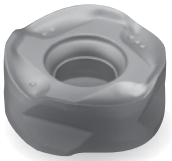
Available for Steel, Stainless Steels, Cast Iron, and Heat-Resistant Alloys

Workpiece Material		Applicable Insert Grade	Applicable Chipbreaker
P Carbon Steel / Alloy Steel / Die Steel		**PR1525**	**GM/SM/GH** Chipbreaker
K Gray Cast Iron / Nodular Cast Iron		**PR1510**	**GH/GM** Chipbreaker
S Ni-base Heat Resistant Alloy	M Martensitic Stainless Steel	**CA6535**	**SM/GM** Chipbreaker
S Titanium Alloy	M Austenitic Stainless Steel M Precipitation Hardened Stainless Steel	**PR1535**	**SM/GM** Chipbreaker

For Chipbreaker Selection and Recommended Cutting Conditions ➡ **J10**

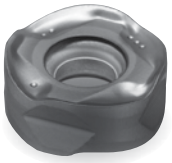
New Grades for Difficult-to-cut Materials

- Stable cutting prevents insert fracturing
- Good for high efficiency machining



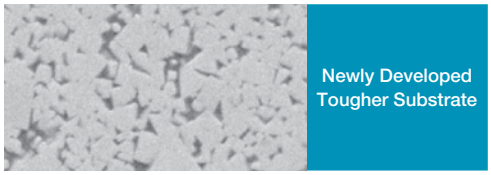
CA6535

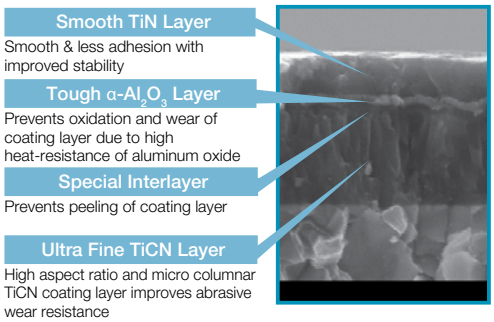
- For Ni-base heat resistant alloys and martensitic stainless steels
- High heat resistance and wear resistance with CVD coating
- Improved stability due to thin film coating technology

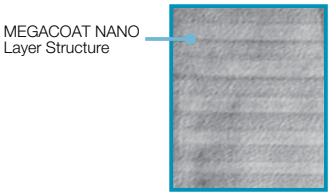


PR1535

- For titanium alloys and precipitation hardened stainless steel
- Stable milling operation and long tool life with Kyocera's MEGACOAT NANO coating technology
- Improved stability due to thin film coating technology

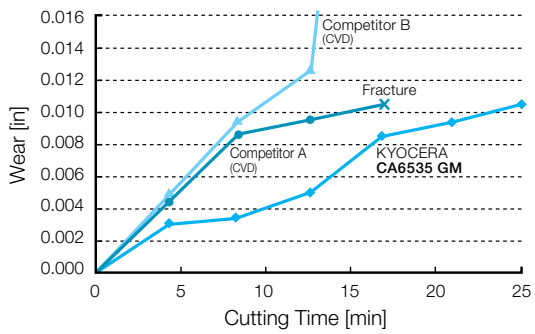






Tool Life Comparison

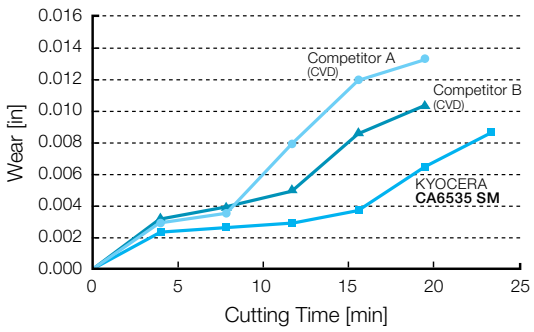
Ni-base Heat Resistant Alloy



<Cutting Conditions> Vc = 160 sfm, D.O.C. = 0.039", fz = 0.006 ipt, WET

1st recommendation GM Chipbreaker

Martensitic Stainless Steel



<Cutting Conditions> Vc = 980 sfm, D.O.C. = 0.079", fz = 0.008 ipt, WET

1st recommendation SM Chipbreaker

MRW Face Mill (Inch Size)

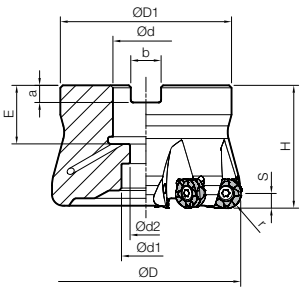


Fig.1

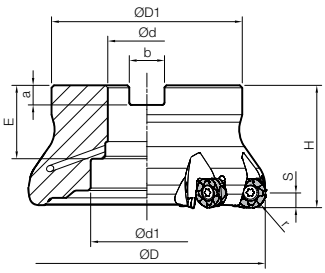


Fig.2

Toolholder Dimensions (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in) r	ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Rake Angle (°) A.R.	Rake Angle (°) R.R.	Coolant Hole	Drawing	Weight (kg)	Max. RPM
MRW 2000R-12-5T	●	5	0.236 (6mm)	2.00	1.75	0.75	0.748	0.433	1.575	0.750	0.187	0.312	0.236 (6mm)	+12°	-15.5°	Yes	Fig.1	0.3	16,000
2000R-12-6T	●	6																0.3	
2500R-12-6T	●	6		2.50	1.75	0.75	0.748	0.433	1.575	0.750	0.187	0.312		+12°	-15.5°	Yes	Fig.1	0.6	14,000
2500R-12-7T	○	7																0.6	
3000R-12-6T	●	6		3.00	2.25	1.00	0.866	0.551	1.969	1.063	0.236	0.381		+12°	-15.5°	Yes	Fig.1	1.1	12,000
3000R-12-8T	○	8																1.1	
4000R-12-7T	●	7		4.00	3.54	1.50	2.047	-	1.969	1.142	0.393	0.625		+12°	-15.5°	Yes	Fig.2	1.5	10,600
4000R-12-9T	○	9																1.4	
MRW 2500R-16-5T	●	5	0.315 (8mm)	2.50	1.75	0.75	0.748	0.433	1.575	0.750	0.187	0.312	0.315 (8mm)	+11°	-16.5°	Yes	Fig.1	0.5	12,800
2500R-16-6T	○	6																0.5	
3000R-16-6T	●	6		3.00	2.25	1.00	0.866	0.551	1.969	1.063	0.236	0.381		+11°	-16.5°	Yes	Fig.1	1.1	11,000
3000R-16-7T	●	7																1.0	
4000R-16-6T	●	6		4.00	3.54	1.50	2.047	-	1.969	1.142	0.393	0.625		+11°	-16.5°	Yes	Fig.2	1.4	9,600
4000R-16-8T	○	8																1.3	
5000R-16-8T	●	8		5.00	3.54	1.50	2.047	-	2.480	1.496	0.393	0.625		+11°	-16.5°	Yes	Fig.2	2.6	8,560
5000R-16-10T	○	10																2.5	

Spare Parts and Applicable Inserts (Inch Size)

Part Number	Spare Parts: Clamp Screw	Wrench: DTPM-15	Wrench: TTP-20	Pre-Set Torque Wrench*	Anti-seize Compound	Arbor Bolt	Applicable Inserts ➡ B16: General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
									
MRW 2000R-12...	SB-4085TRP	DTPM-15	-	PST-IP15	MP-1	HH3/8-1.25 (HH3/8-1.25H)	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
2500R-12...									
3000R-12...						HH1/2-1.25 (HH1/2-1.25H)			
4000R-12...	Recommended Torque for Insert Clamp 3.5 N·m					-			
MRW 2500R-16...	SB-50140TRP	-	TTP-20	PST-IP20	MP-1	HH3/8-1.25 (HH3/8-1.25H)	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
3000R-16...						HH1/2-1.25 (HH1/2-1.25H)			
4000R-16...	Recommended Torque for Insert Clamp 4.5 N·m					-			
5000R-16...									

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Recommended Cutting Conditions ➡ **J10**

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

S is Maximum D.O.C.
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MRW Face Mill (Metric Size)

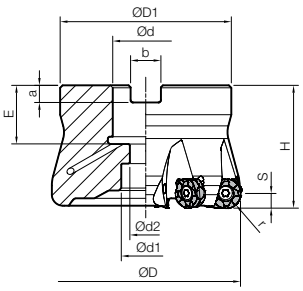


Fig.1

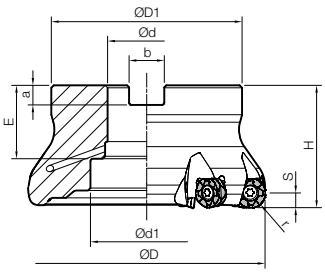
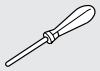


Fig.2

Toolholder Dimensions (Metric Size)

	Part Number	Stock	No. of Inserts	Dimensions (mm) r	ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	S	Rake Angle (°) A.R.	R.R.	Coolant Hole	Drawing	Weight (kg)	Max. RPM
Inch Bore Dia.	MRW 080R-12-6T	○	6	6	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	6.0	+12°	-15.5°	Yes	Fig.1	1.2	12,000
	080R-12-8T	○	8																1.1	
	100R-12-7T	○	7		100	78	1.250"	46	-	50	1.339"	0.315"	0.500"		+12°	-15.5°	Yes	Fig.2	1.5	10,600
	100R-12-9T	○	9																1.4	
	MRW 080R-16-6T	○	6	8	80	70	1.000"	20	13	50	1.063"	0.236"	0.375"	8.0	+11°	-16.5°	Yes	Fig.1	1.1	11,000
	080R-16-7T	○	7																1.1	
	100R-16-6T	○	6		100	78	1.250"	46	-	50	1.339"	0.315"	0.500"		+11°	-16.5°	Yes	Fig.2	1.4	9,600
	100R-16-8T	○	8																1.4	
	125R-16-8T	○	8		125	89	1.500"	55	-	63	1.496"	0.394"	0.625"		+11°	-16.5°	Yes	Fig.2	2.6	8,560
	125R-16-10T	○	10																	
Metric Bore Dia.	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	22	19	11	40	21	6.3	10.4		+12°	-15.5°	Yes	Fig.1	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		+12°	-15.5°	Yes	Fig.1	1.1	12,000
	080R-12-8T-M	○	8																1.1	
	100R-12-7T-M	○	7		100	78	32	46	-	50	30	8	14.4		+12°	-15.5°	Yes	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°	Yes	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		+11°	-16.5°	Yes	Fig.1	1.1	11,000
	080R-16-7T-M	○	7																1.0	
	100R-16-6T-M	○	6		100	78	32	46	-	50	30	8	14.4		+11°	-16.5°	Yes	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		+11°	-16.5°	Yes	Fig.2	2.6	8,560
	125R-16-10T-M	○	10																2.5	

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts: Clamp Screw	Wrench: DTPM-15	Wrench: TTP-20	Pre-Set Torque Wrench*	Anti-seize Compound	Arbor Bolt	Applicable Inserts ➡ B16: General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
				NEW 					
MRW 050R-12... 063R-12... 080R-12... 100R-12...	SB-4085TRP	DTPM-15	-	PST-IP15	MP-1	HH10x30 HH12x35 -	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended Torque for Insert Clamp 3.5 N·m								
MRW 063R-16... 080R-16... 100R-16... 125R-16...	SB-50140TRP	-	TTP-20	PST-IP20	MP-1	HH10x30 HH12x35 -	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended Torque for Insert Clamp 4.5 N·m								

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Recommended Cutting Conditions ➡ J10

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

S is Maximum D.O.C.
For more details, see Page ➡ J10

● : U.S. Stock Standard
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MRW End Mill (Inch Size)

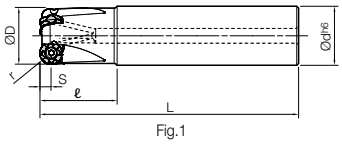

Fig.1

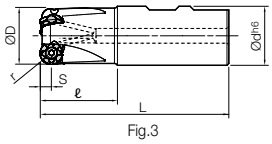

Fig.3

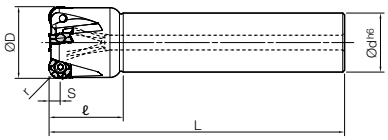

Fig.2

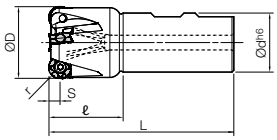

Fig.4

Toolholder Dimensions (Inch Size)

	Part Number	Stock	No. of Inserts	Dimensions (in) r	ØD	Ød	L	ℓ	S	Rake Angle (°) A.R. (Max.)	R.R.	Coolant Hole	Drawing	Max. RPM
Standard Shank (Weldon)	MRW 1250-W125-12-3T	●	3	0.236 (6mm)	1.25	1.25	3.921	1.575	0.236 (6mm)	+12°	-20°	Yes	Fig.3	22,000
	1500-W125-12-4T	●	4		1.50	1.25	3.856	1.575			-16.5°	Yes	Fig.4	18,800
	2000-W150-12-5T	○	5		2.00	1.50	4.266	1.575			-15.5°			16,000
	MRW 1500-W125-16-2T	●	2	0.315 (8mm)	1.50	1.25	3.856	1.575	0.315 (8mm)	+11°	-18°	Yes	Fig.4	17,200
	2000-W150-16-4T	○	4		2.00	1.50	4.262	1.575			-16.5°			14,800
	2500-W150-16-5T	○	5		2.50	1.50	4.262	1.575			-16.5°			12,800
Long Shank (Cylindrical)	MRW 1250-S125-12-2T-8	●	2	0.236 (6mm)	1.25	1.25	8.000	1.575	0.236 (6mm)	+12°	-20°	Yes	Fig.1	22,000
	1500-S125-12-3T-8	●	3		1.50	1.25	8.000	1.575			-16.5°	Yes	Fig.2	18,800
	2000-S150-12-4T-12	○	4		2.00	1.50	12.000	1.969			-15.5°			16,000
	MRW 1500-S125-16-2T-8	●	2	0.315 (8mm)	1.50	1.25	8.000	1.575	0.315 (8mm)	+11°	-18°	Yes	Fig.2	17,200
	2000-S150-16-3T-8	○	3		2.00	1.50	8.000	1.575			-16.5°			14,800
	2500-S150-16-4T-12	○	4		2.50	1.50	12.000	1.969			-16.5°			12,800

Spare Parts and Applicable Inserts (Inch Size)

Part Number	Spare Parts: Clamp Screw	Wrench: DTPM-15	Wrench: TTP-20	Pre-Set Torque Wrench*	Anti-seize Compound	Applicable Inserts ➡ B16: General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
								
MRW ····12...	SB-4085TRP	DTPM-15	-	PST-IP15	MP-1	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended Torque for Insert Clamp 3.5 N·m							
MRW ····16...	SB-50140TRP	-	TTP-20	PST-IP20	MP-1	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended Torque for Insert Clamp 4.5 N·m							

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Recommended Cutting Conditions ➡ **J10**

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

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MRW End Mill (Metric Size)

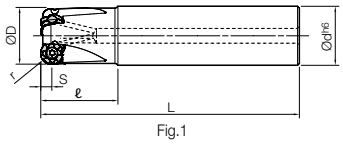


Fig.1

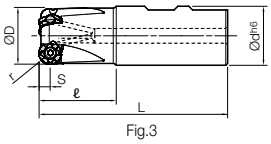


Fig.3

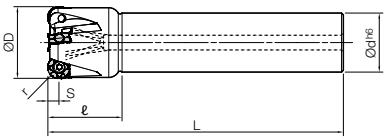


Fig.2

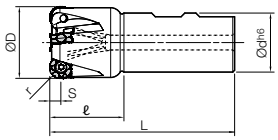


Fig.4

Toolholder Dimensions (Metric Size)

	Part Number	Stock	No. of Inserts	Dimensions (mm) r	ØD	Ød	L	ℓ	S	Rake Angle (°) A.R. (Max.)	R.R.	Coolant Hole	Drawing	Max. RPM
Standard Shank (Cylindrical)	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	32	160	40			-16.5°	Yes	Fig.2	18,800
	50-S42-12-5T	○	5		50	42	170	40			-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	40			-16.5°			14,800
	63-S42-16-5T	○	5		63	42	170	50			-16.5°			12,800
Long Shank (Cylindrical)	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	32	200	40			-16.5°	Yes	Fig.2	18,800
	50-S42-12-4T-300	○	4		50	42	300	40			-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	40			-16.5°			14,800
	63-S42-16-4T-300	○	4		63	42	300	50			-16.5°			12,800
Standard Shank (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	32	100	40			-16.5°	Yes	Fig.4	18,800
	50-W40-12-5T	○	5		50	40	110	40			-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	40			-16.5°			14,800
	63-W40-16-5T	○	5		63	40	120	50			-16.5°			12,800

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts: Clamp Screw	Wrench: DTPM-15	Wrench: TTP-20	Pre-Set Torque Wrench*	Anti-seize Compound	Applicable Inserts ➡ B16: General Purpose	Low Cutting Force	Tough Edge (For Heavy Milling)
								
MRW ····12...	SB-4085TRP	DTPM-15	-	PST-IP15	MP-1	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended Torque for Insert Clamp 3.5 N·m							
MRW ····16...	SB-50140TRP	-	TTP-20	PST-IP20	MP-1	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended Torque for Insert Clamp 4.5 N·m							

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Recommended Cutting Conditions ➡ J10

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

S is Maximum D.O.C.
For more details, see Page ➡ J10

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

◆ Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker fz (ipt) Recommended feed rate (standard value) ※ ROMU12 : D.O.C. = 0.118" ROMU16 : D.O.C. = 0.158"			Recommended Insert Grades (Cutting Speed Vc: sfm)			
				MEGACOAT NANO			CVD Coated Carbide
	GM	SM	GH	PR1535	PR1525	PR1510	CA6535
Carbon Steel	★ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014	☆ 390~**590**~820	★ 390~**590**~820	-	-
Alloy Steel	★ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014	☆ 330~**520**~720	★ 330~**520**~720	-	-
Mold Steel	★ 0.004~**0.006**~0.010	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.012	☆ 260~**460**~590	★ 260~**460**~590	-	-
Austenitic Stainless Steel	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	★ 330~**520**~660	☆ 330~**520**~660	-	-
Martensitic Stainless Steel	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	☆ 490~**660**~820	-	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	★ 0.004~**0.006**~0.008	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010	★ 300~**390**~490	-	-	-
Gray Cast Iron	★ 0.004~**0.008**~0.012	-	☆ 0.006~**0.012**~0.014	-	-	★ 390~**590**~820	-
Nodular Cast Iron	★ 0.004~**0.006**~0.010	-	☆ 0.006~**0.008**~0.012	-	-	★ 330~**490**~660	-
Ni-base Heat Resistant Alloy	★ 0.004~**0.005**~0.006	☆ 0.002~**0.004**~0.006	☆ 0.005~**0.006**~0.008	☆ 70~**100**~160	-	-	★ 70~**100**~160
Titanium Alloy	☆ 0.004~**0.005**~0.006	★ 0.002~**0.004**~0.006	-	★ 130~**200**~260	-	☆ 100~**160**~230	-

※ Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy ★: 1st Recommendation ☆: 2nd Recommendation

※ The figure in bold font is center value of the recommended cutting conditions. 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 D.O.C. is rε/2 (0.118" for ROMU12, 0.158" for ROMU16).
For lower feed rates than the above conditions, the conversion factor in the following table is recommended.

● Conversion Factor for Feed Per Tooth by Depth of Cut (D.O.C.)

Insert	D.O.C. (Recommended)	D.O.C. (Max.)	Conversion Factor for Feed Per Tooth				
			D.O.C. = 0.020"	D.O.C. = 0.039"	D.O.C. = 0.079"	D.O.C. = 0.118"	D.O.C. = 0.158"
ROMU12 Type	0.118" or less	0.236"	2.1	1.5	1.1	1.0 (Standard)	-
ROMU16 Type	0.158" or less	0.315"	2.4	1.7	1.3	1.1	1.0 (Standard)

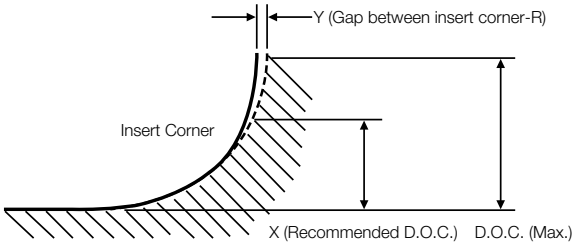
Calculation Example (ROMU12, Carbon Steel, GM Chipbreaker, D.O.C. = 0.039")

fz = 0.008 ipt (Standard value for carbon steel and GM chipbreaker)	X	1.5 (Conversion factor for ROMU12 type, D.O.C. = 0.039")	=	fz = 0.012 ipt (Recommended feed rate)

※ Recommended D.O.C. : 0.118" or less for ROMU12, 0.158" or less for ROMU16

● Corner R Shape During Processing with MRW (See Fig.1)

Insert	D.O.C. (Max.)	X	Y
ROMU12 Type	0.236"	0.118"	0.004"
ROMU16 Type	0.315"	0.158"	0.004"



※ When machining with larger D.O.C. than recommended D.O.C. (X), there is a gap (Y) between the workpiece corner and insert corner R (rε).
※ The above figure is an estimation. There is a ±0.008" variation depending on the cutting conditions.

Fig.1

How to Mount an Insert

1. Be sure to remove dust and chips from the insert mounting pocket.

2. Apply anti-seize compound on portion of taper and thread of clamp screw.
   ① Attach the screw to the front end of the wrench
   ② While lightly pressing the insert against the mating surfaces, put the screw into the hole of the insert and tighten. (See **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)
   Use a "Torx Plus" Wrench for tightening clamp 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.
   For recommended torque, see **pages** **J6-J9**.

5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the holder or between the insert side surfaces and the mating surface of the holder.

If there is any clearance, remove the insert and mount it again according to the above steps.

Fig.1

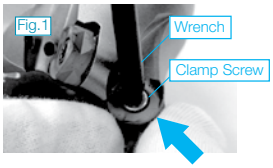
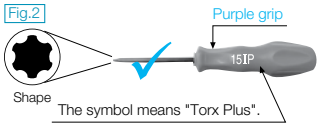
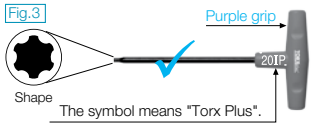


Fig.2



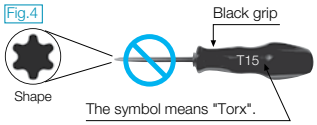
The symbol means "Torx Plus".
Straight grip wrench for MRW-12

Fig.3



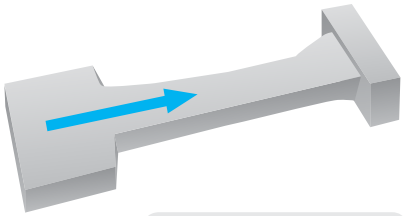
The symbol means "Torx Plus".
T-shaped grip wrench for MRW-16

Fig.4



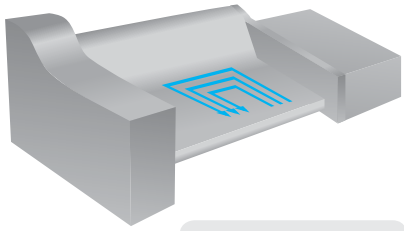
The symbol means "Torx".
"Torx" Wrench (Do **NOT** use for MRW)

Case Studies

410 Stainless Steel	
• Turbine Blade • Vc = 890 sfm • fz = 0.011 ipt • D.O.C. = 0.020~0.039" • ae = Max. 1.378" • Dry • MRW050R-12-6T-M (6 Flutes) • ROMU1204M0ER-SM (CA6535)	 1.2 times the machining efficiency Economical double-faced insert
CA6535	**Stable Machining**
Competitor A (Positive Insert Cutter)	Unstable Machining

MRW improved machining efficiency 1.2 times with same tool life compared to Competitor A.
MRW has a cost advantage due to double sided inserts.

(User Evaluation)

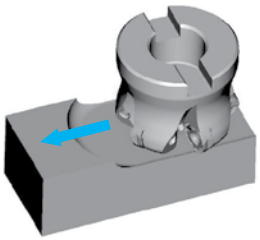
410 Stainless Steel	
• Turbine Blade • Vc = 820 sfm • fz = 0.006 ipt • D.O.C. = 0.079" • ae = 0.197~1.181" • Wet • MRW050R-12-5T-M (5 Flutes) • ROMU1204M0ER-SM (CA6535)	 Same or longer tool life Economical double-faced insert
CA6535	**Stable, available for further machining**
Competitor B (Positive Insert Cutter)	Unstable Machining

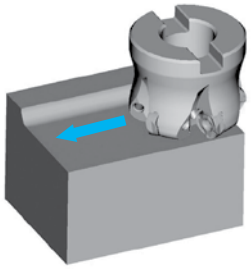
MRW showed less damage on the cutting edge and reduced machining noise.
MRW has equal or longer tool life and cost advantage due to double sided inserts.

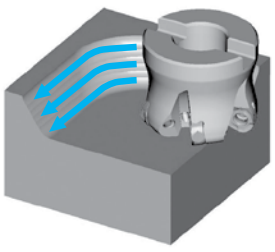
(User Evaluation)

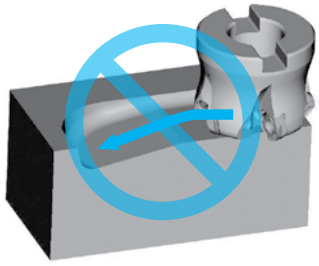
Application

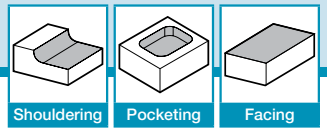
※MRW is not available for 3D machining such as Plunging and Profiling.


Facing


Shouldering


Contour-Line Milling


Plunging / Profiling

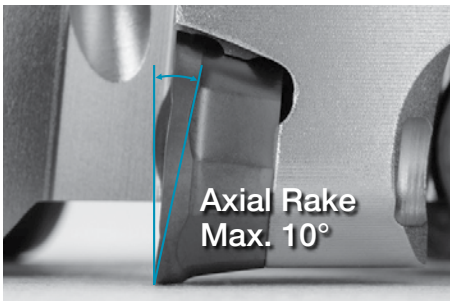


RAD-6 (MRX)

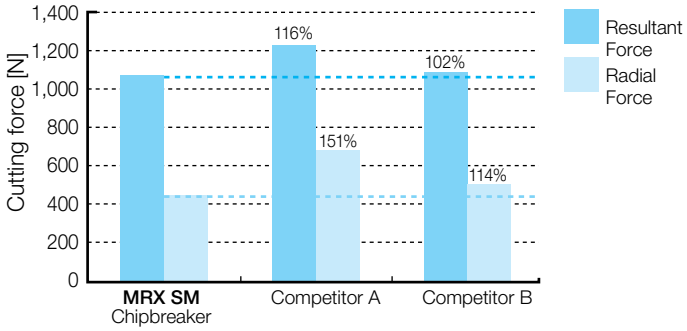
The MRX Radius Cutter
Lowers Cutting Costs and
Increases Efficiency!

Advantages

Low Cutting Forces with Helical Cutting Edge Design



• **Cutting Force Comparison**



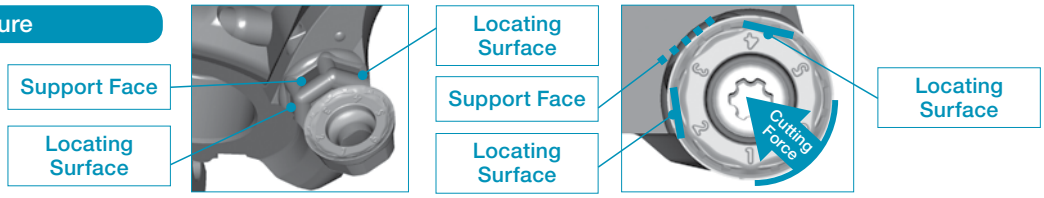
< Cutting Conditions >
Vc=400sfm, D.O.C.×ae=0.079×0.984", fz=0.008ipt, 304 Stainless Steel, Cutter Ø50mm

Flat Lock Structure to Hold Insert Firmly in Place

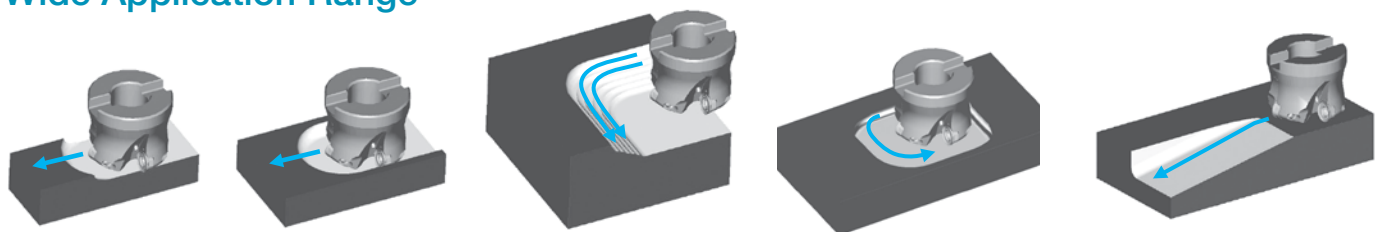
Prevents insert rotation during machining to provide stable cutting

Flat Lock Structure

Wide flat binding face
- Receives even cutting forces
- Prevents insert rotation



Wide Application Range



Facing | Slotting | Shouldering | Pocketing | Ramping / Profiling

New Grades for Difficult-to-cut Materials

Longer tool life with a wide lineup including 4 grades and 3 chipbreakers!
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MRX Face Mill (Inch Size)

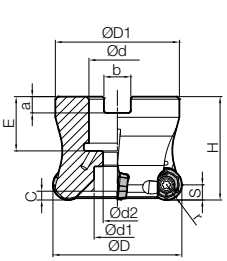

Fig.1

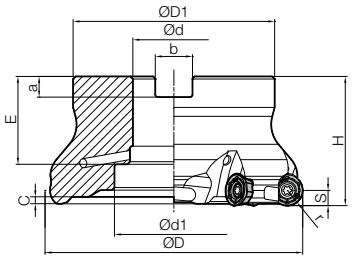

Fig.2

Toolholder Dimensions (Inch Size)

Part Number	Stock	No. of Inserts	Dimensions (in)												Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max. RPM
			r	ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	C	S	A.R.	R.R.				
MRX 1500R-10-5T	●	5	0.197 (5mm)	1.500	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.114	0.197 (5mm)	+10°	-5.5°	Yes	Fig.1	0.2	20,000
2000R-10-6T	●	6		2.000	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.114		+10°	-5.5°			0.3	17,500
2500R-10-7T	□	7		2.500	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.114		+10°	-5.5°			0.5	15,000
MRX 1500R-12-4T	□	4	0.236 (6mm)	1.500	1.400	0.500	0.394	0.276	1.575	0.709	0.156	0.250	0.134	0.236 (6mm	+10°	-5.5°	Yes	Fig.1	0.2	21,000
2000R-12-4T	□	4		2.000	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.134		+10°	-5.5°			0.3	18,000
2000R-12-5T	●	5		2.000	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.134		+10°	-5.5°			0.3	18,000
2500R-12-5T	□	5		2.500	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.134		+10°	-5.5°			0.4	15,500
2500R-12-6T	□	6		2.500	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.134		+10°	-5.5°			0.4	15,500
3000R-12-6T	●	6		3.000	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382	0.134		+10°	-5.5°			0.8	13,500
3000R-12-7T	□	7		3.000	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382	0.134		+10°	-5.5°			0.8	13,500
4000R-12-7T	□	7	0.236 (6mm)	4.000	3.540	1.500	2.047	-	1.969	1.142	0.394	0.626	0.134	0.236 (6mm	+10°	-5.5°	Yes	Fig.2	1.7	12,000
4000R-12-9T	□	9		4.000	3.540	1.500	2.047	-	1.969	1.142	0.394	0.626	0.134		+10°	-5.5°			1.6	12,000
MRX 2500R-16-4T	□	4	0.315 (8mm)	2.500	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.173	0.315 (8mm)	+10°	-5.5°	Yes	Fig.1	0.4	13,500
2500R-16-5T	●	5		2.500	1.750	0.750	0.669	0.433	1.575	0.750	0.187	0.313	0.173		+10°	-5.5°			0.4	13,500
3000R-16-5T	□	5		3.000	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382	0.173		+10°	-5.5°			0.8	11,500
3000R-16-6T	●	6		3.000	2.250	1.000	0.866	0.551	1.969	1.063	0.236	0.382	0.173		+10°	-5.5°			0.8	11,500
4000R-16-6T	□	6	0.315 (8mm)	4.000	3.540	1.500	2.047	-	1.969	1.142	0.394	0.626	0.173	0.315 (8mm)	+10°	-5.5°	Yes	Fig.2	1.6	10,000
4000R-16-7T	●	7		4.000	3.540	1.500	2.047	-	1.969	1.142	0.394	0.626	0.173		+10°	-5.5°			1.6	10,000
5000R-16-6T	□	6		5.000	3.540	1.500	2.047	-	2.480	1.496	0.394	0.626	0.173		+10°	-5.5°			2.9	9,000
5000R-16-8T	□	8		5.000	3.540	1.500	2.047	-	2.480	1.496	0.394	0.626	0.173		+10°	-5.5°			2.8	9,000

Face Mill Spare Parts and Applicable Inserts (Inch Size)

Part Number	Spare Parts: Clamp Screw	Wrench: DTPM	Wrench: TTP	Pre-Set Torque Wrench*	Anti-seize Compound	Arbor Bolt	Applicable Inserts ➡ B16
MRX 1500R-10...	SB-3070TRP	DTPM-10	-	PST-IP10	MP-1	HH1/4-0.75	RPMT10T3M0**ER-GM** RPGT10T3M0**ER-GM** RPGT10T3M0**ER-SM** ※1 RPMT10T3M0**EN-GH**
2000R-10...	Recommended Torque for Insert Clamp 2.0 N·m					HH3/8-1.25	
2500R-10...						HH3/8-1.25	
MRX 1500R-12...	SB-4090TRP	DTPM-15	-	PST-IP15	MP-1	HH1/4-0.75	RPMT1204M0**ER-GM** RPGT1204M0**ER-GM** RPGT1204M0**ER-SM** ※2 RPMT1204M0**EN-GH** RPMW1204M0TN
2000R-12...						HH3/8-1.25	
2500R-12...	Recommended Torque for Insert Clamp 3.5 N·m					HH3/8-1.25	
3000R-12...						HH1/2-1.25	
4000R-12...						-	
MRX 2500R-16...	SB-50120TRP	-	TTP-20	PST-IP20	MP-1	HH3/8-1.25	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM ※3 RPMT1605M0EN-GH RPMW1605M0TN
3000R-16...						HH1/2-1.25	
4000R-16...	Recommended Torque for Insert Clamp 4.5 N·m					-	
5000R-16...						-	

Recommended Cutting Conditions ➡ J18

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

*For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force. Pre-Set Torque Wrench sold separately.

※1...Not compatible with conventional RPMT10T3M0 inserts (without **ER**-.. or **EN**-..)

※2...Not compatible with conventional RPMT1204M0 or RPMT1204M0-H inserts (without **ER**-.. or **EN**-..)

※3...Not compatible with conventional RPMT1605M0-H inserts.

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

MRX Face Mill (Metric Size)

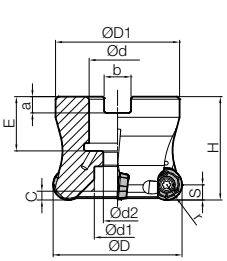

Fig.1

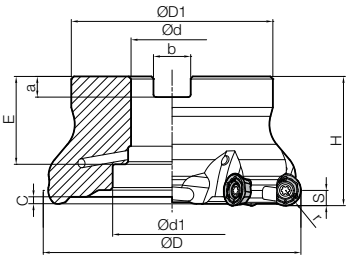

Fig.2

Toolholder Dimensions (Metric Size)

	Part Number	Stock	No. of Inserts	Dimensions (mm) r	ØD	ØD1	Ød	Ød1	Ød2	H	E	a	b	C	S	Rake Angle (°) A.R.	R.R.	Coolant Hole	Drawing	Weight (kg)	Max. RPM
Inch Bore Dia.	MRX 080R-12-6T	○	6	6	80	70	1.000"	20.0	13	50	1.063"	0.236"	0.375"	3.4	6	+10°	-5.5°	Yes	Fig.1	1.2	13,500
	080R-12-8T	○	8																	1.1	13,500
	100R-12-7T	○	7		100	78	1.250"	46.0	-	50	1.339"	0.315"	0.500"	3.4		+10°	-5.5°	Yes	Fig.2	1.5	12,000
	100R-12-9T	○	9																	1.5	12,000
	MRX 080R-16-5T	○	5	8	80	70	1.000"	20.0	13	50	1.063"	0.236"	0.375"	4.4	8	+10°	-5.5°	Yes	Fig.1	1.1	11,500
	080R-16-6T	○	6																	1.1	11,500
	100R-16-6T	○	6		100	78	1.250"	46.0	-	50	1.339"	0.315"	0.500"	4.4		+10°	-5.5°	Yes	Fig.2	1.4	10,000
	100R-16-7T	○	7																	1.4	10,000
	125R-16-6T	○	6		125	89	1.500"	55.0	-	63	1.496"	0.394"	0.625"	4.4		+10°	-5.5°	Yes	Fig.2	2.7	9,000
	125R-16-8T	○	8																		9,000
Metric Bore Dia.	MRX 040R-10-5T-M	○	5	5	40	38	16	15.0	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	18.0	11	40	21	6.3	10.4	2.9		+10°	-5.5°	Yes	Fig.1	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°	Yes	Fig.1	0.2	21,000
	050R-12-4T-M	○	4		50	48	22	18.0	11	40	21	6.3	10.4	3.4		+10°	-5.5°	Yes	Fig.1	0.3	18,000
	050R-12-5T-M	○	5																	0.3	18,000
	063R-12-5T-M	○	5		63	60	22	18.0	11	40	21	6.3	10.4	3.4		+10°	-5.5°	Yes	Fig.1	0.6	15,500
	063R-12-6T-M	○	6																	0.6	15,500
	080R-12-6T-M	○	6		80	70	27	20.0	13	50	24	7.0	12.4	3.4		+10°	-5.5°	Yes	Fig.1	1.2	13,500
	080R-12-8T-M	○	8																	1.1	13,500
	100R-12-7T-M	○	7		100	78	32	46.0	-	50	30	8.0	14.4	3.4		+10°	-5.5°	Yes	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	18.0	11	40	21	6.3	10.4	4.4	8	+10°	-5.5°	Yes	Fig.1	0.5	13,500
	063R-16-5T-M	○	5																	0.5	13,500
	080R-16-5T-M	○	5		80	70	27	20.0	13	50	24	7.0	12.4	4.4		+10°	-5.5°	Yes	Fig.1	1.1	11,500
	080R-16-6T-M	○	6																	1.1	11,500
	100R-16-6T-M	○	6		100	78	32	46.0	-	50	30	8.0	14.4	4.4		+10°	-5.5°	Yes	Fig.2	1.4	10,000
	100R-16-7T-M	○	7																	1.4	10,000
	125R-16-6T-M	○	6		125	89	40	55.0	-	63	33	9.0	16.4	4.4		+10°	-5.5°	Yes	Fig.2	2.6	9,000
	125R-16-8T-M	○	8																	2.6	9,000

Face Mill Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts: Clamp Screw	Wrench: DTPM	Wrench: TTP	Pre-Set Torque Wrench*	Anti-seize Compound	Arbor Bolt	Applicable Inserts ➡ B16
MRX 040R-10...	SB-3070TRP	DTPM-10	-	PST-IP10	MP-1	HH8X25	RPMT10T3M0**ER-GM**
050R-10...	Recommended Torque for Insert Clamp 2.0 N·m					HH10X30	RPGT10T3M0**ER-GM** RPGT10T3M0**ER-SM** ※1
063R-10...						HH10X30	RPMT10T3M0**EN-GH**
MRX 040R-12...	SB-4090TRP	DTPM-15	-	PST-IP15	MP-1	HH8X25	RPMT1204M0**ER-GM**
050R-12...						HH10X30	RPGT1204M0**ER-GM**
063R-12...	Recommended Torque for Insert Clamp 3.5 N·m					HH10X30	RPGT1204M0**ER-SM** ※2
080R-12...						HH12X35	RPMT1204M0**EN-GH**
100R-12...						-	RPMW1204M0TN
MRX 063R-16...	SB-50120TRP	-	TTP-20	PST-IP20	MP-1	HH10X30	RPMT1605M0ER-GM
080R-16...	Recommended Torque for Insert Clamp 4.5 N·m					HH12X35	RPGT1605M0ER-GM
100R-16...						-	RPGT1605M0ER-SM ※3
125R-16...						-	RPMT1605M0EN-GH RPMW1605M0TN

Recommended Cutting Conditions ➡ J18

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force. Pre-Set Torque Wrench sold separately.

※1…Not compatible with conventional RPMT10T3M0 inserts (without **ER**-.. or **EN**-..)

※2…Not compatible with conventional RPMT1204M0 or RPMT1204M0-H inserts (without **ER**-.. or **EN**-..)

※3…Not compatible with conventional RPMT1605M0-H inserts.

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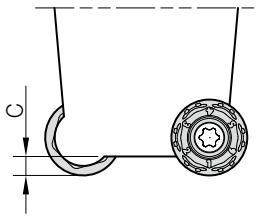
MRX End Mill (Inch Size)



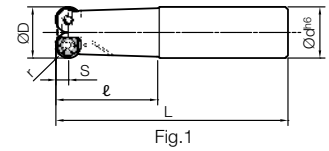


Fig.1

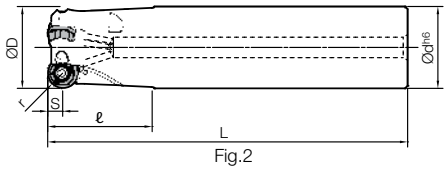


Fig.2

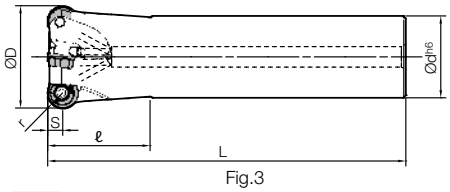


Fig.3

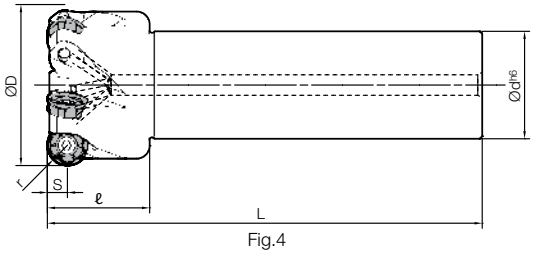


Fig.4

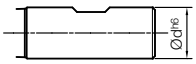


Fig.5

Fig.6

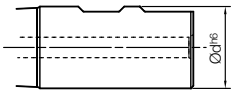


Fig.7

Fig.8

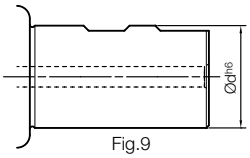


Fig.9

Toolholder Dimensions (Inch Size)

	Part Number		Stock	No. of Inserts	Dimensions (in)							Rake Angle (°)		Coolant Hole	Drawing	Max. RPM
					r	ØD	Ød	L	ℓ	C	S	A.R. (Max.)	R.R.			
Standard Shank (Weldon)	MRX	0625-W625-08-2T	●	2	0.157 (4mm)	0.625	0.625	4.331	2.386	0.094	0.157 (4mm)	+3°	-6.5°	No	Fig.5	38,000
		0750-W750-08-2T	□	2		0.750	0.750	4.724	2.654	0.094		+10°	-5.5°	Yes	Fig.6	32,000
		1000-W100-08-4T	●	4		1.000	1.000	4.724	2.406	0.094		+10°	-5.5°	Yes	Fig.7	28,000
	MRX	1000-W100-10-3T	●	3	0.197 (5mm)	1.000	1.000	4.724	2.409	0.114	0.197 (5mm)	+10°	-5.5°	Yes	Fig.7	28,000
		1250-W125-10-4T	●	4		1.250	1.250	5.512	3.197							22,500
	MRX	1250-W125-12-3T	●	3	0.236 (6mm)	1.250	1.250	5.512	3.189	0.134	0.236 (6mm)	+10°	-5.5°	Yes	Fig.7	24,500
		1500-W125-12-4T	●	4		1.500	1.250	5.512	1.575	0.134		+10°	-5.5°	Yes	Fig.8	21,000
		2000-W150-12-5T	□	5		2.000	1.500	6.693	1.575							18,000
	MRX	1500-W125-16-2T	●	2	0.315 (8mm)	1.500	1.250	5.512	1.575	0.173	0.315 (8mm)	+10°	-5.5°	Yes	Fig.8	18,000
		2000-W150-16-4T	●	4		2.000	1.500	6.693	1.575							15,500
Standard Shank (Cylindrical)	MRX	0625-S625-08-2T-6	□	2	0.157 (4mm)	0.625	0.625	6.000	3.150	0.094	0.157 (4mm)	+3°	-6.5°	No	Fig.1	38,000
		0750-S750-08-2T-7	□	2		0.750	0.750	7.000	3.150	0.094		+10°	-5.5°	Yes	Fig.2	32,000
		1000-S100-08-4T-7	□	4		1.000	1.000	7.000	3.150							28,000
	MRX	1000-S100-10-2T-7	□	2	0.197 (5mm)	1.000	1.000	7.000	3.150	0.114	0.197 (5mm)	+10°	-5.5°	Yes	Fig.2	28,000
	MRX	1250-S125-12-2T-8	□	2	0.236 (6mm)	1.250	1.250	8.000	3.150	0.114	0.236 (6mm)	+10°	-5.5°	Yes	Fig.2	24,500
		1500-S125-12-4T-8	□	4		1.500	1.250	8.000	1.575	0.134		+10°	-5.5°	Yes	Fig.3	21,000
		2000-S150-12-4T12	□	4		2.000	1.500	12.000	1.575							18,000
	MRX	1500-S125-16-2T-8	□	2	0.315 (8mm)	1.500	1.250	8.000	1.575	0.173	0.315 (8mm)	+10°	-5.5°	Yes	Fig.3	18,000
		2000-S150-16-4T12	□	4		2.000	1.500	12.000	1.575							15,500
		2500-S150-16-4T12	□	4		2.500	1.500	12.000	1.575	0.173		+10°	-5.5°	Yes	Fig.4	13,500

Recommended Cutting Conditions J18
End Mill Spare Parts and Applicable Inserts J17

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

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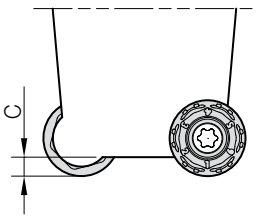
MRX End Mill (Metric Size)



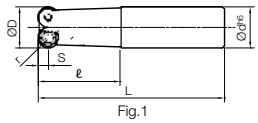


Fig.1

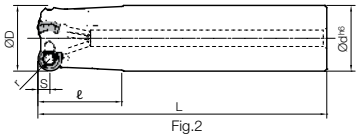


Fig.2

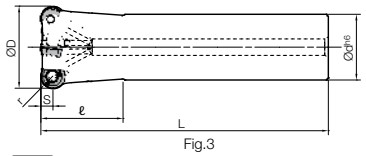


Fig.3

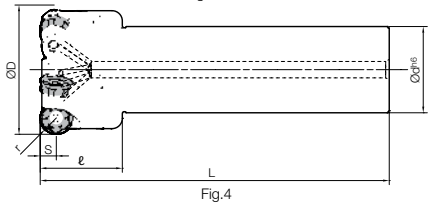


Fig.4

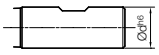


Fig.5

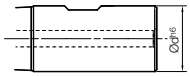


Fig.6

Fig.7

Fig.8

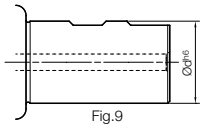


Fig.9

Toolholder Dimensions (Metric Size)

	Part Number	Stock	No. of Inserts	Dimensions (mm)							Rake Angle (°)		Coolant Hole	Drawing	Max. RPM
				r	ØD	Ød	L	ℓ	C	S	A.R. (Max.)	R.R.			
Standard Shank (Cylindrical)	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	40	2.4	4.0	+10°	-5.5°	Yes	Fig.2	32,000
	25-S25-08-4T	○	4		25	25	120								28,000
	MRX 20-S20-10-2T	○	2	5	20	20	120	40	2.9	5.0	+5°	-8.0°	No	Fig.1	30,000
	25-S25-10-3T	○	3		25	25	120	40	2.9	5.0	+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	32	140	40	3.4	6.0	+10°	-5.5°	Yes	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	42	170	40	4.4	8.0	+10°	-5.5°	Yes	Fig.4	13,500
Standard Shank (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	40	2.4	4.0	+10°	-5.5°	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°	-8.0°	No	Fig.5	30,000
	25-W25-10-3T	○	3		25	25	97	40	2.9	5.0	+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	32	101	40	3.4	6.0	+10°	-5.5°	Yes	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	40	112	40	4.4	8.0	+10°	-5.5°	Yes	Fig.9	13,500
Long Shank (Cylindrical)	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	2.4	4.0	+10°	-5.5°	Yes	Fig.2	32,000
	25-S25-08-4T-180	○	4		25	25	180								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	180	80	2.9	5.0	+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	32	200	40	3.4	6.0	+10°	-5.5°	Yes	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	42	300	40	4.4	8.0	+10°	-5.5°	Yes	Fig.4	13,500

Recommended Cutting Conditions ➡ J18
End Mill Spare Parts and Applicable Inserts ➡ J17

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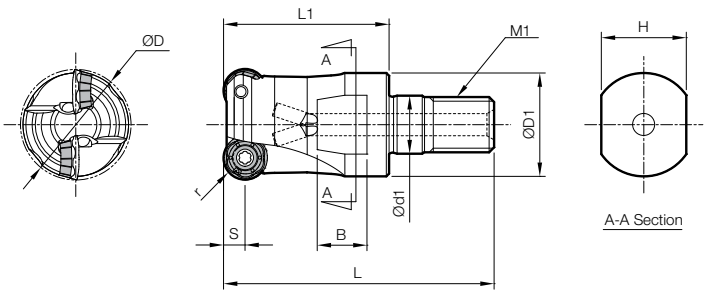
MRX Modular End Mill (Metric Size)



Toolholder Dimensions (Metric Size)

Part Number	Stock	No. of Inserts	Dimensions (mm)										Rake Angle (°)		Coolant Hole	Applicable Inserts	Max. RPM
			r	ØD	ØD1	Ød1	L	L1	M1	H	B	S	A.R. (Max.)	R.R.			
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	4	20	18.7	10.5	49	30	M10xP1.50	15	9	4	+10°	-5.5°	Yes		32,000
25-M12-08-4T	○	4		25	23.0	12.5	57	35	M12xP1.75	19	10						28,000
MRX 20-M10-10-2T	○	2	5	20	18.7	10.5	49	30	M10xP1.50	15	9	5	+5°	-8.0°	No	RPMT10 RPGT10	30,000
25-M12-10-3T	○	3	5	25	23.0	12.5	57	35	M12xP1.75	19	10	5	+10°	-5.5°	Yes		28,000
32-M16-10-4T	○	4		32	30.0	17.0	63	40	M16xP2.00	24	12						22,500
MRX 32-M16-12-3T	○	3	6	32	30.0	17.0	63	40	M16xP2.00	24	12	6	+10°	-5.5°	Yes	RPMT12 RPGT12 RPMW12	24,500
40-M16-12-4T	○	4		40	30.0	17.0	63	40	M16xP2.00	24	12						21,000
MRX 40-M16-16-2T	○	2	8	40	30.0	17.0	63	40	M16xP2.00	24	12	8	+10°	-5.5°	Yes	RPMT16 RPGT16 RPMW16	18,000

End Mill Spare Parts and Applicable Inserts (Inch / Metric Size)

Part Number	Spare Parts					Applicable Inserts → B16
	Clamp Screw	Wrench		Pre-Set Torque Wrench*	Anti-seize Compound	
		DTPM	TTP			
MRX ...-08...	SB-2555TRP	DTPM-8	-	PST-IP9	MP-1	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM ※1 RDMT0803M0EN-GH
	Recommended Torque for Insert Clamp 1.2 N·m					
MRX ...-10...	SB-3070TRP	DTPM-10	-	PST-IP10	MP-1	RPMT10T3M0**ER-GM** RPGT10T3M0**ER-GM** RPGT10T3M0**ER-SM** ※2 RPMT10T3M0**EN-GH**
	Recommended Torque for Insert Clamp 2.0 N·m					
MRX ...-12...	SB-4090TRPN	DTPM-15	-	PST-IP15	MP-1	RPMT1204M0**ER-GM** RPGT1204M0**ER-GM** RPGT1204M0**ER-SM** ※3 RPMT1204M0**EN-GH** RPMW1204M0TN
	Recommended Torque for Insert Clamp 3.5 N·m					
MRX ...-16...	SB-50120TRP	-	TTP-20	PST-IP20	MP-1	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM ※4 RPMT1605M0EN-GH RPMW1605M0TN
	Recommended Torque for Insert Clamp 4.5 N·m					

Recommended Cutting Conditions → J18

Caution with Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

For prolonged insert and cutter life, it is recommended to use the pre-set torque wrench to ensure proper insert screw force.
Pre-Set Torque Wrench sold separately.

※1…Not compatible with conventional RPMT08T2M0-H inserts

※2…Not compatible with conventional RPMT10T3M0 inserts (without **ER**-.. or **EN**-..)

※3…Not compatible with conventional RPMT1204M0 or RPMT1204M0-H inserts (without **ER**-.. or **EN**-..)

※4…Not compatible with conventional RPMT1605M0-H inserts.

Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker per Material (fz: ipt) ※RD..08 Type: D.O.C. = 0.079" RP..10 Type: D.O.C. = 0.098" RP..12 Type: D.O.C. = 0.118" RP..16 Type: D.O.C. = 0.158"					Recommended Insert Grades (Cutting Speed Vc: sfm)			
						MEGACOAT NANO			CVD Coated Carbide
	RDMT-GM RPMT-GM	**RDGT-GM RPGT-GM**	**RDGT-SM RPGT-SM**	**RDMT-GH RPMT-GH**	**RPMW**	**PR1535**	**PR1525**	**PR1510**	**CA6535**
Carbon Steel	★ 0.004~**0.008**~0.012	☆ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014		☆ 390~**590**~820	★ 390~**590**~820	-	-
Alloy Steel	★ 0.004~**0.008**~0.012	☆ 0.004~**0.008**~0.012	☆ 0.002~**0.006**~0.008	☆ 0.006~**0.012**~0.014		☆ 330~**520**~720	★ 330~**520**~720	-	-
Mold Steel	★ 0.004~**0.006**~0.010	☆ 0.004~**0.006**~0.010	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.012		☆ 260~**460**~590	★ 260~**460**~590	-	-
Austenitic Stainless Steel	☆ 0.004~**0.006**~0.008	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010		★ 330~**520**~660	☆ 330~**520**~660	-	-
Martensitic Stainless Steel	☆ 0.004~**0.006**~0.008	☆ 0.004~**0.006**~0.008	★ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010		☆ 490~**660**~820	-	-	★ 590~**790**~980
Precipitation Hardened Stainless Steel	☆ 0.004~**0.006**~0.008	★ 0.004~**0.006**~0.008	☆ 0.002~**0.005**~0.008	☆ 0.006~**0.008**~0.010		★ 300~**390**~490	-	-	-
Gray Cast Iron	★ 0.004~**0.008**~0.012	☆ 0.004~**0.008**~0.012	-	☆ 0.006~**0.012**~0.014		-	-	★ 390~**590**~820	-
Nodular Cast Iron	★ 0.004~**0.006**~0.010	☆ 0.004~**0.006**~0.010	-	☆ 0.006~**0.008**~0.012		-	-	★ 330~**490**~660	-
Ni-base Heat Resistant Alloy	☆ 0.004~**0.005**~0.006	★ 0.004~**0.005**~0.006	☆ 0.002~**0.004**~0.006	☆ 0.005~**0.006**~0.008		☆ 70~**100**~160	-	-	★ 70~**100**~160
Titanium Alloy	☆ 0.004~**0.005**~0.006	☆ 0.004~**0.005**~0.006	★ 0.002~**0.004**~0.006	-		★ 130~**200**~260	-	☆ 100~**160**~230	-

★: 1st Recommendation ☆: 2nd Recommendation

※ Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy.
※ RDGT / RPGT are recommended for Stainless Steel, Ni-base Heat Resistant Alloy, and Titanium Alloy.
※ The figure in bold font is the starting value of the recommended cutting conditions.
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 D.O.C. is re/2 (0.079" for RD..08 / 0.098" for RP..10 / 0.118" for RP..12 / 0.158" for RP..16).
For other D.O.C., 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), MRX20-W20-10-2T, MRX0625-W625-08-2T, MRX0625-S625-08-2T-6 set the feed rate no higher than 50% of the recommended cutting conditions.

Conversion Factor for Feed Per Tooth by Depth of Cut (D.O.C.)

Insert	D.O.C. (Max.)	Conversion Factor for Feed Per Tooth									
		D.O.C. = 0.020" (0.5mm)	D.O.C. = 0.039" (1.0mm)	D.O.C. = 0.059" (1.5mm)	D.O.C. = 0.079" (2.0mm)	D.O.C. = 0.098" (2.5mm)	D.O.C. = 0.118" (3.0mm)	D.O.C. = 0.158" (4.0mm)	D.O.C. = 0.197" (5.0mm)	D.O.C. = 0.236" (6.0mm)	D.O.C. = 0.315" (8.0mm)
RD..08 Type (GM/SM/GH Chipbreaker)	0.158" (4mm)	1.7	1.3	1.1	1.0 (Standard)	0.9	0.8	0.8	-	-	-
RP..10 Type (GM/SM/GH Chipbreaker)	0.197" (5mm)	1.9	1.4	1.2	1.0	1.0 (Standard)	0.9	0.8	0.8	-	-
RP..12 Type (GM/SM/GH Chipbreaker)	0.236" (6mm)	2.1	1.5	1.3	1.1	1.0	1.0 (Standard)	0.9	0.8	0.8	-
RP..16 Type (GM/SM/GH Chipbreaker)	0.315" (8mm)	2.4	1.7	1.4	1.3	1.1	1.1	1.0 (Standard)	0.9	0.8	0.8

Calculation Example (RPMT12, Carbon Steel, GM Chipbreaker, D.O.C. = 0.039")

fz = 0.008 ipt (Standard value for carbon steel and GM chipbreaker)	X	**1.5** (Conversion factor for ROMU12 type, D.O.C. = 0.039")	=	**fz = 0.012 ipt** (Recommended feed rate)

Max. D.O.C. and Usable Edges

Usable Edges	Insert Corner-R			
	R4	R5	R6	R8
3 Edges	D.O.C. = 0.079"~0.158"	D.O.C. = 0.098"~0.197"	D.O.C. = 0.118"~0.236"	D.O.C. = 0.158"~0.315"
6 Edges	Less than D.O.C. = 0.079"	Less than D.O.C. = 0.098"	Less than D.O.C. = 0.118"	Less than D.O.C. = 0.158"

Drilling Conditions

[Drilling Depth]

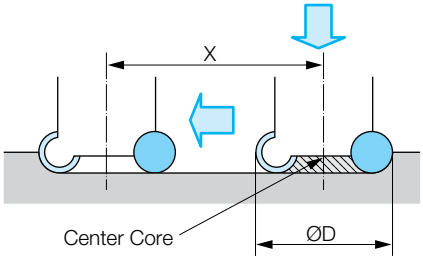
See Max. Cutting Depth **(Pd)** in the table below.

[Traversing After Drilling]

Caution when Traversing right after Drilling

① Reduce the table feed by 50% of the recommended conditions until the center core part is completely cut off. The internal cutting edge's radial rake angle is large in the negative direction.

② Min cutting length for flat bottom face **(X)** is in the table to the right.

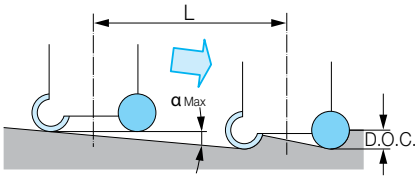


Inch					Metric				
Inch Tool Spec. **Insert**	Tool **Dia.**	Max **D.O.C.**	Max. Cutting Depth **(Pd)**	Min. Cutting Length for flat bottom face **(X)**	**Metric** Tool Spec. **Insert**	Tool Dia. **Metric**	Max **D.O.C.**	Max. Cutting Depth **(Pd)**	Min. Cutting Length for flat bottom face **(X)**
RD..08	**0.625**	0.157	0.028	0.349	**RD..08**	**16**	4	0.7	9
	0.750	0.157	0.055	0.474		**20**	4	1.4	13
	1.000	0.157	0.055	0.724		**25**	4	1.4	18
RP..10	**0.750**	0.197	0.024	0.396	**RP..10**	**20**	5	0.6	11
	1.000	0.197	0.075	0.646		**25**	5	1.9	16
	1.250	0.197	0.075	0.896		**32**	5	1.9	23
	1.500	0.197	0.075	1.146		**40**	5	1.9	31
	2.000	0.197	0.075	1.646		**50**	5	1.9	41
	2.500	0.197	0.075	2.146		**63**	5	1.9	54
RP..12	**1.250**	0.236	0.094	0.817	**RP..12**	**32**	6	2.4	21
	1.500	0.236	0.094	1.067		**40**	6	2.4	29
	2.000	0.236	0.094	1.567		**50**	6	2.4	39
	2.500	0.236	0.094	2.067		**63**	6	2.4	52
	3.000	0.236	0.094	2.567		**80**	6	2.4	69
	4.000	0.236	0.094	3.567		**100**	6	2.4	89
RP..16	**1.500**	0.315	0.134	0.909	**RP..16**	**40**	8	3.4	25
	2.000	0.315	0.134	1.409		**50**	8	3.4	35
	2.500	0.315	0.134	1.909		**63**	8	3.4	48
	3.000	0.315	0.134	2.409		**80**	8	3.4	65
	4.000	0.315	0.134	3.409		**100**	8	3.4	85
	5.000	0.315	0.134	4.346		**125**	8	3.4	110

※ Above value is based on the clearance of 0.039" between the tool and the workpiece.

Ramping Conditions

- Ramping angle should be under **α max** (maximum ramping angle) in the table below.
- Feed rate should be under 70% of the cutting conditions on **page** **J18**



Inch						Metric					
Inch Tool Spec.		Max **D.O.C.**	Max Ramping Angle **α max**	**tan α max**	Max. Cutting Length at Max. Ramping Angle **(L)**	**Metric** Tool Spec.		Max **D.O.C.**	Max Ramping Angle **α max**	**tan α max**	Max. Cutting Length at Max. Ramping Angle **(L)**
Insert	Tool **Dia.**					**Insert**	Tool **Dia.**				
RD..08	**0.625**	0.157	7°	0.123	1.282	**RD..08**	**16**	4	8°	0.141	28
	0.750	0.157	9°	0.158	0.994		**20**	4	9°	0.158	25
	1.000	0.157	5°	0.087	1.800		**25**	4	5°	0.087	45
RP..10	**0.750**	0.197	4°	0.070	2.816	**RP..10**	**20**	5	5°	0.087	57
	1.000	0.197	9°	0.158	1.243		**25**	5	10°	0.176	28
	1.250	0.197	6°	0.105	1.873		**32**	5	6°	0.105	47
	1.500	0.197	4°	0.070	2.816		**40**	5	4°	0.070	71
	2.000	0.197	3°	0.052	3.757		**50**	5	3°	0.052	95
	2.500	0.197	2°	0.035	5.640		**63**	5	2°	0.035	143
RP..12	**1.250**	0.236	9°	0.158	1.491	**RP..12**	**32**	6	9°	0.158	37
	1.500	0.236	6°	0.105	2.248		**40**	6	5°	0.087	68
	2.000	0.236	4°	0.070	3.379		**50**	6	4°	0.070	85
	2.500	0.236	2°	0.035	6.768		**63**	6	2°	0.035	171
	3.000	0.236	2°	0.035	6.768		**80**	6	2°	0.035	171
	4.000	0.236	1°	0.017	13.498		**100**	6	1°	0.017	343
RP..16	**1.500**	0.315	12°	0.213	1.481	**RP..16**	**40**	8	11°	0.194	41
	2.000	0.315	6°	0.105	2.997		**50**	8	7°	0.123	65
	2.500	0.315	4°	0.070	4.506		**63**	8	4°	0.070	114
	3.000	0.315	3°	0.052	6.011		**80**	8	3°	0.052	152
	4.000	0.315	2°	0.035	9.025		**100**	8	2°	0.035	229
	5.000	0.315	1°	0.017	17.998		**125**	8	1°	0.017	458

※ Above value is based on the clearance of 0.039" between the tool and the workpiece.

Helical Milling Conditions

- Sinking depth **(h)** when helical milling should be under **Max D.O.C.** in table below. Sinking **angle** α (with trajectory of the center line of tool) should be under α **max** (maximum ramping angle) in cutting conditions on **page** ➡ **J20**.
- Feed rate should be under 70% of cutting conditions on **page** ➡ **J18**.
- Climb milling is recommended.

Formula for Sinking Depth (h)
$h = \pi \times \text{ØDs} \times \tan \alpha$
(**h** should be under **D.O.C.**)
(α should be under α ***max***)

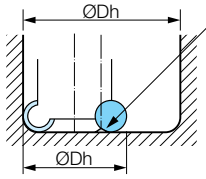
ØDs (Trajectory diameter of cutter's center line)
ØDs=ØDh-ØD

Inch						Metric					
Inch Tool Spec.						**Metric** Tool Spec.					
Insert	Tool **Dia.**	Max **D.O.C.**	Min. Cutting Dia. **ØDh1**	Min. Cutting Dia. for flat bottom facing **ØDh2**	Max. Cutting Dia. **ØDh3**	**Insert**	Tool **Dia.**	Max **D.O.C.**	Min. Cutting Dia. **ØDh1**	Min. Cutting Dia. for flat bottom facing **ØDh2**	Max. Cutting Dia. **ØDh3**
RD..08	**0.625**	0.157	0.787	0.935	1.171	**RD..08**	**16**	4	20	24	30
	0.750	0.157	0.984	1.185	1.421		**20**	4	26	32	38
	1.000	0.157	1.457	1.685	1.921		**25**	4	36	42	48
RP..10	**0.750**	0.197	0.945	1.106	1.421	**RP..10**	**20**	5	26	30	38
	1.000	0.197	1.299	1.606	1.921		**25**	5	33	40	48
	1.250	0.197	1.811	2.106	2.421		**32**	5	47	54	62
	1.500	0.197	2.323	2.606	2.921		**40**	5	63	70	78
	2.000	0.197	3.307	3.606	3.921		**50**	5	83	90	98
	2.500	0.197	4.331	4.606	4.921		**63**	5	109	116	124
RP..12	**1.250**	0.236	1.654	2.028	2.421	**RP..12**	**32**	6	43	52	62
	1.500	0.236	2.165	2.528	2.921		**40**	6	59	68	78
	2.000	0.236	3.150	3.528	3.921		**50**	6	79	88	98
	2.500	0.236	4.173	4.528	4.921		**63**	6	105	114	124
	3.000	0.236	5.157	5.528	5.921		**80**	6	139	148	158
	4.000	0.236	7.165	7.528	7.921		**100**	6	179	188	198
RP..16	**1.500**	0.315	1.890	2.370	2.921	**RP..16**	**40**	8	51	64	78
	2.000	0.315	2.874	3.370	3.921		**50**	8	71	84	98
	2.500	0.315	3.858	4.370	4.921		**63**	8	97	110	124
	3.000	0.315	4.882	5.370	5.921		**80**	8	131	144	158
	4.000	0.315	6.890	7.370	7.921		**100**	8	171	184	198
	5.000	0.315	8.740	9.244	9.795		**125**	8	221	234	248

※ Above value is based on the clearance of 0.039" between the tool and the workpiece.

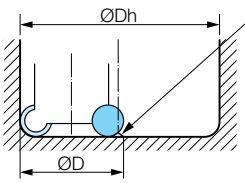
Requirements for Removing Core

[When Cutting Dia. ØDh1≦ØDh＜ØDh2]



Center core part remains after machining. (Not removable with the same cutter)

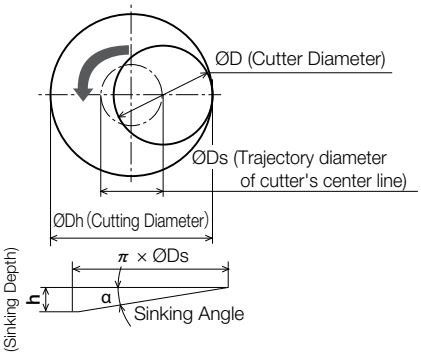
[When Cutting Dia. ØDh2≦ØDh≦ØDh3]



Center core part remains after machining. (Removable by traversing with the same cutter)

※ Refer to table on the left for ØDh1~ØDh3.

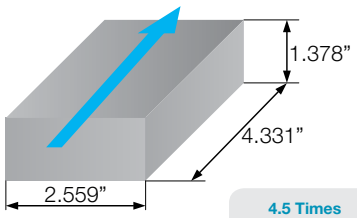
Helical Milling Factors



Case Studies

304 Stainless Steel

- Nozzle Parts
- Vc = 370 sfm
- fz = 0.006 ipt
- D.O.C. × ae = 0.039" × 2.559"
- Dry
- MRX100R-12-9T-M (9 Flutes)
- RPGT1204M0ER-SM (PR1535)



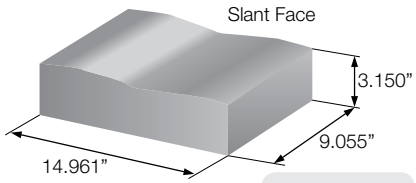
4.5 Times Longer Tool Life

PR1535	**450 pcs / Edge**
Conventional	100 pcs / Edge

Cost savings with 4.5 times longer tool life with 1.5 times more insert edges. MRX prevented burr formation and improved surface finish.
(User Evaluation)

H13 Tool Steel (47~49HRC)

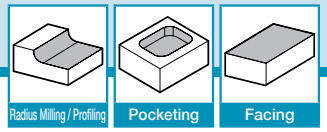
- Mold Parts
- Vc = 410 sfm
- fz=0.010 ipt
- D.O.C. × ae = 0.039~0.079" × 0.394"
- Dry
- MRX20-S20-08-2T (2 Flutes)
- RDGT0803M0ER-GM (PR1525)



More than Double Tool Life

PR1525	**2 pcs with Stable Machining**
Conventional	1pc with Unstable Tool Life

Conventional tool only machined 1 workpiece due to unstable tool life, but the MRX doubled the tool life with stable machining.
(User Evaluation)



MRP-S End Mill


Standard Shank


Long Shank

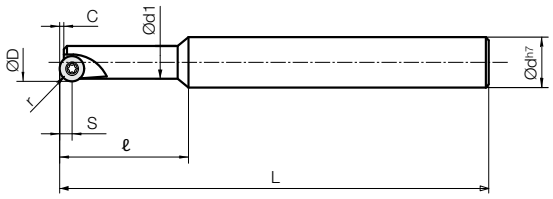


Fig.1

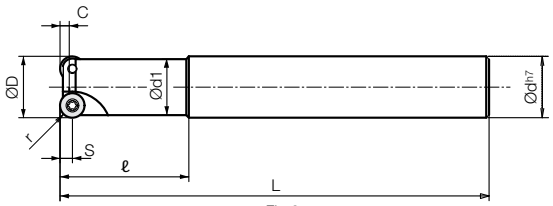


Fig.2

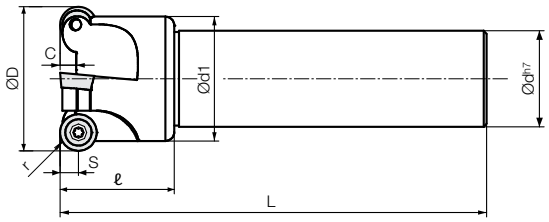


Fig.3

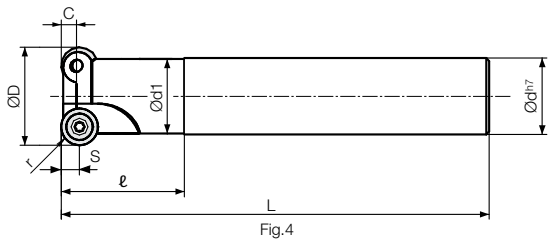


Fig.4

Toolholder Dimensions

	Part Number	Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Drawing	Spare Parts		Applicable Inserts ➡ B21
				r	ØD	Ød	Ød1	L	ℓ	C	Pd	S	A.R.	R.R.		Clamp Screw	Wrench	
Standard Shank	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		16	16	14.4	110	40	3.0	0.5	4	0.0°	-5.5°	Fig.2			
	020-S20-08	○	2		20	20	17.0	120	40	3.0	2.0	4	+5.0°	-4.0°	Fig.2			
	MRP 025-S25-10-3T	○	3	5	25	25	21.0	120	40	3.5	2.5	5	+2.0°	-6.0°	Fig.2	SB-3080TR	DT-10	RPMT10T3M0
	032-S32-10-4T	○	4		32	32	28.0	140	40	3.5	2.5	5	+2.0°	-6.0°	Fig.2			
	MRP 032-S25-12	○	2	6	32	25	24.4	140	40	5.0	4.0	6	+5.0°	-4.0°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H
	040-S32-12	○	3		40	32	31.4	160	40	5.0	4.0	6	+5.0°	-5.0°	Fig.3			RPMT1204M0
	040-S32-12-4T	○	4		40	32	31.4	140	40	4.5	3.5	6	+5.0°	-5.0°	Fig.3			
	050-S42-12	○	4		50	42	41.4	170	40	5.0	4.0	6	+5.0°	-5.0°	Fig.3	SB-40115TR		
	MRP 040-S32-16	○	2	8	40	32	31.4	160	40	7.0	6.0	8	+5.0°	-3.0°	Fig.3	SB-50120TR	DT-20	RPMT1606M0-H
	050-S42-16	○	3		50	42	41.4	170	40	7.0	6.0	8	+5.0°	-3.0°	Fig.3			
	063-S42-16	○	4		63	42	54.4	170	50	7.0	6.0	8	+5.0°	-3.0°	Fig.4			
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		16	16	14.4	160	40	3.0	0.5	4	0.0°	-5.5°	Fig.2			
	020-S20-08-180	○	2		20	20	17.0	180	40	3.0	2.0	4	+5.0°	-4.0°	Fig.2			
	MRP 025-S25-10-3T-180	○	3	5	25	25	21.0	180	40	3.5	2.5	5	+2.0°	-6.0°	Fig.2	SB-3080TR	DT-10	RPMT10T3M0
	032-S32-10-4T-200	○	4		32	32	28.0	200	40	3.5	2.5	5	+2.0°	-6.0°	Fig.2			
	MRP 032-S25-12-300	○	2	6	32	25	24.4	300	40	5.0	4.0	6	+5.0°	-4°	Fig.3	SB-4085TR	DT-15	RPMT1204M0-H
	040-S32-12-300	○	3		40	32	31.4	300	40	5.0	4.0	6	+5.0°	-5.0°	Fig.3			RPMT1204M0
	040-S32-12-4T-200	○	4		40	32	31.4	200	40	4.5	3.5	6	+5.0°	-5.0°	Fig.3			
	050-S42-12-300	○	4		50	42	41.4	300	40	5.0	4.0	6	+5.0°	-5.0°	Fig.3	SB-40115TR		
	MRP 040-S32-16-300	○	2	8	40	32	31.4	300	40	7.0	6.0	8	+5.0°	-3.0°	Fig.3	SB-50120TR	DT-20	RPMT1606M0-H
	050-S42-16-300	○	3		50	42	41.4	300	40	7.0	6.0	8	+5.0°	-3.0°	Fig.3			
	063-S42-16-300	○	4		63	42	54.4	300	50	7.0	6.0	8	+5.0°	-3.0°	Fig.4			

- Pd: Max. Plunging Depth

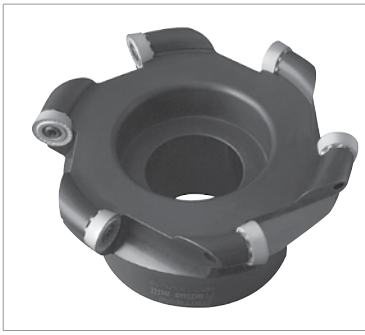
Recommended Cutting Conditions ➡ J24

(Customer Service) 800.823.7284 - Option 1
(Technical Support) 800.823.7284 - Option 2
Visit us online at KyoceraPrecisionTools.com

U.S. Stock Standard : ●
World Express (Shipping: 7-10 Business Days) : ○

Radius Milling / Profiling | Pocketing | Facing

MRP Face Mill



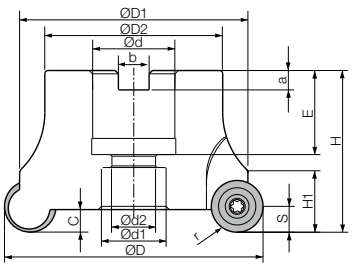


Fig.1

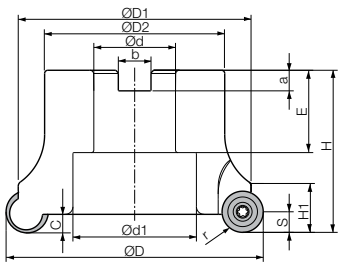


Fig.2

Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)															Rake Angle (°)		Drawing	Weight (kg)
			r	ØD	ØD1	ØD2	Ød	Ød1	Ød2	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	50	13	26	6.0	9.5	3.5	2.5	5.0	+5°	-5°	Fig.1	0.5
MRP 050R-12	○	4	6	50	41.4	38	22.0	18	12	50	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	50	15	26	6.0	9.5	5.0	4.0	6.0	+5°	-5°	Fig.1	0.5
080R-12	○	6		80	71.4	55	25.4	20	14	50	15	26	6.0	9.5	5.0	4.0	6.0	+5°	-3°	Fig.1	0.7
080R-12-7T	○	7		80	74.4	59	25.4	20	14	50	15	26	6.0	9.5	4.5	3.5	6.0	+5°	-5°	Fig.1	0.7
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	19	32	8.0	12.7	7.0	6.0	8.0	+5°	-5°	Fig.2	1.0
100R-16-7T	○	7		100	93.0	70	31.75	48	-	63	19	32	8.0	12.7	6.0	5.0	8.0	+5°	-6°	Fig.2	1.0
125R-16	○	6		125	115.5	80	38.10	58	-	63	19	38	10.0	15.9	7.0	6.0	8.0	+5°	-5°	Fig.2	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	23	32	8.0	12.7	8.5	N.A.	10.0	+5°	-5°	Fig.2	1.0

- Pd: Max. Plunging Depth
- Use BTOO-FMC22 (TMT Standard in the market) for MRP050R-10-6T and MRP050R-12.

Recommended Cutting Conditions ➡ J24

Spare Parts and Applicable Inserts (Metric Size)

Part Number	Spare Parts		Applicable Inserts ➡ B21
	Clamp Screw	Wrench	
			
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	DT-15	RPMT1204M0-H RPMT1204M0
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 (HH10×25) is included for MRP050R.
- Mounting bolt (HH12×35) is included for MRP063R.
- Mounting bolt (HH12×35) is included for MRP080R.

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)

Applicable Inserts

Part Number	Applicable Inserts ➡ B21		
	 Tough Edge	 Tough Edge	
MRP ...-08	RDMT08T2M0-H	-	-
...-10	-	-	RPMT10T3M0
...-12	-	RPMT1204M0-H	RPMT1204M0
...-16	-	RPMT1606M0-H	-
...-20	-	RPMT2006M0-H	-

Top Face

Low cutting force and good chip evacuation with new chipbreaker design. "-H" type insert has a second cutting edge next to the first cutting edge that adds edge strength.

Ratchet design prevents the insert's movement and holds the insert firmly in the insert pocket even during heavy machining.
(Only RPMT)

Bottom Face

Insert Part Number	Land at Edge	Applications	Notes
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 achieved.
RPMT08T2M0-H **RPMT1204M0-H** **RPMT1606M0-H** **RPMT2006M0-H**	Parallel Land 0.008" Width	Tough Edge	Used for General Roughing.

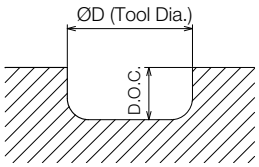
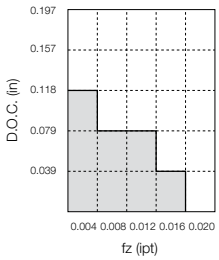
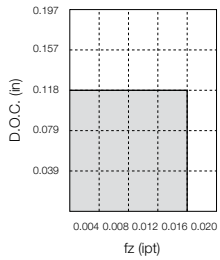
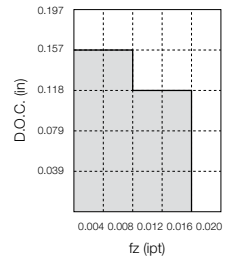
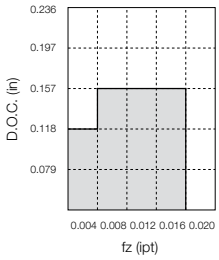
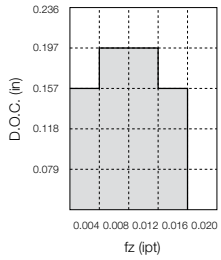
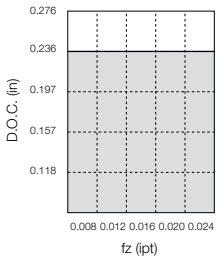
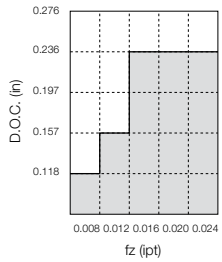
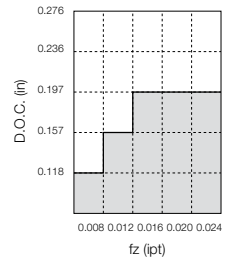
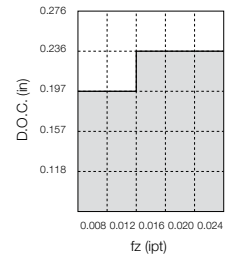
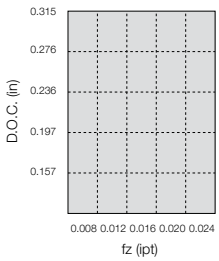
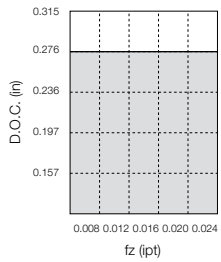
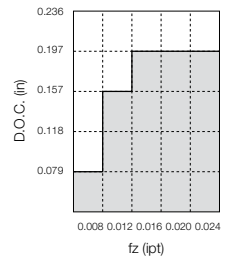
Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)			
		Cermet	MEGACOAT		Carbide
		TN100M	**PR1230**	**PR1210**	**KW10**
Carbon Steel	~0.024	★ 390~820	★ 390~820	-	-
Alloy Steel	~0.024	★ 330~590	★ 330~720	-	-
Mold Steel	~0.020	★ 330~590	★ 260~590	-	-
Stainless Steel	~0.016	☆ 390~660	★ 390~720	-	-
Cast Iron	~0.024	-	-	★ 330~720	☆ 260~490
Non-ferrous Metals	~0.024	-	-	-	★ 330~980

Notes) Reduce the D.O.C. by 20-50% when machining with long overhang length or using long shank types.

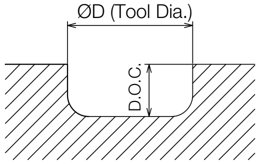
★: 1st Recommendation ☆: 2nd Recommendation

Cutting Performance of Radius Mill (Standard Type)

Workpiece Material	Slotting
S50C	 • Cutting Conditions Toolholder : Standard Type Vc = 390~490 sfm (Ref. to the table below) D.O.C. = varied, fz = varied, Dry Overhang Length = L_1
Insert Part Number	
08 Type (RDMT08T2M0-H)	MRP012-S16-08 n = 3,980 RPM (Vc = 490 sfm) L_1 = 42mm 
	MRP016-S16-08 n = 2,980 RPM (Vc = 490 sfm) L_1 = 42mm 
	MRP020-S20-08 n = 2,390 RPM (Vc = 490 sfm) L_1 = 42mm 
10 Type (RPMT10T3M0)	MRP025-S25-10-3T n = 1,910 RPM (Vc = 490 sfm) L_1= 60mm 
	MRP032-S32-10-4T n = 1,490 RPM (Vc = 490 sfm) L_1 = 80mm 
12 Type (RPMT1204M0-H)	MRP032-S25-12 n = 1,490 RPM (Vc = 490 sfm) L_1 = 80mm 
	MRP040-S32-12 n = 1,195 RPM (Vc = 490 sfm) L_1 = 80mm 
	MRP040-S32-12-4T n = 1,195 RPM (Vc = 490 sfm) L_1 = 80mm 
	MRP050-S42-12 n = 765 RPM (Vc = 390 sfm) L_1 = 80mm 
16 Type (RPMT1606M0-H)	MRP040-S32-16 n = 1,195 RPM (Vc = 490 sfm) L_1 = 90mm 
	MRP050-S42-16 n = 765 RPM (Vc = 390 sfm) L_1 = 90mm 
	MRP063-S42-16 n = 605 RPM (Vc = 390 sfm) L_1 = 90mm 

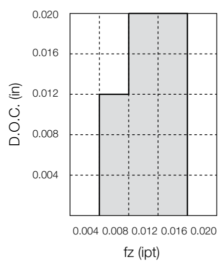
Cutting Performance of Radius Mill (Long Shank Type)

Workpiece Material	Slotting
S50C	• Cutting Conditions Toolholder: Long Shank Type Vc = 390~490 sfm (Ref. to the table below) D.O.C. = varied, fz = varied, Dry Overhang Length = L_1
Insert Part Number	

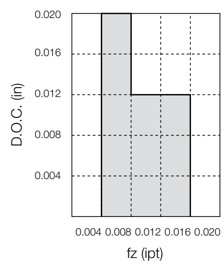


08 Type (RDMT08T2M0-H)

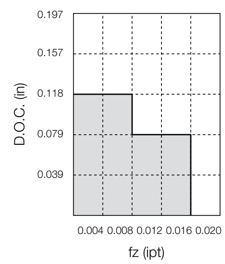
MRP012-S16-08-160
n = 3,980 RPM (Vc = 490 sfm)
L_1 = 80mm



MRP016-S16-08-160
n = 2,980 RPM (Vc = 490 sfm)
L_1 = 80mm

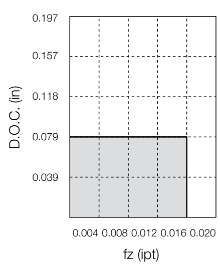


MRP020-S20-08-180
n = 2,390 RPM (Vc = 490 sfm)
L_1 = 90mm

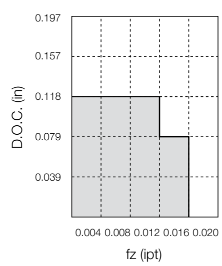


10 Type (RPMT10T3M0)

MRP025-S25-10-3T-180
n = 1,910 RPM (Vc = 490 sfm)
L_1 = 90mm

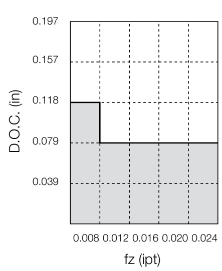


MRP032-S32-10-4T-200
n = 1,490 RPM (Vc = 490 sfm)
L_1 = 100mm

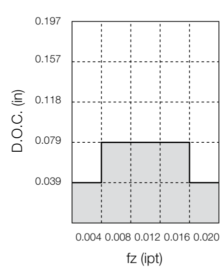


12 Type (RPMT1204M0-H)

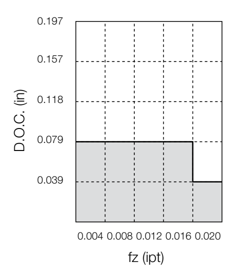
MRP032-S25-12-300
n = 1,490 RPM (Vc = 490 sfm)
L_1 = 150mm



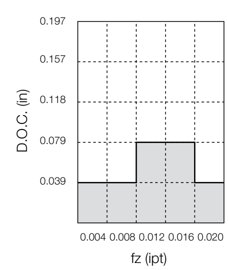
MRP040-S32-12-300
n = 1,195 RPM (Vc = 490 sfm)
L_1 = 150mm



MRP040-S32-12-4T-200
n = 1,195 RPM (Vc = 490 sfm)
L_1 = 100mm

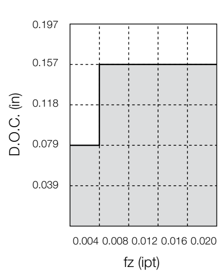


MRP050-S42-12-300
n = 765 RPM (Vc = 390 sfm)
L_1 = 150mm

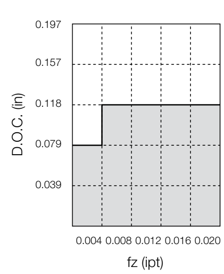


16 Type (RPMT1606M0-H)

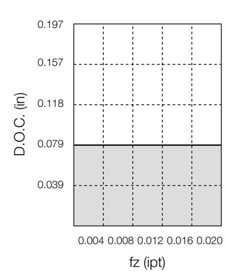
MRP040-S32-16-300
n = 1,195 RPM (Vc = 490 sfm)
L_1 = 150mm



MRP050-S42-16-300
n = 765 RPM (Vc = 390 sfm)
L_1 = 150mm



MRP063-S42-16-300
n = 605 RPM (Vc = 390 sfm)
L_1 = 150mm



Guide for Drilling

[Drilling Depth]

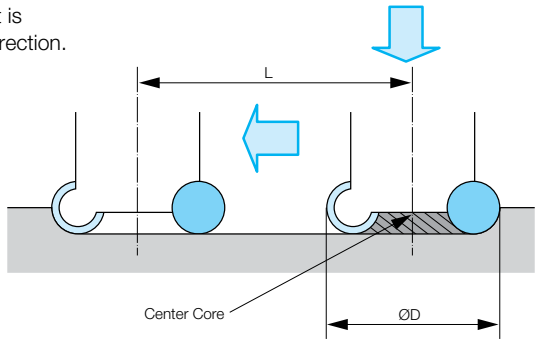
Refer to Max. Cutting Depth **(Pd)** value in Toolholder Dimension table on **page** **J22-J23**.

[Traversing After Drilling]

Caution when Traversing right after Drilling

① Reduce the table feed by 50% of the recommended conditions until the center core part is completely cut off. The internal cutting edge's radial rake angle is large in the negative direction.

② Min cutting length **(L)** for flat bottom face in table below.



Insert Part Number	L (mm)
RDMT08T2M0-H	ØD-7
RPMT10T3M0	ØD-9
RPMT1204M0	ØD-11
RPMT1204M0-H	
RPMT1606M0-H	ØD-15

Guide for Ramping

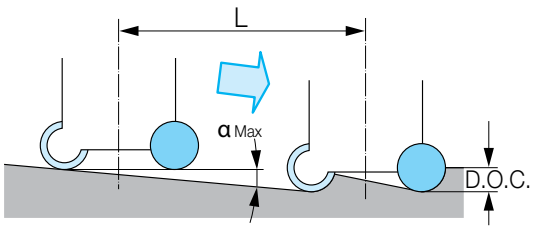
- Ramping angle should be under ***α* Max.** (maximum ramping angle) in table below
- Feed rate should be under 70% of the cutting conditions on **page** **J24**

Part Number		α Max. (°)	tan α Max.
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 for Max. Cutting Length "L" at Max. Ramping Angle

$$L = \frac{D.O.C.}{\tan \alpha \text{ Max.}}$$



OTHER APPLICATIONS

K1 - K14

OTHER APPLICATIONS		K2 - K14
API	RING GROOVING FOR M/C	K2
CM / CM-AL	CHAMFERING END MILL	K5
MCSE	CHAMFERING END MILL	K6
MEF	BOLT COUNTERSINK END MILL	K8
METS	T-SLOT MILL	K10
MGI	GROOVING END MILL FOR M/C	K12
MVG	RING GROOVING END MILL FOR M/C	K14

Ring Grooving

API Ring Groover

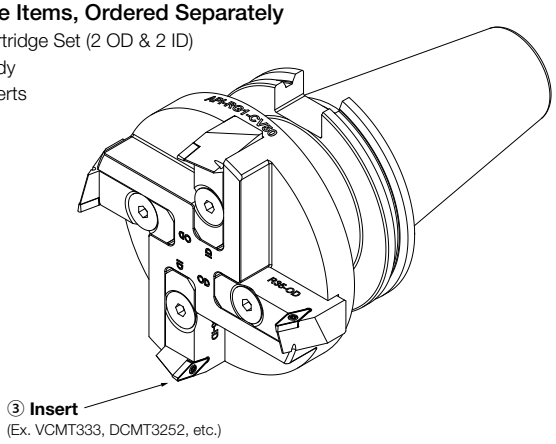
Kyocera is the only choice for economical ring groovers. Featuring an integral shank for maximum rigidity, Kyocera's API Ring Groovers are the most versatile ring grooving tools on the market.

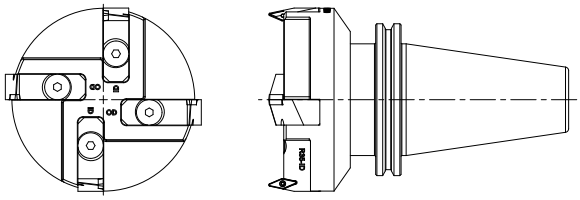
ADVANTAGES

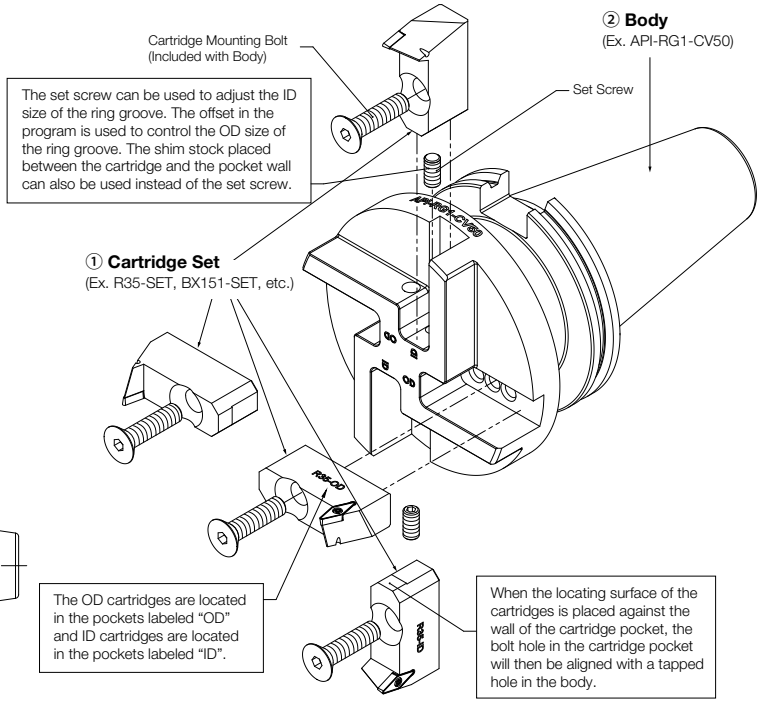
- Create ring grooves per API Spec 6A for BX, R, and RX style grooves
- Roughout and finish of inlay of API Ring Grooves
- Replaceable cartridges allow a single cutter body to produce multiple size API grooves
- Integral shank, multiple sizes and styles available

3 Line Items, Ordered Separately

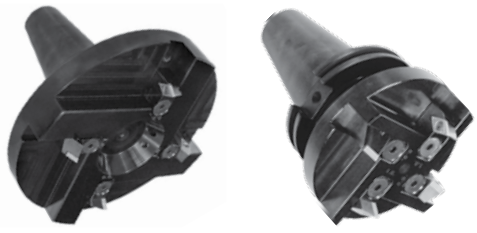
① Cartridge Set (2 OD & 2 ID)
② Body
③ Inserts

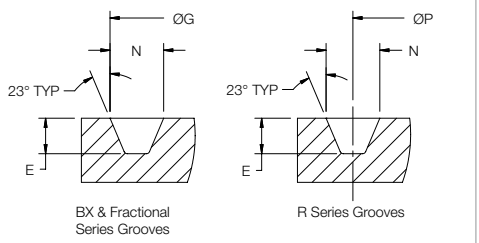


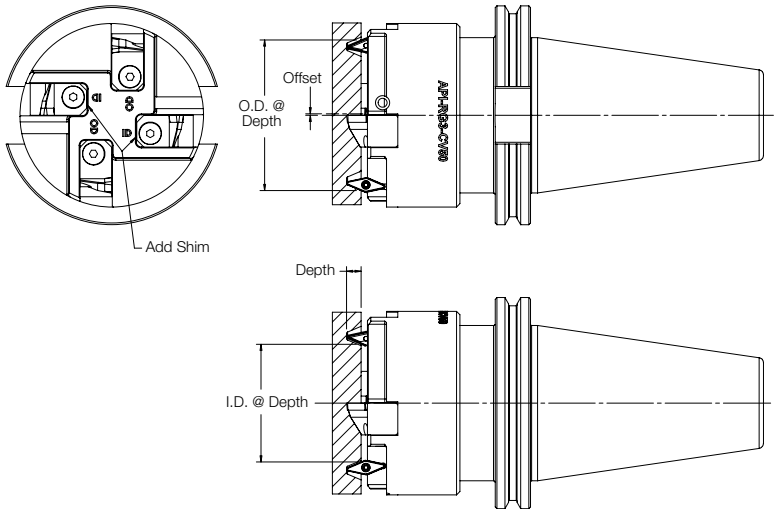




API Ring Groover Dimensions







See Dimension Table ➔ K3

K OTHER APPLICATIONS

Ring / Cartridge Set Dimensions

Ring Specification	① Cartridge Set Part Number **Choose Set**	Stock	No. of Inserts	No. of Flutes	Dimensions (in)							Roughout Cartridges	Applicable Body Part Number
					Offset	Pitch P	OD G	Width N	Depth E	OD Depth	ID Depth		
BX-150	BX150-SET	●	4	2	0.061	-	2.893	0.450	0.220	2.771	2.115	-	API-RG-3-CV40 API-RG-3-CV50 API-RG-3-BT50 API-RG-3-DIN-69871
BX-150-R	BX150-R-SET	●		1	0.097		3.341	0.841	0.485	3.147	1.853	Yes	
BX-151	BX151-SET	●	4	2	0.065	-	3.062	0.466	0.220	2.932	2.260	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
BX-151-R	BX151-R-SET	●	4	1	0.097	-	3.496	0.846	0.485	3.302	1.998	Yes	API-RG-3-CV40 API-RG-3-CV50 API-RG-3-BT50 API-RG-3-DIN-69871
BX-152	BX152-SET	●	4	2	0.069	-	3.395	0.498	0.230	3.257	2.537	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
BX-152-R	BX152-R-SET	●		1	0.091		3.826	0.876	0.505	3.644	2.256	Yes	
BX-153	BX153-SET	●		2	0.077		4.046	0.554	0.270	3.892	3.092	-	
BX-153-R	BX153-R-SET	●		1	0.110		4.486	0.936	0.535	4.266	2.834	Yes	
BX-154	BX154-SET	●		2	0.083		4.685	0.606	0.300	4.519	3.369	-	
BX-154-R	BX154-R-SET	●		1	0.112		5.116	0.971	0.570	4.892	3.398	Yes	
BX-155	BX155-SET	●	4	2	0.100	-	5.930	0.698	0.330	5.730	4.734	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
BX-155-R	BX155-R-SET	●		1	0.223		6.366	1.076	0.595	5.920	4.660	Yes	
BX-156	BX156-SET	●	4	2	0.132	-	9.521	0.921	0.440	9.257	7.943	-	API-RG-4-CV50 API-RG-4-BT50 API-RG-4-DIN-69871
BX-156-R	BX156-R-SET	●		1	0.166		9.956	1.306	0.710	9.624	7.676	Yes	
BX-169	BX169-SET	●	4	2	0.081	-	6.955	0.666	0.380	6.793	5.785	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
R-16	R16-SET	●	4	2	0.026	2.000	-	0.344	0.250	2.292	1.708	-	API-RG-3-CV40 API-RG-3-CV50 API-RG-3-BT50 API-RG-3-DIN-69871
R-18	R18-SET	●				2.375				2.667	2.083		
R-20	R20-SET	●				2.688				2.980	2.396		
R-23	R23-SET	●	4	2	0.046	3.250	-	0.469	0.310	3.627	2.873	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
R-23-R	R23-R-SET	●		1	0.081	3.300		0.856	0.575	3.994	2.606	Yes	
R-24	R24-SET	●		2	0.046	3.750		0.469	0.310	4.127	3.373	-	
R-24-R	R24-R-SET	●		1	0.077	3.800		0.871	0.590	4.517	3.083	Yes	
R-26	R26-SET	●		2	0.046	4.000		0.469	0.310	4.377	3.623	-	
R-27	R27-SET	●				4.250				4.627	3.873		
R-31	R31-SET	●	4	2	0.044	4.875	-	0.469	0.310	5.256	4.494	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
R-31-R	R31-R-SET	●		1	0.072	4.920		0.856	0.575	5.632	4.208	Yes	
R-35	R35-SET	●		2	0.046	5.375		0.469	0.310	5.752	4.998	-	
R-35-R	R35-R-SET	●		1	0.081	5.420		0.856	0.575	6.114	4.726	Yes	
R-37	R37-SET	●		2	0.046	5.875		0.469	0.310	6.252	5.498	-	
R-39	R39-SET	●				6.375				6.752	5.998		
R-39-R	R39-R-SET	●		1	0.081	6.420		0.856	0.575	7.114	5.726	Yes	
R-41	R41-SET	●		2	0.046	7.125		0.469	0.310	7.502	6.748	-	
R-44	R44-SET	●				7.625				8.002	7.248		
R-44-R	R44-R-SET	●		1	0.071	7.670		0.856	0.575	8.384	6.956	Yes	
R-45	R45-SET	●		2	0.046	8.313		0.469	0.310	8.690	7.936	-	
R-46	R46-SET	●			0.048			0.531	0.380	8.748	7.878		
R-46-R	R46-R-SET	●		1	0.082	8.360		0.916	0.645	9.112	7.608	Yes	
1-13/16	1-13/16-SET	●	4	2	0.034	-	4.373	0.377	0.258	4.305	3.687	-	API-RG-1-CV40 API-RG-1-CV50 API-RG-1-BT50 API-RG-1-BT40 API-RG-1-DIN-69871
2-1/16-10K	2-1/16-10K-SET	●					4.623			4.555	3.937		
2-9/16-15K	2-9/16-15K-SET	□	4	2	0.034	-	5.873	0.377	0.258	5.805	5.187	-	API-RG-2-CV50 API-RG-2-BT50 API-RG-2-DIN-69871
3-1/16-10K	3-1/16-10K-SET	●					5.748			5.680	5.062		
4-1/16-10K	4-1/16-10K-SET	●					7.123			7.055	6.437		
5-1/8-10K	5-1/8-10K-SET	●					8.748			8.680	8.062		

Applicable Body Stock

② Body Part Number **Choose Body**	Stock	Shank	Body Spare Parts	
			Mounting Bolt	Set Screw
API-RG-1-CV40	●	CAT40	01-05	01-08
API-RG-1-CV50	●	CAT50		
API-RG-1-BT50	●	BT50		
API-RG-1-BT40	□	BT40		
API-RG-1-DIN-69871	□	DIN69871		
API-RG-2-CV50	●	CAT50	01-05	01-08
API-RG-2-BT50	●	BT50		
API-RG-2-DIN-69871	□	DIN69871		
API-RG-3-CV40	●	CAT40	01-06	01-09
API-RG-3-CV50	●	CAT50		
API-RG-3-BT50	□	BT50		
API-RG-3-DIN-69871	□	DIN69871		
API-RG-4-CV50	●	CAT50	01-07	01-10
API-RG-4-BT50	□	BT50		
API-RG-4-DIN-69871	□	DIN69871		

Note

The OD and ID dimensions are to set the cut diameter of a given cartridge set using a presetter. The dimensions are the cut diameter of the tool at the depth of the ring groove. By setting zero at the nose radius then moving the presetter to the depth of the API groove the OD and ID can be preset to the dimensions shown.

See illustration on page ➡ **K2**

Cartridge Set Spare Parts & Applicable Inserts ➡ **K4**

● : U.S. Stock Standard
□ : Made to Order / Quoted Item
○ : World Express (Shipping: 7-10 Business Days)

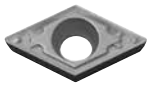
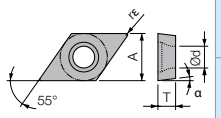
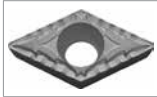
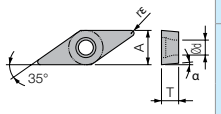
(Customer Service) **800.823.7284 - Option 1**
(Technical Support) **800.823.7284 - Option 2**
Visit us online at **KyoceraPrecisionTools.com**

Cartridge Set Spare Parts & Applicable Inserts

Ring Specification	Cartridge Set Part Number	Spare Parts: Clamp Screw	Spare Parts: Wrench	③ Applicable Inserts **Choose Inserts**
BX-150	BX150-SET	SCR-02	T15	DCMT3252
BX-150-R	BX150-R-SET			DCMT3253
BX-151	BX151-SET			DCMT3252
BX-151-R	BX151-R-SET			DCMT3253
BX-152	BX152-SET			DCMT3252
BX-152-R	BX152-R-SET			DCMT3253
BX-153	BX153-SET			DCMT3252
BX-153-R	BX153-R-SET			DCMT3253
BX-154	BX154-SET			DCMT3252
BX-154-R	BX154-R-SET			DCMT3253
BX-155	BX155-SET			DCMT3252
BX-155-R	BX155-R-SET			VCMT333
BX-156	BX156-SET			VCMT332
BX-156-R	BX156-R-SET			VCMT333
BX-169	BX169-SET			VCMT332
R-16	R16-SET	SCR-01	T7	VCMT222
R-18	R18-SET			
R-20	R20-SET			
R-23	R23-SET	SCR-02	T15	DCMT3252
R-23-R	R23-R-SET			VCMT333
R-24	R24-SET			DCMT3252
R-24-R	R24-R-SET			VCMT333

Ring Specification	Cartridge Set Part Number	Spare Parts: Clamp Screw	Spare Parts: Wrench	③ Applicable Inserts **Choose Inserts**
R-26	R26-SET	SCR-02	T15	DCMT3252
R-27	R27-SET			
R-31	R31-SET			
R-31-R	R31-R-SET			VCMT333
R-35	R35-SET			DCMT3252
R-35-R	R35-R-SET			VCMT333
R-37	R37-SET			DCMT3252
R-39	R39-SET			
R-39-R	R39-R-SET			VCMT333
R-41	R41-SET			DCMT3252
R-44	R44-SET			
R-44-R	R44-R-SET			VCMT333
R-45	R45-SET			DCMT3252
R-46	R46-SET			VCMT333
R-46-R	R46-R-SET			
1-13/16	1-13/16-SET	SCR-01	T7	VCMT222
2-1/16-10K	2-1/16-10K-SET			
2-9/16-15K	2-9/16-15K-SET			
3-1/16-10K	3-1/16-10K-SET			
4-1/16-10K	4-1/16-10K-SET			
5-1/8-10K	5-1/8-10K-SET			

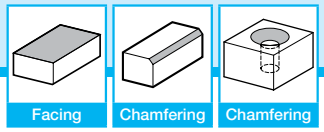
Applicable Inserts (Inch Size)

Insert		ANSI Part Number	ISO Part Number	Dimensions (in I.C. (A)	T	Ød	rε	Angle (°) α	Insert Grades: CVD Coated Carbide CA525	CA5525	CA6525	MEGACOAT Coated Carbide PR1225	PR1425	PVD Coated Carbide PR660
		DCMT 3252HQ	DCMT 11T308HQ	3/8	5/32	0.173	1/32	7°	●	●	●		●	●
		DCMT 3253CQ	DCMT 11T312CQ	3/8	5/32	0.173	3/64	7°		●	●			●
		VCMT 222HQ	VCMT 110308HQ	1/4	1/8	0.110	1/32	7°				●		
		VCMT 332HQ		3/8	3/16	0.173	1/32	7°	●	●	●			●
		333HQ	160412HQ	3/8	3/16	0.173	3/64	7°				●		

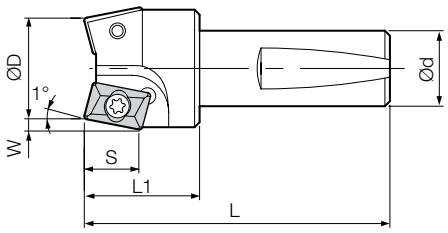
Sample CNC Program for the API Ring Groover

Use 0.03 Depth in Z for Inconel and 0.04 Depth in Z for Steel

Sample is shown without cutter comp.
N10 (Incremental Program)
N20 G00 X (As required) Y (As required) Z.100 M03 S (As required)
N30 G01 Z0.0 F100
N40 G91 Y (Offset) Z-.100 F (As required)
N50 G03 J (Offset) Z-.100 F (As required)
N60 G03 J (Offset) Z-.100
Continue to Depth
Last Pass
N90 G03 J (Offset) Z0.00



CM / CM-AL (For Aluminum Cutting)



Toolholder Dimensions

Part Number		Stock	No. of Inserts	Dimensions (in)							Spare Parts		Applicable Inserts B25
				ØD	Ød	L	L1	S	W	α	Clamp Screw	Wrench	
CM	0563-15-09	●	2	0.563	0.500	2.780	1.000	0.340	0.089	15.0°	SCR-04	T7	XPMT090208
	0563-20-09	●						0.330	0.116	20.0°			
	0563-25-09	●						0.310	0.143	25.0°			
	0563-30-09	●		0.563	0.625	2.910	1.000	0.300	0.169	30.0°	SCR-04	T7	
	0563-35-09	●						0.280	0.194	35.0°			
	0563-45-09	●		0.563	0.625	2.910	1.000	0.240	0.239	45.0°	SCR-01	T7	
	0563-60-09	●						0.160	0.301	60.0°			
	0563-75-09	●						0.080	0.327	75.0°			
CM	1000-03	●	2	1.000	0.750	3.150	1.250	0.589	0.031	3.0°	SCR-16	T10	XPMT15T3...
	1000-05	●						0.586	0.052	5.0°			
	1000-10	●						0.577	0.103	10.0°			
	1000-15	●						0.564	0.154	15.0°			
	1000-20	●		1.000	0.750	3.150	1.250	0.547	0.204	20.0°	SCR-30	T10	
	1000-25	●						0.526	0.252	25.0°			
	1000-30	●						0.501	0.298	30.0°			
	1000-35	●						0.472	0.343	35.0°			
	1000-37.5	●		1.000	0.750	3.150	1.250	0.456	0.372	37.5°	SCR-30	T10	
	1000-41	●						0.433	0.393	41.0°			
	1000-45	●						0.400	0.400	45.0°			
	1000-50	●						0.376	0.454	50.0°			
	1000-55	●						0.327	0.507	55.0°			
	1000-60	●						0.284	0.521	60.0°			
	1000-70	●						0.193	0.547	70.0°			
	1000-75	●						0.146	0.584	75.0°			
CM	1000-15-AL	●	2	1.000	0.750	3.250	1.350	0.613	0.158	15.0°	SCR-02	T15	APET1604...
	1000-20-AL	●						0.595	0.208	20.0°			
	1000-30-AL	●						0.544	0.304	30.0°			
	0800-45-AL	●		0.800	0.750	3.250	1.350	0.440	0.430	45.0°	SCR-02	T15	
	0800-60-AL	●						0.308	0.528	60.0°			
	0690-75-AL	●		0.690	0.750	3.250	1.350	0.158	0.591	75.0°	SCR-02	T15	

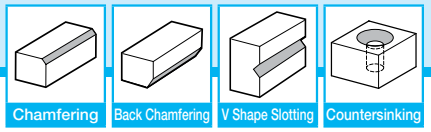
Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)						
		Cermet		MEGACOAT NANO	PVD Coated Carbide			Carbide
		TN100M	TC60	PR1525	PR930	PR905	PR830	KW10
Low Carbon Steel	0.003~0.006	☆ 800~1400	★ 800~1400	★ 400~800	☆ 350~750	-	-	-
Carbon Steel	0.003~0.006	☆ 600~1200	★ 600~1200	★ 300~700	☆ 250~650	-	-	-
Mold Steel	0.003~0.006	☆ 400~700	★ 400~700	★ 250~600	☆ 250~600	-	-	-
Stainless Steel	0.002~0.006	☆ 300~800	☆ 300~800	★ 300~600	☆ 300~500	-	☆ 300~800	-
Cast Iron	0.003~0.008	☆ 400~1200	★ 400~1200	-	-	★ 400~800	-	☆ 300~500
Non-ferrous Metals	0.005~0.007	☆ 1500~1800	☆ 1500~1800	-	-	-	-	★ 2000~4000

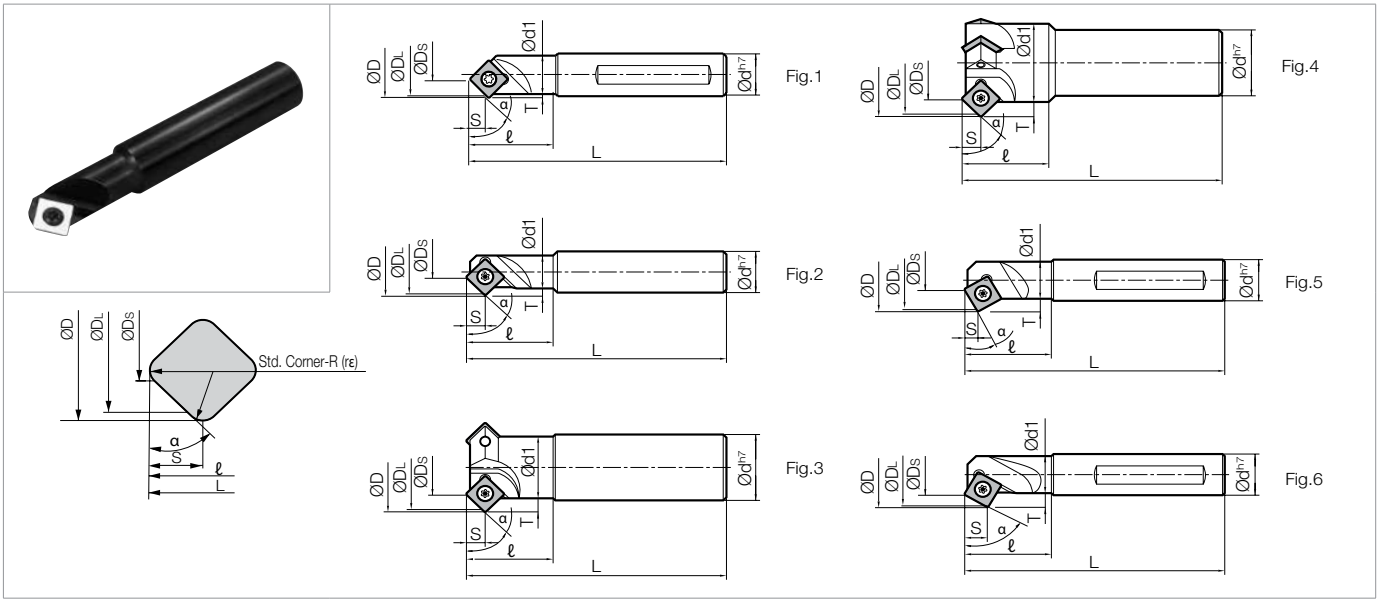
* Apply sufficient amount of coolant

★: 1st Recommendation ☆: 2nd Recommendation

● : U.S. Stock Standard
○ : World Express (Shipping: 7-10 Business Days)



MCSE



Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm)									Std. Corner-R (rε)	Angle (°)	Rake Angle (°)		Drawing	Spare Parts	
																	Clamp Screw	Wrench
			ØD	ØDL	ØDs	Ød	Ød1	L	ℓ	S	T		α	A.R.	R.R.			 DT LTW
MCSE 104	●	1	16.0	15	4	16	15	85	30	6.5	0.50	0.4	45°	0°	-4.5°	Fig.1	SB-3060TR	DT-10
106	●	1	22.0	21	6	20	16	120	40	8.6	3.00	0.8	45°	0°	-1.0°	Fig.2	SB-5090TR	LTW-20
115	○	1	31.0	30	15	20	18	120	40	8.6	6.50				+5.0°			
227	○	2	43.0	42	27	32	30	120	40	8.6	6.50	0.8	45°	0°	+8.0°	Fig.3	SB-5090TR	LTW-20
336	○	3	52.0	51	36	32	38	120	40	8.6	7.00	0.8	45°	0°	+10.0°	Fig.4	SB-5090TR	LTW-20
MCSE 104-30D	○	1	19.0	18	4	16	15	85	30	4.7	2.00	0.4	30°	0°	-4.0°	Fig.5	SB-3060TR	DT-10
108-30D	○	1	28.0	27	8	20	19	110	40	6.3	4.50	0.8	30°	0°	-2.5°	Fig.5	SB-5090TR	LTW-20
110-30D	○	1	30.0	28	10	20	18	120	40	6.3	6.00				0.0°			
MCSE 108-60D	○	1	19.5	19	8	20	19	110	40	10.0	0.25	0.8	60°	0°	-3.5°	Fig.6	SB-5070TR	LTW-20
120-60D	○	1	31.0	30	20	20	18	120	40	10.0	6.50				0.0°	Fig.6	SB-5090TR	LTW-20

- Dimension T indicates available back chamfering dimension.

Applicable Inserts (Metric Size)

Part Number	Applicable Inserts ➡ B22		
			
MCSE 104	SDKW 09T204TN	SDKW 09T204FN	SDMT 31.81C
104-30D			
MCSE 106	SEKW 421TN SEKW 422TN	SEKW 421FN SEKW 422FN	SEMT 421C
115			
227			
336			
MCSE 108-30D			
110-30D			
MCSE 108-60D			
120-60D			

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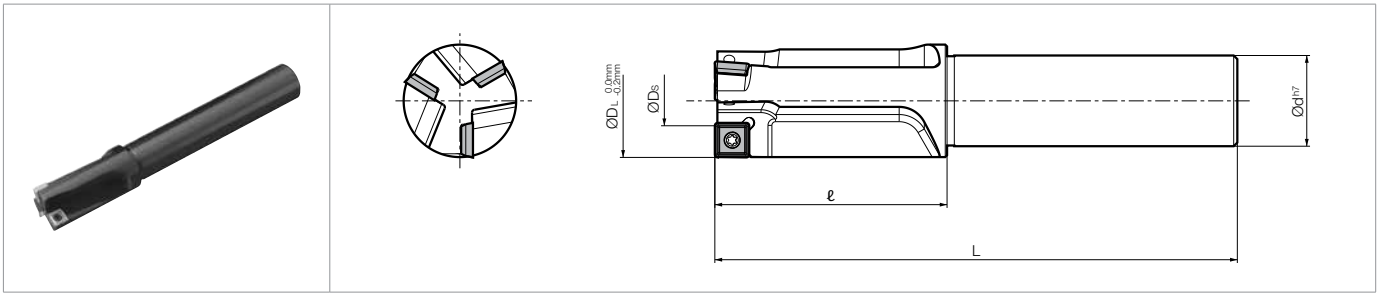
Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)		Recommended Insert Grades (Cutting Speed Vc: sfm)		
			Cermet	MEGACOAT	Carbide
	ØDs (Ø4mm~Ø20mm)	ØDs (Ø27mm~Ø36mm)	**TN100M**	**PR1225**	**KW10**
Carbon Steel	0.002~0.010	0.008~0.016	★ 330~590	★ 390~820	-
Alloy Steel	0.002~0.010	0.008~0.016	★ 330~590	★ 330~720	-
Mold Steel	0.002~0.010	0.008~0.016	★ 330~490	★ 260~590	-
Stainless Steel	0.002~0.008	0.004~0.012	☆ 330~590	★ 390~720	-
Cast Iron	0.004~0.012	0.012~0.020	-	-	☆ 260~490
Non-ferrous Metals	0.004~0.012	0.012~0.020	-	-	★ 330~980

- Use down-cut machining.

★: 1st Recommendation ☆: 2nd Recommendation

MEF

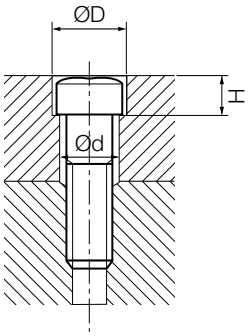


Toolholder Dimensions

Part Number	Stock	No. of Inserts	Dimensions (mm) ØDL	ØDs	Ød	L	ℓ	Std. Corner-R (rε)	Rake Angle (°) A.R.	R.R.	Objective Bolt Size	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ B24
MEF 11-S10	○	1	11.0	3.0	10	103	23	0.4	+5°	-13°	M6	SB-2250TR	DT-7	
14-S12	○		14.0	4.5	12	108	28				M8	SB-2260TR		
17-S16	○	2	17.5	7.3	16	115	35	0.4	+5°	-13°	M10	SB-2260TR	DT-7	
18-S16	○		18.0	7.7	16	117	38				-			
20-S16	○	3	20.0	9.5	16	120	40	0.4	+5°	-12°	M12	SB-2260TR	DT-7	SPMT060204E-Z SPMT060208E-Z
22-S20	○		22.0	11.4	20	124	44				-			
23-S20	○		23.0	12.4	20	126	46				M14			
24-S20	○		24.0	13.4	20	128	48				-			
25-S20	○		25.0	14.4	20	130	50				-			
26-S25	○	3	26.0	9.8	25	132	52	0.8	+5°	-13°	M16	SB-3080TR	DT-10	SPMT090304E-Z SPMT090308E-Z
27-S25	○		27.0	10.6	25	134	54				-			
28-S25	○		28.0	11.5	25	136	56				-			
29-S25	○		29.0	12.6	25	138	58				M18			
30-S25	○		30.0	13.5	25	140	60				-			
32-S25	○		32.0	15.5	25	144	64				M20			
35-S32	○		35.0	18.4	32	150	70				M22			
39-S32	○	4	39.0	22.5	32	158	78	0.8	+5°	-13°	M24	SB-3080TR	DT-10	
43-S32	○	4	43.0	26.2	32	166	86	0.8	+5°	-12°	M27	SB-3080TR	DT-10	
48-S32	○		48.0	31.3	32	176	96				M30			

- Although Corner-R(rε) pertains to MEF11-S10, ØDS = 3.0mm.

Bolt Counter Sink (Hexagon Socket Head Cap Screw)



Nominal Screw Size	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
ØD (mm)	11.0	14.0	17.5	20.0	23.0	26.0	29.0	32.0	35.0	39.0	43.0	48.0
H (mm)	6.5	8.6	10.8	13.0	15.2	17.5	19.5	21.5	23.5	25.5	29.0	32.0
Ød (mm)	6.6	9.0	11.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	30.0	33.0
Applicable End Mill	MEF11	MEF14	MEF17	MEF20	MEF23	MEF26	MEF29	MEF32	MEF35	MEF39	MEF43	MEF48

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Recommended Cutting Conditions

Workpiece Material	fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)		
		MEGACOAT		Carbide
		PR1225	PR1210	KW10
Carbon Steel	0.004~0.006	★ 390~720	-	-
Alloy Steel	0.004~0.006	★ 390~720	-	-
Mold Steel	0.002~0.004	★ 330~590	-	-
Stainless Steel	0.002~0.004	★ 260~590	-	-
Cast Iron	0.004~0.008	-	★ 330~720	☆ 260~390
Non-ferrous Metals	0.004~0.008	-	-	★ 330~980

★: 1st Recommendation ☆: 2nd Recommendation

Points at Bolt Counter Sink Milling

① Carbon Steel

Increase the feed rate to fz = 0.004~0.006 ipt for preventing long chips at low feed rates.
Chip control is good when setting Vc = 260 sfm for MEF11~MEF25, and Vc = 390 sfm for MEF26~MEF48.

Part Number	Cutting Speed Vc (sfm)	fz (ipt)
MEF11~MEF25	260	0.004~0.006
MEF26~MEF48	390	0.004~0.006

② Sticky Materials

Step feed is recommended for good chip control
Increase the feed rate to fz = 0.004~0.006 ipt for preventing long chips at low feed rate fz = 0.002 ipt.
Use cover to prevent accidents or injury by thick chips at higher feed rates.

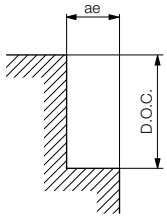
Part Number	Cutting Speed Vc (sfm)	fz (ipt)	Step Feed (inch)
MEF11~MEF48	260~490	0.004~0.006	0.020~0.059

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 for shouldering.



Vc = 260~390 sfm
1055
DRY
Overhang Length:
Same as ℓ in the dimension table

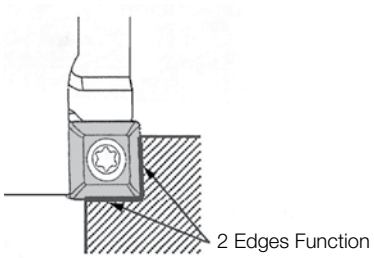


Fig.1

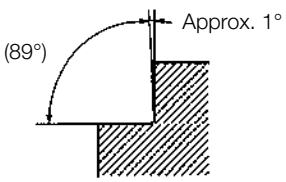
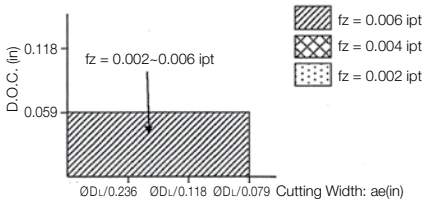
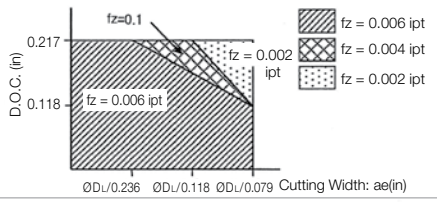
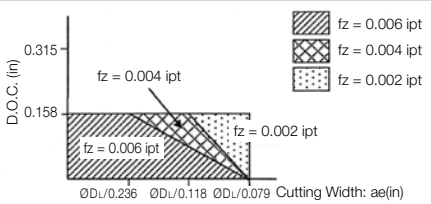
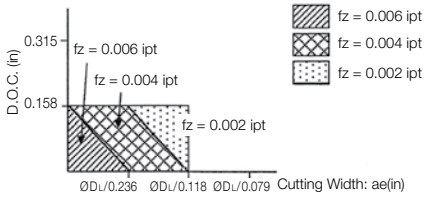


Fig.2

- When shouldering, both side edge and bottom edges function.
  Both edges wear at the same time depending on D.O.C..
  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 countersink milling.
  Therefore, worked side wall is approx. 1° inclined against the vertical face.
  (Ref. to Fig.2)

Part Number	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	

T-Slotting | Back Side Milling

METS

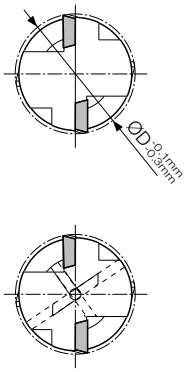


Fig.1

Fig.2

Toolholder Dimensions

Part Number	Stock	No. of Inserts	No. of Flutes	Dimensions (mm)									Rake Angle (°)		Drawing	Spare Parts		Applicable Inserts ➔ B22
				ØD	Ød	Ød1	ℓ	L1	L2	L3	L4	L5	A.R.	R.R.		Clamp Screw	Wrench	
METS 21-S25	○	2	1	21	25	10.5	9	109	29	32	12	17	+9°	-10°	Fig.1	SB-2560TR	DT-8	SDMT221E-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	+9°	-10°	Fig.1	SB-3060TR	DT-10	SDMT080308E-K
40-S32	○	4	2	40	32	20.5	18	130	50	36	14	19	+9°	-12°	Fig.1	SB-4085TR	DT-15	SDMT432E-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	SDMT221E-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	+9°	-10°	Fig.2	SB-3060TR	DT-10	SDMT080308E-K
40-S32-H	○	4	2	40	32	20.5	18	130	50	36	14	19	+9°	-12°	Fig.2	SB-4085TR	DT-15	SDMT432E-K
50-S32-H	○			50		26.5	22	140	60									

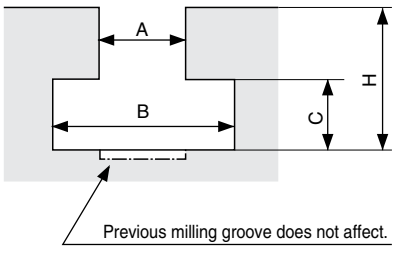
- METS····-H type has air holes

Applicable Inserts

Part Number	Applicable Inserts ➔ B22
	
METS 21-S25	SDMT 221E-K
21-S25-H	
25-S25	
25-S25-H	
METS 32-S32	SDMT 080308E-K
32-S32-H	
METS 40-S32	SDMT 432E-K
40-S32-H	
50-S32	
50-S32-H	

JIS Standard of T-Slot (Extracted from B0952) (Unit: mm)

A (Nominal Size)	B	C	H	
			Max.	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



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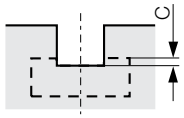
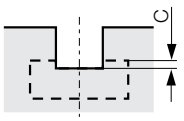
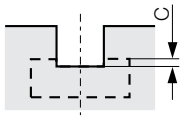
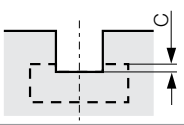
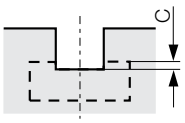
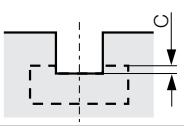
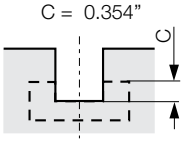
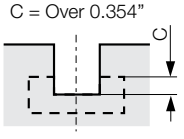
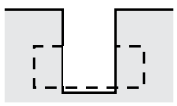
Recommended Cutting Conditions

Workpiece Material	fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)		
		MEGACOAT		Carbide
		PR1230	**PR1210**	**KW10**
Carbon Steel	0.004~0.006	★ 330~660	-	-
Alloy Steel	0.003~0.005	★ 330~660	-	-
Mold Steel	0.002~0.004	★ 260~490	-	-
Cast Iron	0.004~0.006	-	★ 330~660	☆ 260~390
Non-ferrous Metals	0.004~0.006	-	-	★ 330~980

★: 1st Recommendation ☆: 2nd Recommendation

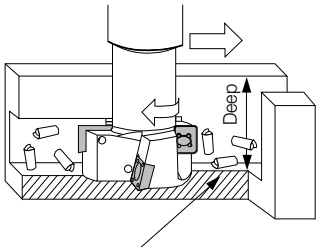
Part Number (T-Slot Nominal Size)	Steel			Cast Iron		
	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to Prevent Chattering	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to Prevent Chattering
METS21-S25(-H) (Nominal Size 12)	C = 0.039~0.118" 	Vc = 390 fz = 0.004 (n = 1,820) (Vf = 7.165)	Vc = 200 fz = 0.006 (n = 920) (Vf = 5.394)	C = Over 0.039" 	Vc = 390 fz = 0.005 (n = 1,820) (Vf = 8.583)	Vc = 260 fz = 0.006 (n = 1,210) (Vf = 7.165)
METS25-S25(-H) (Nominal Size 14)	C = 0.039~0.118" 	Vc = 390 fz = 0.004 (n = 1,530) (Vf = 12.047)	Vc = 200 fz = 0.006 (n = 760) (Vf = 8.976)	C = Over 0.039" 	Vc = 390 fz = 0.005 (n = 1,530) (Vf = 14.449)	Vc = 260 fz = 0.006 (n = 1,020) (Vf = 12.047)
METS32-S32(-H) (Nominal Size 18)	C = 0.039~0.118" 	Vc = 330 fz = 0.004 (n = 1,000) (Vf = 7.874)	Vc = 200 fz = 0.006 (n = 600) (Vf = 7.087)	C = Over 0.039" 	Vc = 390 fz = 0.005 (n = 1,190) (Vf = 11.260)	Vc = 260 fz = 0.006 (n = 800) (Vf = 9.449)
METS40-S32(-H) (Nominal Size 22)	C = 0.354" 	Vc = 260 fz = 0.006 Chattering is likely when set to shallower than C = 0.354".	Vc = 200 fz = 0.006 (n = 480) (Vf = 5.669)	C = Over 0.354" 	Vc = 390 fz = 0.006 (n = 960) (Vf = 8.976)	Vc = 260 fz = 0.006 (n = 640) (Vf = 7.559)
METS50-S32(-H) (Nominal Size 28)	Not recommended for steel because of chattering				Vc = 390 fz = 0.006 (n = 760) (Vf = 8.976)	Vc = 260 fz = 0.006 (n = 510) (Vf = 6.024)

[Cutting Speed : Vc (sfm), Spindle Revolution : n (min^{-1}), Feed Rate fz (ipt), Table Feed Vf (ipm)]

- Chattering is likely when fz is less than fz = 0.004 ipt. Keep feed rate between fz = 0.004~0.006 ipt.
  For cast iron machining, the bigger the C-dimension becomes, the less chattering occurs.

How to Prevent Damaging Chips when Steel Machining

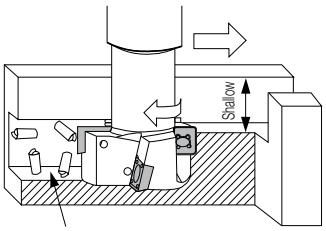
Before Improvement (Deep Groove at Pre-Process)



Chips stay in the pre-process groove.

Improvement of chip biting

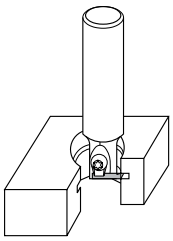
After Improvement (Shallow Groove at Pre-Process)



Chips are evacuated backward and chances of damaging chips are less.

Make pre-process groove shallower to prevent the tool from becoming damaged from chips.
Use compressed air to aid in chip evacuation.

MGI



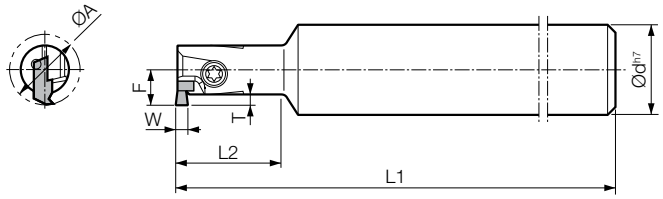


Fig.1

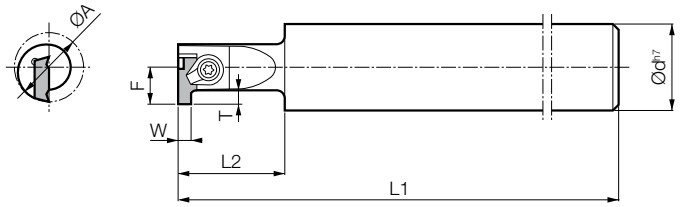


Fig.2

Toolholder Dimensions

Part Number		Stock	Min. Bore Dia.	Dimensions (mm)					Edge Width	Drawing	Spare Parts				Applicable Inserts ➡ K13
											Clamp Set		Clamp Screw	Wrench	
			ØA	Ød	L1	L2	F	T	W		5F	6F		FT / LW	
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	20	110	25	7.8	2.2	1.0~3.4	Fig.1	-	-	SB-4085TR	FT-15	GVR...-020S
	2020-1A	○	20	20	110	30	9.8	2.2	1.0~3.4	Fig.2	CPS-5F	-	-	FT-15	GVR...-020A GVR...-...AR
	2220-1B	○	22	20	110	30	11.0	2.8	1.45~4.0	Fig.2	CPS-5F	-	-	FT-15	GVR...-020B GVR...-...BR
	3225-1C	○	32	25	120	35	16.0	5.5 (4.5)	2.8~4.0	Fig.2	-	CPS-6F	-	LW-3	GVR...-020C
	4025-1C	○	40	25	120	40	20.0								

- Dimension T shows available grooving depth.
- **GVR280-020C**, **GVR300-020C** inserts are available for groove depths up to 4.5mm.
- **GVR430-020C** ~ **GVR500-020C** inserts can be installed into **MGI3225-1C** and **MGI4025-1C** holders, but are not recommended for steel machining because of toolholder's rigidity.

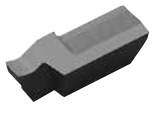
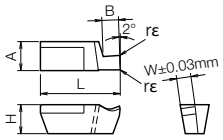
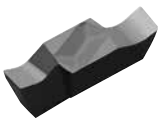
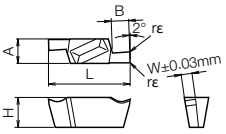
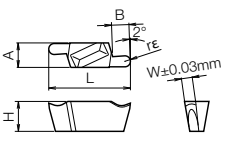
Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)					
		Cermet			MEGA COAT	PVD Coated Carbide	Carbide
		TN90	**TC40N**	**TC60**	**PR1225**	**PR930**	**KW10**
Carbon Steel	0.002~0.006	★ 390~660	☆ 390~660	☆ 330~590	★ 260~490	☆ 260~490	-
Alloy Steel	0.002~0.006	★ 390~660	☆ 390~660	☆ 330~590	★ 260~490	☆ 260~490	-
Mold Steel	0.001~0.005	★ 330~590	☆ 330~590	☆ 260~490	★ 200~430	☆ 200~430	-
Stainless Steel	0.001~0.005	☆ 330~590	☆ 330~590	★ 260~490	★ 200~430	☆ 200~430	-
Cast Iron	0.002~0.008	★ 330~490	☆ 330~490	-	-	-	★ 260~490
Non-ferrous Metals	0.002~0.008	-	-	-	-	-	★ 330~980

- Use down-cut machining.

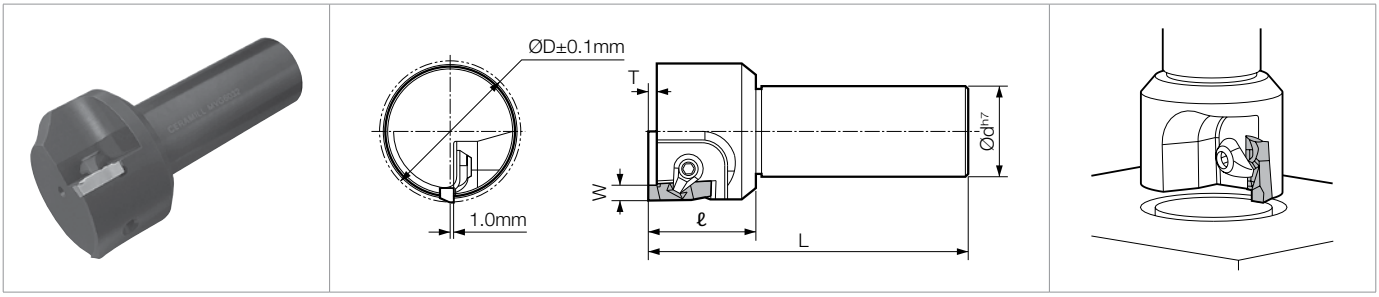
★: 1st Recommendation ☆: 2nd Recommendation

● Applicable Inserts (Metric Size)

Insert Right-handed Insert Shown		Part Number	Previous Part Number	Dimensions (mm)						Insert Grades					
										Cermet			MEGA COAT	PVD	Carbide
				W	B	rε	A	L	H	TN90	TC40	TC60	PR1225	PR930	KW10
 1-Edge		GVR 100-020SS	GVR 100SS	1.00	2.3	0.2	3.6	9	3.0	○		○	○	○	○
		125-020SS	125SS	1.25						○		○	○	○	○
		145-020SS	145SS	1.45						○		○	○	○	○
		200-020SS	200SS	2.00						○		○	○	○	○
		250-020SS	250SS	2.50						○		○	○	○	○
		300-020SS	300SS	3.00						○		○	○	○	○
		GVR 100-020S	GVR 100S	1.00	2.3	0.2	4.0	11	4.0	○	○	○	○	○	○
		125-020S	125S	1.25						○	○	○	○	○	○
		145-020S	145S	1.45						○	○	○	○	○	○
		185-020S	185S	1.85						○	○	○	○	○	○
		200-020S	200S	2.00						○	○	○	○	○	○
		250-020S	250S	2.50						○	○	○	○	○	○
		340-020S	340S	3.40							○	○	○	○	○
 2-Edge		GVR 100-020A	GVR 100A	1.00	2.3	0.2	4.0	12	5.0	○	○	○	○	○	○
		125-020A	125A	1.25						○	○	○	○	○	○
		145-020A	145A	1.45						○	○	○	○	○	○
		185-020A	185A	1.85						○	○	○	○	○	○
		200-020A	200A	2.00						○	○	○	○	○	○
		250-020A	250A	2.50						○	○	○	○	○	○
		300-020A	300A	3.00						○	○	○	○	○	○
		340-020A	340A	3.40						○	○	○	○	○	○
		GVR 145-020B	GVR 145B	1.45	2.8	0.2	4.5	15	5.5	○	○	○	○	○	○
		185-020B	185B	1.85						○	○	○	○	○	○
		200-020B	200B	2.00	3.2	0.2	4.5	15	5.5	○	○	○	○	○	○
		230-020B	230B	2.30						○	○	○	○	○	○
		250-020B	250B	2.50						○	○	○	○	○	○
		280-020B	280B	2.80						○	○	○	○	○	○
		300-020B	300B	3.00	4.2	0.2	4.5	15	5.5	○	○	○	○	○	○
		340-020B	340B	3.40						○	○	○	○	○	○
		400-020B	400B	4.00						○	○	○	○	○	○
		GVR 280-020C	GVR 280C	2.80	4.5	0.2	5.8	21	6.5	○	○	○	○	○	○
		300-020C	300C	3.00						○	○	○	○	○	○
		340-020C	340C	3.40	5.5	0.2	5.8	21	6.5	○	○	○	○	○	○
		400-020C	400C	4.00						○	○	○	○	○	○
		(430-020C)	(430C)	4.30	6.3	0.2	5.8	21	6.5	○	○	○	○	○	○
		(460-020C)	(460C)	4.60							○	○	○	○	○
		(500-020C)	(500C)	5.00						○	○	○	○	○	○
 2-Edge Full-R		GVR 200-100AR	GVR 100AR	2.00	2.3	1.00	4.0	12	5.0			○	○	○	○
		250-125AR	125AR	2.50	2.3	1.25						○	○	○	○
		300-150AR	150AR	3.00	2.3	1.50						○	○	○	○
		GVR 200-100BR	GVR 100BR	2.00	3.2	1.00	4.5	15	5.5	○		○	○	○	○
		300-150BR	150BR	3.00	4.2	1.50				○		○	○	○	○

- Only Right-hand insert is applicable.
- **GVR280-020C**, **GVR300-020C** inserts are available for groove depths up to 4.5mm.
- **GVR430-020C** ~ **GVR500-020C** inserts can be installed into **MGI3225-1C** and **MGI4025-1C** holders, but are not recommended for steel machining because of toolholder's rigidity.

MVG

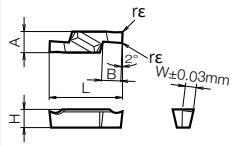


Toolholder Dimensions

Part Number		Stock	Dimensions (mm)					Edge Width	Spare Parts	
									Clamp Set	Wrench
			ØD	Ød	L	ℓ	T	W		
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 Right-handed Insert Shown		Part Number	Previous Part Number	Dimensions (mm)						Insert Grades					
										Cermet			MEGA COAT	PVD	Carbide
				W	B	rε	A	L	H	TN90	TC40	TC60	PR1225	PR930	KW10
		GVFR 400-020B	GVFR 400B	4.00	5.3	0.2	5.8	20	5.0	○	○	○	○	○	○
		GVFR 430-020B	GVFR 430B	4.30							○	○	○	○	○
		GVFR 460-020B	GVFR 460B	4.60							○	○	○	○	○
		GVFR 490-020B	GVFR 490B	4.90							○	○	○	○	○

- **GVFR430B-020B** inserts are applicable for sealing groove of G-series
  For other ring grooving applications, **GVFR400B-020B** ~ **GVFR490B-020B** are applicable.
- Only Right-hand insert is applicable.

Recommended Cutting Conditions

Workpiece Material	Feed Rate fz (ipt)	Recommended Insert Grades (Cutting Speed Vc: sfm)					
		Cermet			MEGACOAT	PVD Coated Carbide	Carbide
		TN90	TC40	TC60	PR1225	PR930	KW10
Carbon Steel	0.002~0.006	-	★ 390~660	☆ 330~590	★ 260~560	☆ 260~490	-
Alloy Steel	0.002~0.006	-	★ 390~660	☆ 330~590	★ 260~560	☆ 260~490	-
Mold Steel	0.001~0.005	-	★ 330~590	☆ 260~490	★ 200~490	☆ 200~430	-
Stainless Steel	0.001~0.005	-	☆ 330~590	☆ 260~490	★ 200~490	☆ 200~430	-
Cast Iron	0.002~0.008	-	-	-	-	-	★ 260~490
Non-ferrous Metals	0.002~0.008	-	-	-	-	-	★ 330~980

★: 1st Recommendation ☆: 2nd Recommendation

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TOOL HOLDING

O1 - O5

CAT40

Face Mill Toolholders

- Made from 8620 Alloy Steel
- Concentricity is less than .0002 at face and arbor
- All critical surfaces are precision ground
- Case hardened to 54-58 RC
- Case depth is .03-.04
- Balanced to G2.5 @ 20,000 rpm
- Rear thread for pull stud is 5/8-11
- Coolant through capable

CAT40 Face Mill Holders

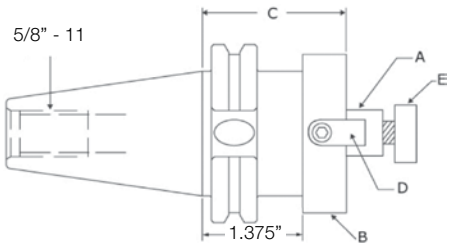

Fig.1

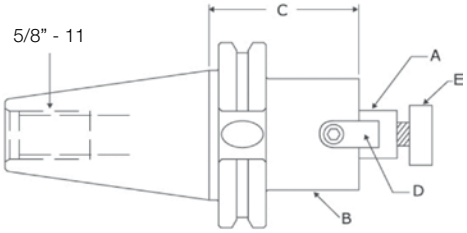

Fig.2

CAT40 Holder Dimensions

Part Number		Stock	Dimensions (in)					
			Arbor Dia. (A)	O.D. (B)	Gage Length (C)	Key Width (D)	Screw (E)	Drawing
KYO-CAT40-	FM.75-2.0	●	0.750	1.750	2.000	5/16	3/8-24	2
	FM1.0-2.0	●	1.000	2.180	2.000	3/8	1/2-20	1
	FM1.25-2.0	●	1.250	2.440	2.000	1/2	5/8-18	1
	FM1.5-2.0	●	1.500	2.520	2.000	5/8	3/4-16	1

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CAT40

End Mill Toolholders

- Made from 8620 Alloy Steel
- All critical surfaces are precision ground
- Case hardened to 56-58 RC
- Case depth is .03-.04
- Balanced to G2.5 @ 20,000 rpm
- Concentricity is .0001 or less
- Rear thread for pull stud is 5/8-11
- Coolant through capable

CAT40 End Mill Holders

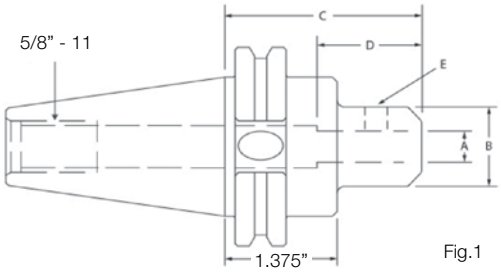

Fig.1

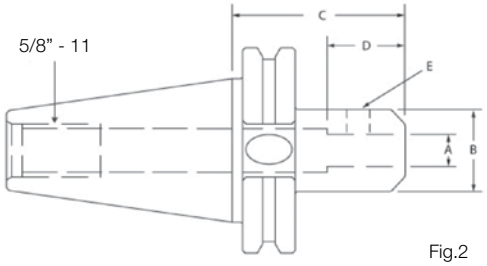

Fig.2

CAT40 Holder Dimensions

Part Number		Stock	Dimensions (in)					
			I.D. (A)	O.D. (B)	Gage Length (C)	Tool Depth (D)	Set Screw (E)	Drawing
KYO-CAT40-	EM.500-1.75	●	0.500	1.375	1.750	N/A	7/16-20	2
	EM.625-1.75	●	0.625	1.500	1.750	2.100	9/16-18	2
	EM.75-1.75	●	0.750	1.750	1.750	2.500	5/8-18	2
	EM1.0-1.75	●	1.000	1.750	1.750	2.600	5/8-18	2
	EM1.25-2.5	●	1.250	2.500	2.500	2.750	3/4-16	1
	EM1.5-4.0	●	1.500	2.620	4.000	3.000	2x – 3/4-16	2※

※ This tool holder does not have a safety zone for the tool changer.
Although most machines do not require a safety zone, please be sure to check your machine tool requirements.

CAT50

Face Mill Toolholders

- Made from 8620 Alloy Steel
- Concentricity is less than .0002 at face and arbor
- All critical surfaces are precision ground
- Case hardened to 54-58 RC
- Case depth is .03-.04
- Balanced to G2.5 @ 20,000 rpm
- Rear thread for pull stud is 1” x 8
- Coolant through capable

CAT50 Face Mill Holders

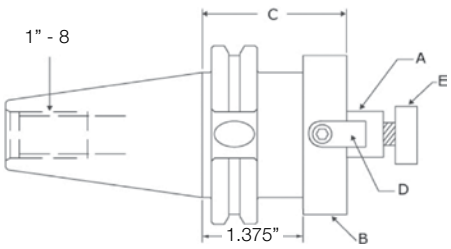

Fig.1

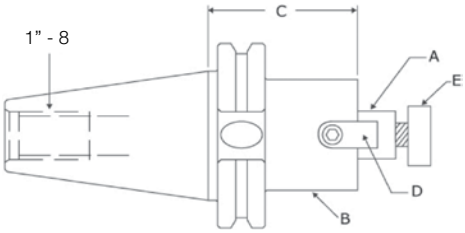

Fig.2

CAT50 Holder Dimensions

Part Number		Stock	Dimensions (in)					
			Arbor Dia. (A)	O.D. (B)	Gage Length (C)	Key Width (D)	Screw (E)	Drawing
KYO-CAT50-	FM.75-3.0	●	0.750	1.750	3.000	5/16	3/8-24	2
	FM1.0-3.0	●	1.000	2.180	3.000	3/8	1/2-20	2
	FM1.25-3.0	●	1.250	2.440	3.000	1/2	5/8-18	2
	FM1.5-3.0	●	1.500	2.740	3.000	5/8	3/4-16	2
	FM2.0-3.0	●	2.000	3.700	3.000	3/4	1-14	1
	FM2.5-3.0	●	2.500	4.000	3.000	1.0	1-14	1

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CAT50

End Mill Toolholders

- Made from 8620 Alloy Steel
- All critical surfaces are precision ground
- Case hardened to 56-58 RC
- Case depth is .03-.04
- Balanced to G2.5 @ 20,000 rpm
- Concentricity is .0002 or less
- Rear thread for pull stud is 1" x 8
- Coolant through capable

CAT50 End Mill Holders

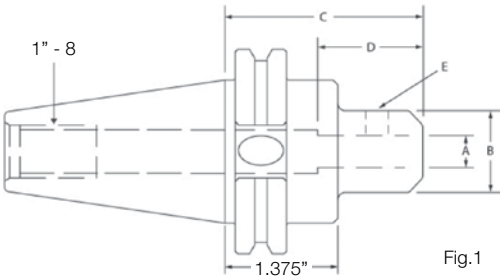


Fig.1

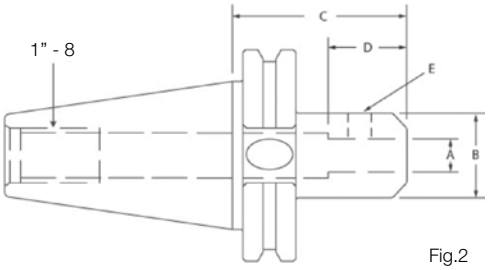


Fig.2

CAT50 Holder Dimensions

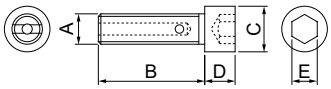
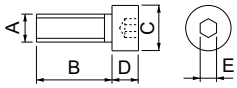
Part Number		Stock	Dimensions (in)					
			I.D. (A)	O.D. (B)	Gage Length (C)	Tool Depth (D)	Set Screw (E)	Drawing
KYO-CAT50-	EM.500-3.0	●	0.500	1.375	3.000	N/A	7/16-20	1
	EM.625-3.0	●	0.625	1.500	3.000	N/A	9/16-18	1
	EM.75-3.0	●	0.750	1.750	3.000	N/A	5/8-18	1
	EM1.0-4.0	●	1.000	1.900	4.000	2.750	5/8-18	1
	EM1.25-4.0	●	1.250	2.500	4.000	2.750	3/4-16	1
	EM1.5-4.5	●	1.500	2.750	4.500	3.000	2x – 3/4-16	1
	EM2.0-5.0	●	2.000	3.500	5.000	3.500	2x – 1.0-14	2※

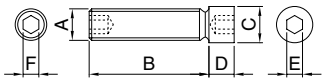
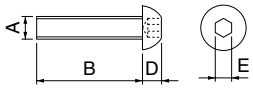
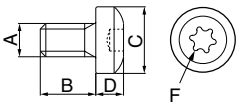
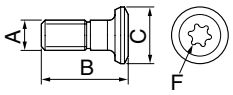
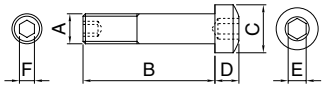
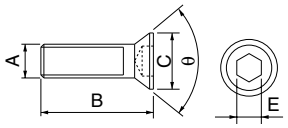
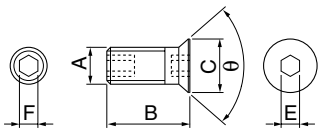
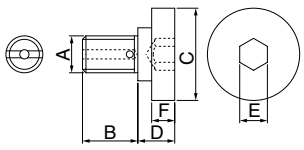
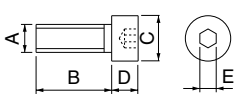
※ This tool holder does not have a safety zone for the tool changer.
Although most machines do not require a safety zone, please be sure to check your machine tool requirements.

SPARE PARTS

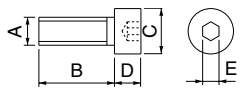
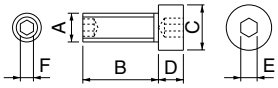
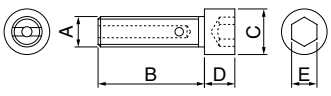
P1 - P23

Screws / Bolts

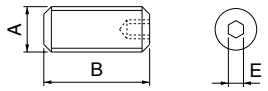
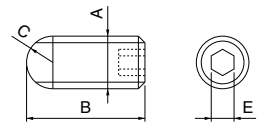
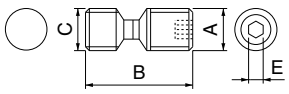
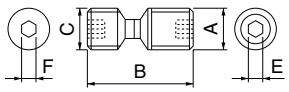
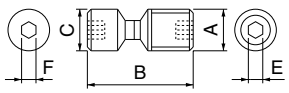
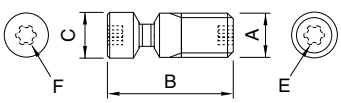
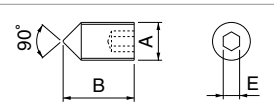
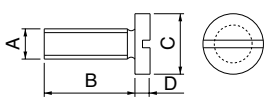
Drawing	Part Number		Dimension (in) A	B	C	D	E	F	Angle (°) α	θ	Torque (N • m)	Notes
	HH	3/8-1.25H	3/8-24 UNF	1.250	0.550	0.375	0.312	-	-	-	-	With Coolant Hole
		1/2-1.25H	1/2-20 UNF		0.750	0.500	0.375					
		3/4-2.3H	3/4-16 UNF	1.500	1.120	0.750	0.625					
	HH	1/4-0.75	1/4-28 UNF	0.750	0.375	0.250	0.188	-	-	-	-	
		3/8-1.25	3/8-24 UNF	1.250	0.550	0.375	0.312					
		3/8-1.5	3/8-24 UNF	1.500								
		1/2-1.25	1/2-20 UNF	1.250	0.750	0.500	0.375					
		3/4-2.3	3/4-16 UNF	1.500	1.120	0.750	0.625					

Drawing	Part Number		Dimension (mm) A	B	C	D	E	F	Angle (°) α	θ	Torque (N • m)	Notes
	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	-4090TRL W	M4X0.7	9.0	5.8	-	2.0	2.0	-	82°	-	R Shows Right-hand Thread L Shows Left-hand Thread
	HF	16X40HA	M16X2.0	24.0	40.0	16.0	12.0	10.0	-	-	-	With Coolant Hole
		20X53H	M20X2.5	35.0	43.0	18.0	14.0	14.0				
		20X53HA		33.0	50.0	20.0						
		24X60H	M24X3.0	40.5	65.0	19.5	17.0					
		24X60HA		36.0		24.0						
	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								
		6X16AA		16.0								
		6X18AA		18.0								
		6X20		20.0								
		6X25		25.0								
		6X30		30.0								

Screws / Bolts

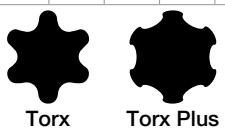
Drawing	Part Number		Dimension (mm)						Angle (°)		Torque (N • m)	Notes
			A	B	C	D	E	F	α	θ		
	HH	8X25	M8X1.25	25.0	13.0	8.0	6.0	-	-	-	-	
		8X35		35.0								
		8X40		40.0								
		8X50		50.0								
		8X55		55.0								
		8X65		65.0								
		8X70		70.0								
		8X80		80.0								
		8X85		85.0								
		8X100		100.0								
		8X110		110.0								
	HH	10X25	M10X1.5	25.0	16.0	10.0	8.0	-	-	-	-	
		10X30		30.0								
		10X30M		30.0								
		10X30S		30.0		6.0	7.0					
		10X35		35.0		10.0	8.0					
		10X40		40.0								
	HH	12X25	M12X1.75	25.0	18.0	12.0	10.0	-	-	-	-	
		12X35		35.0								
		12X35M		35.0								
		12X40		40.0								
		12X55		55.0								
		12X65		65.0								
		12X80		80.0								
		12X85		85.0								
		12X100		100.0								
		12X110		110.0								
		12X120		120.0								
		12X130		130.0								
		12X140		140.0								
		12X150		150.0								
	HH	16X35	M16X2.0	35.0	24.0	16.0	14.0	-	-	-	-	
		16X40		40.0								
		16X45		45.0								
		16X65		65.0								
		16X90		90.0								
		16X110		110.0								
		16X130		130.0								
	HH	20X40	M20X2.5	40.0	30.0	20.0	17.0	-	-	-	-	
		20X53		53.0								
		20X55		55.0								
		20X75		75.0								
		20X90		90.0								
		20X110		110.0								
		20X120		120.0								
		20X140		140.0								
		20X150		150.0								
		20X170		170.0								
	HH	24X40	M24X3.0	40.0	36.0	24.0	19.0	-	-	-	-	
		24X60		60.0								
		24X75		75.0								
		24X90		90.0								
		24X110		110.0								
		24X120		120.0								
		24X140		140.0								
		24X150		150.0								
		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
		10X30H	M10X1.5	30.0	16.0	10.0	6.0					
		10X35HK		35.0								
		12X35H	M12X1.75	35.0	18.0	12.0	8.0					
		12X35HK										
		16X52H	M16X2.0	36.0	24.0	16.0	12.0					

Screws / Bolts

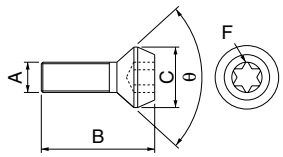
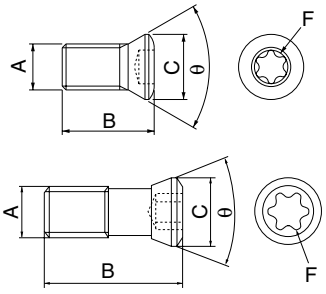
Drawing	Part Number	Dimension (mm)						Angle (°)		Torque (N • m)	Notes
		A	B	C	D	E	F	α	θ		
	HS 3X4P	M3X0.5	3.9	-	-	1.5	-	-	-	1.0	HS4X4P and HS6X4P Have a Flat Edge Clamp Screw Equivalent to JIS B-1177
	HS 3X4		4.0								
	HS 3X8		8.0								
	HS 3X12		12.0								
	HS 3X16		16.0								
	HS 4X4P	M4X0.7	3.9	-	-	2.0	-	-	-	2.0	
	HS 4X4		4.0								
	HS 5X5	M5X0.8	5.0			2.5				3.0	
	HS 6X4P	M6X0.75	3.9	-	-	3.0	-	-	-	4.0	
	HS 6X6	M6X1.0	6.0								
	HS 6X8T		8.0								
	HS 6X14		14.0								
	HS 6X22		22.0								
	HS 8X10	M8X1.25	10.0	-	-	4.0	-	-	-	-	
	HS 8X12		12.0								
	HS 10X10	M10X1.5	10.0	-	-	5.0	-	-	-		
	HS 10X16		16.0								
	HS 12X12	M12X1.75	12.0	-	-	6.0	-	-	-	-	
	HS 12X16		16.0								
	HS 12X18		18.0								
	HS 12X20		20.0								
	HS 12X25		25.0								
	HS 12X30		30.0								
	HS 12X35		35.0								
	HS 16X12	M16X2.0	12.0	-	-	8.0	-	-	-		
	HS 16X18		18.0								
	HS 16X20		20.0								
	HSB 4X8R/L	M4X0.7	8.0	R2.0	-	2.0	-	-	-	2.0	R Shows Right-hand Thread L Shows Left-hand Thread
	LS -03	M5X0.8	10.0	M5X0.8	-	2.0	-	-	-	2.0	
	LS -03S		12.2			2.5				3.0	
	LS -03N	M5X0.8	9.7	M5X0.8	-	2.0	-	-	-	2.0	N : Silver Coated
	LS -03SN		12.0			2.5				3.0	
	LS -05	M5X0.8	15.5	M5X0.8	-	2.0	2.0	-	-	2.0	
	LS -1	M6X1.0	17.0	6.0	-	2.5	2.5	-	-	3.0	N : Silver Coated
	LS -1N										
	LS -1S		14.2								
	LS -1SN										
	LS -1T		21.0								
	LS -2	M8X1.0	20.0	8.0	-	3.0	3.0	-	-	4.0	
	LS -2N										
	LS -3		22.0								
	LS -4		24.0								
	LS -4N										
	LS -1P	M6X1.0	16.5	6.0	-	10IP	10IP	-	-	2.0	○○IP Shows Torx Plus
	LS -2P	M8X1.0	18.2	8.0		15IP	15IP			3.5	
	LS -3P		21.8								
	LS -11	M6X1.0	9.5	-	-	3.0	-	-	-	-	
	LS -15		12.5								
	M 3X8	M3X0.5	8.0	5.5	2.0	-	-	-	-	-	Flat Fillister Head Screw Equivalent to JIS B-1101
	M 3X12		12.0								
	M 4X10	M4X0.7	10.0	7.0	2.6						

Reference

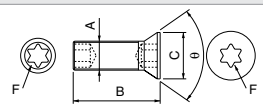
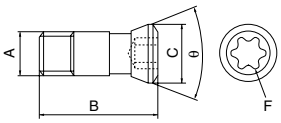
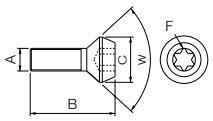
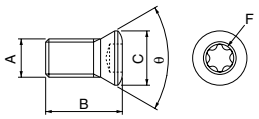
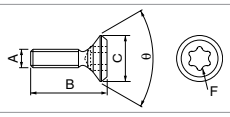
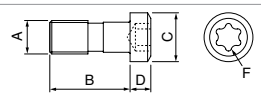
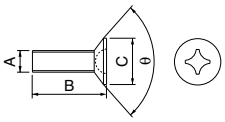
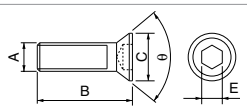
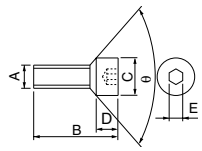
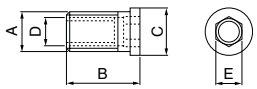
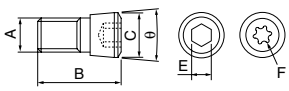
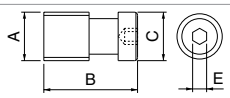
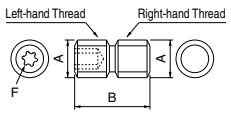
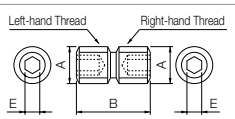
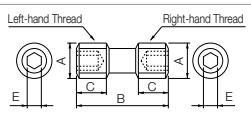
Torx and Torx Plus have different cross-sections.



Screws / Bolts

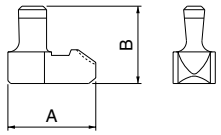
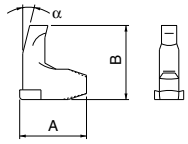
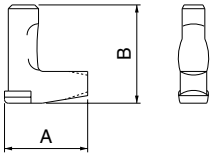
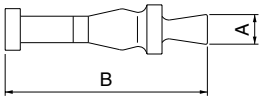
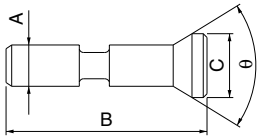
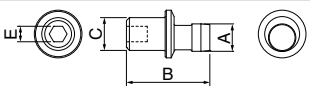
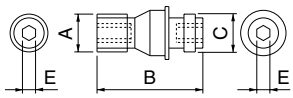
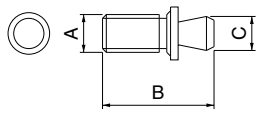
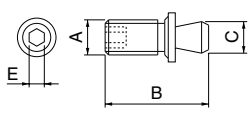
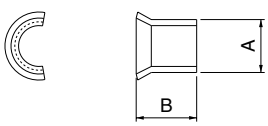
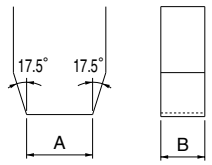
Drawing	Part Number	Dimension (mm)						Angle (°)		Torque (N • m)	Notes
		A	B	C	D	E	F	α	θ		
	SB -1TR	M2X0.4	5.3	3.8			T6			0.5	
	-2TR	M2.5X0.45	6.2	4.5			T8			1.2	
	-3TR	M3X0.5	7.2	4.8			T10			2.0	
	-3STR		6.4	5.2							
	-3.5TR	M3.5X0.6	9.3	5.6			T15			3.5	
	-4TR	M4X0.7	7.7	5.8							
	-5TR	M5X0.8	20.0	8.7	-	-	T20	-	90°	4.5	R Shows Right-hand Thread
	-2290TR	M2.2X0.45	9.2	2.8			T6			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		60°	4.5	
	-5090TR		9.0								
	-50120TR		12.0								
 SB-40125TRN	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 ○○IP Shows Torx Plus
	-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	
	-3590TRP		9.0				15IP			4.0	
	-3592TR		9.2	5.1			T10			2.0	
	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	6.8			20IP		60°	4.5	
	-50120TRS			7.2			15IP			3.5	
	-50137K		13.7	9.7			T20		70°	4.5	
	-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	

Screws / Bolts

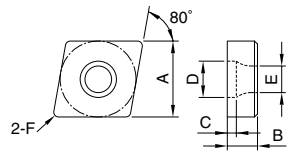
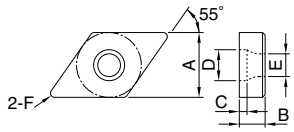
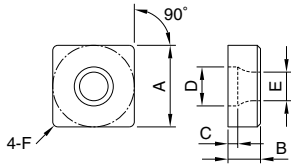
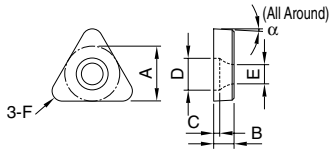
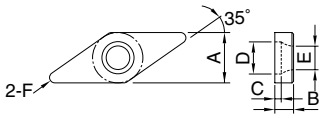
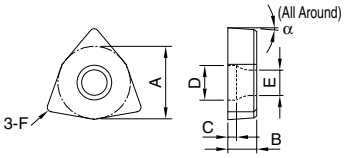
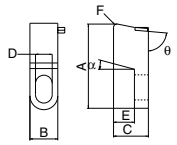
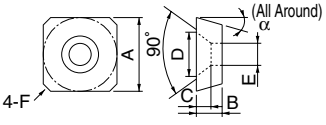
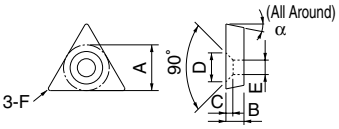
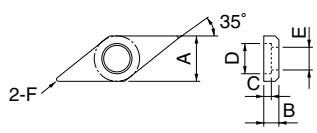
Drawing	Part Number		Dimension (mm)						Angle (°)		Torque (N • m)	Notes
			A	B	C	D	E	F	α	θ		
	SB	-4070TRW	M4X0.7	6.7	5.5	-	-	T8	-	60°	1.2	R Shows Right-hand Thread
		-4590TRWN	M4.5X0.75	9.3	5.6			T10		57°	2.0	
	SC	-30067	M3X0.35	6.7	4.4	-	-	T8	-	60°	1.2	
		-35085	M3.5X0.35	8.5	5.7			T10			2.0	
		-40100	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	
	SCR	-01	M2.5X0.45	6.6	3.6	-	-	T7	-	60°	0.8	
		-03	M3X0.5	8.4	4.6	-	-	T9			1.6	
		-04	M2.5X0.45	4.6	3.6	-	-	T7			0.8	
		-05										
		-16	M3.5X0.6	6.9	5.0	-	-	T10			2.0	
		-30		8.9								
	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 Fillister Head
		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	M8X1.0	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								
	XNS	610	3/8-24UNF	1.250"	0.500"	-	0.188"	-	-	-	-	Differential Screw

* No Socket on Right-hand Thread Side

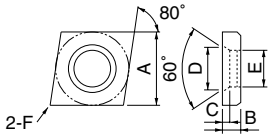
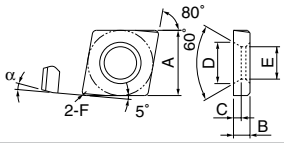
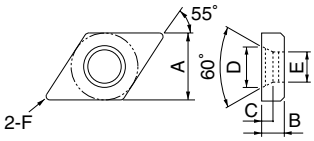
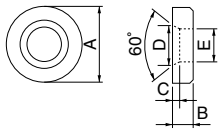
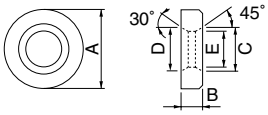
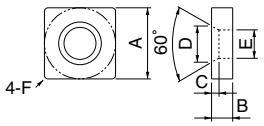
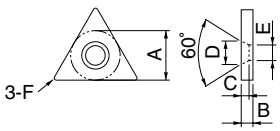
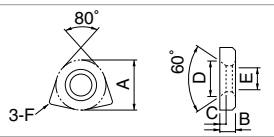
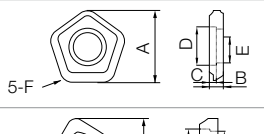
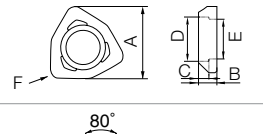
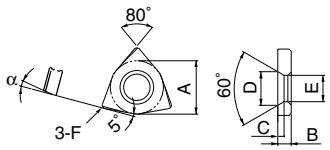
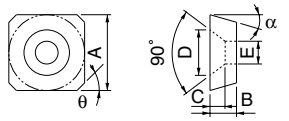
Pins

Drawing	Part Number		Dimension (mm) A	B	C	D	E	F	Angle (°) α	θ	Notes
	LL	-03	7.8	6.3	-	-	-	-	-	-	
		-03N									
		-03S	11.1	8.9							
		-03SN									
		-03T	8.3	8.9							
		-03TN									
	LL	-05C	10.7	11.7	-	-	-	-	12°	-	
		-1C	13.0	13.3					14°		
		-1CN									
		-2C	18.8	17.6					14°		
	LL	-1	10.3	12.0	-	-	-	-	-	-	
		-1K	10.0	12.0							
		-1N	10.3	12.0							
		-1D	12.3	12.0							
		-1DN									
		-2	13.5	13.0							
		-2K	13.3	13.2							
		-2N	13.5	13.0							
		-3	16.4	13.0							
		-3K	16.0	14.8							
		-3N	16.4	13.0							
		-4	16.4	14.7							
		-5	17.1	16.7							
		-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	3.60	-	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							

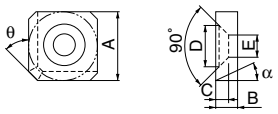
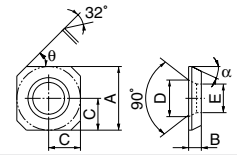
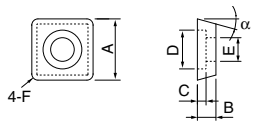
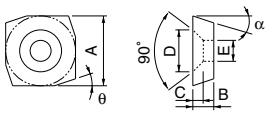
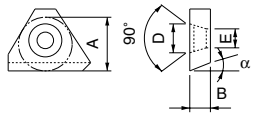
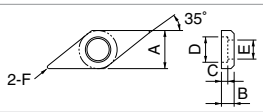
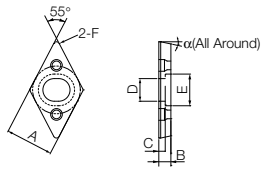
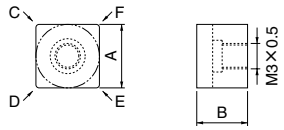
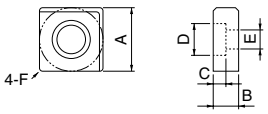
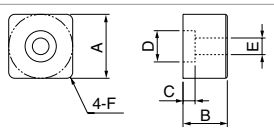
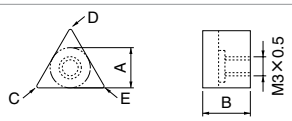
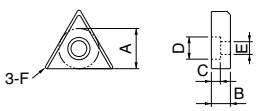
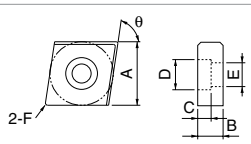
Shims

Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		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[illegible]	34.0	10.0	12.7	5.6	5.0	R1.6	0°	55°	R Shows Right-hand Thread L Shows Left-hand Thread 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-6S LP-2S

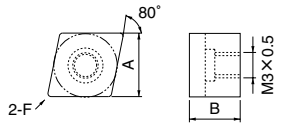
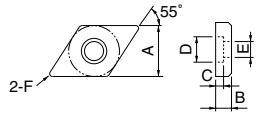
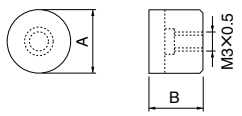
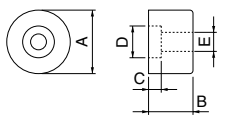
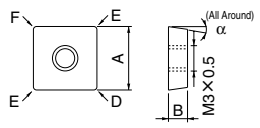
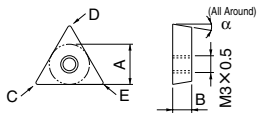
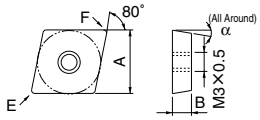
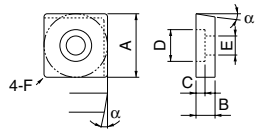
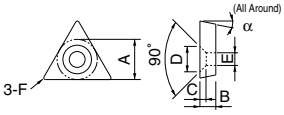
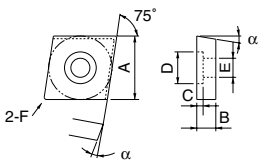
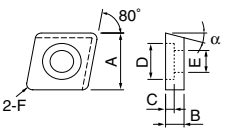
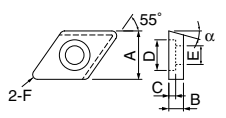
Shims

Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		A	B	C	D	E	F	α	θ	
	LC -32	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
	LC -32N									
	LC -4K	11.7	3.2	1.4	8.1	6.73	R0.8	-	-	Shim Pin : LSP-3K
	LC -42	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
	LC -42N									
	LC -42N-20						R2.0			
	LC -53	15.9	4.8	1.7	10.0	8.0	R1.2	-	-	Shim Pin : LSP-3
	LC -53N									
	LC -42R/L	12.65	3.2	1.5	8.01	6.28	R0.8	10°	-	R Shows Right-hand Thread L Shows Left-hand Thread Shim Pin : LSP-2
	LC -42NR/L									
	LC -42NR/L-20						R2.0			
	LD -32	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
	LD -32N									
	LD -4K	11.7	3.2	1.4	8.1	6.73	R0.8	-	-	Shim Pin : LSP-3K
	LD -4K43		4.8	3.0	8.3	6.60	R1.2			
	LD -42	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
	LD -42-20						R2.0			
	LD -43	12.65	4.8	3.1	8.5	6.28	R0.8	-	-	
	LD -43-20						R2.0			
	LR -80	9.47	3.2	1.3	6.25	4.75	-	-	-	Shim Pin : LSP-1
	LR -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
	LR -12C	10.0	3.2	6.3	6.3	4.7	-	-	-	
	LR -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
	LS -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
	LT -32	9.47	2.7	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
	LT -32N									
	LT -32N-20						R2.0			
	LT -42	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
	LT -42N									
	LT -42N-20						R2.0			
	LW -32	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
	LW -32N									
	LW -42	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
	LW -42N									
	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
	LW -42R/L	12.65	3.2	1.5	8.01	6.28	R0.8	10°	-	R Shows Right-hand Thread L Shows Left-hand Thread Shim Pin : LSP-2
	LW -42NR/L									
	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

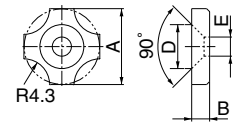
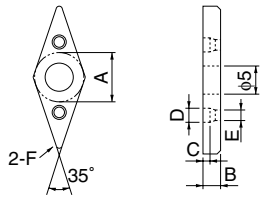
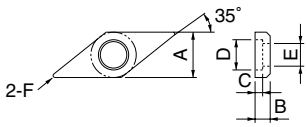
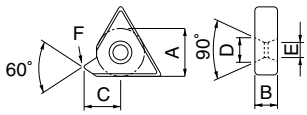
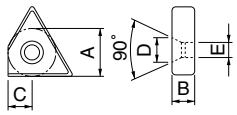
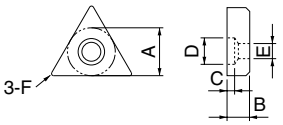
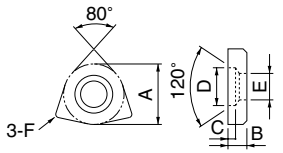
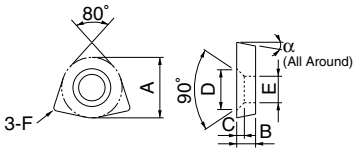
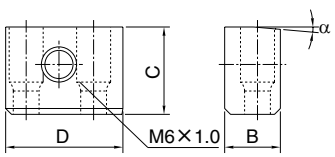
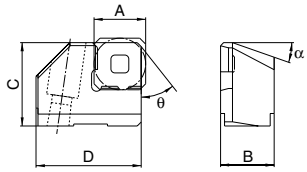
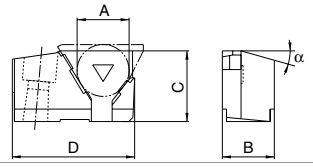
Shims

Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		A	B	C	D	E	F	α	θ	
	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
	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

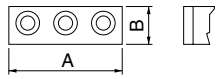
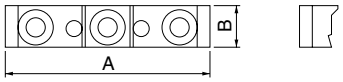
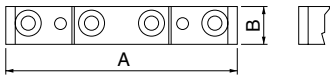
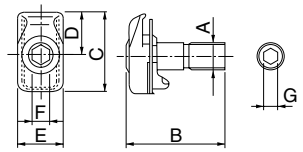
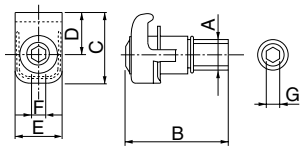
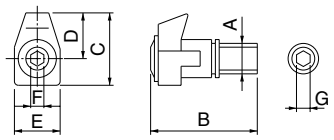
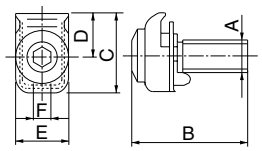
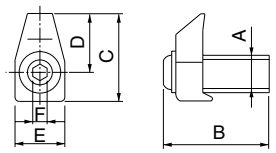
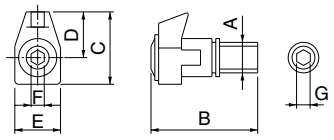
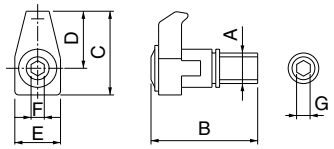
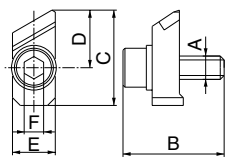
Shims

Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		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

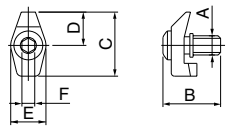
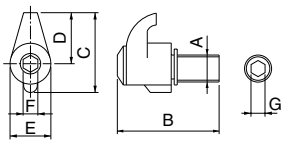
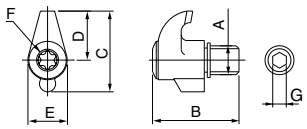
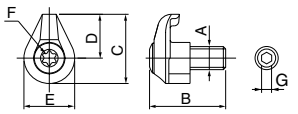
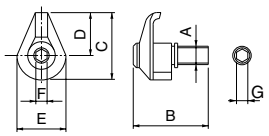
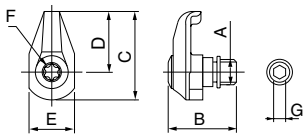
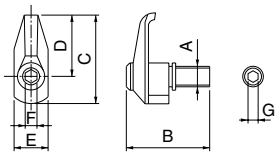
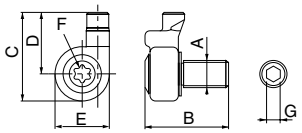
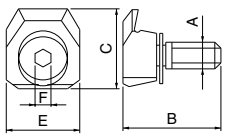
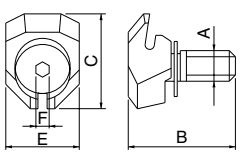
Shims / Cartridges

Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		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
	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.

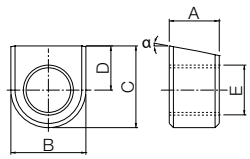
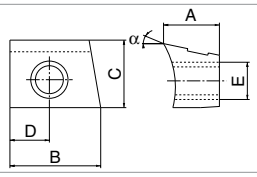
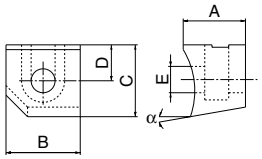
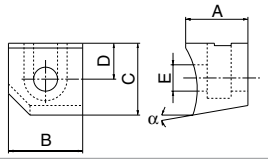
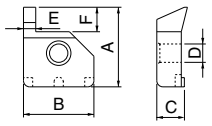
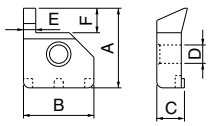
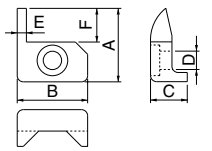
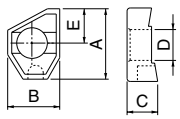
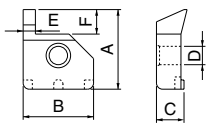
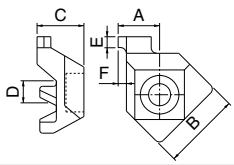
Clamp Sets

Drawing	Part Number	Dimension (mm)							Notes
		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 Thread L Shows Left-hand Thread

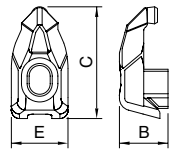
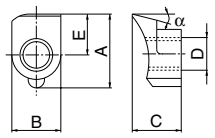
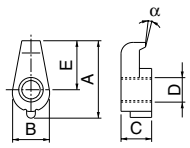
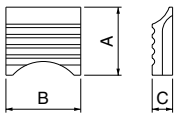
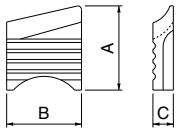
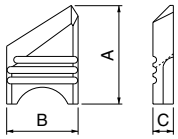
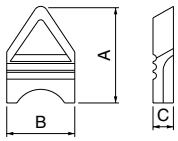
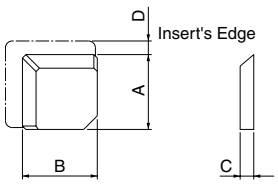
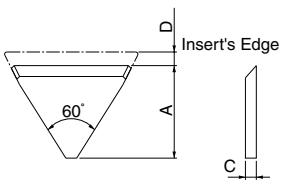
Clamp Sets

Drawing	Part Number	Dimension (mm)							Notes
		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	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 -16RS	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 Thread L Shows Left-hand Thread
	-22RS			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	-	

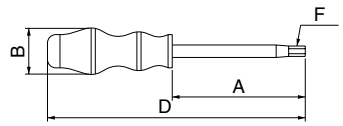
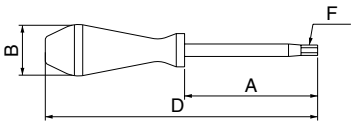
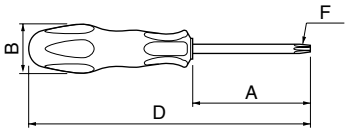
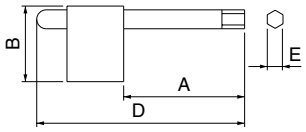
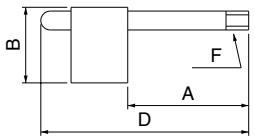
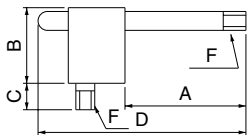
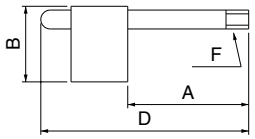
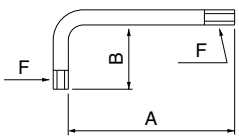
Clamps

Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		A	B	C	D	E	F	α	θ	
	C 09N	6.0	9.0	9.8	5.3	M6X1.0 (L-hand Thread)	-	10°	-	Clamp Screw : W6X18N
	C 17R	12.2	20.0	14.3	8.5	M8X1.25 (L-hand Thread)	-	12°	-	Clamp Screw : W6X18N
	C 20R	15.1	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw : TX8X15
	CH -20R	13.1	15.5	14.8	7.5	5.3	-	10°	-	Clamp Screw : TX8X15
	C 25R	13.2	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw : TX8X15
	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			

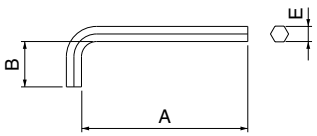
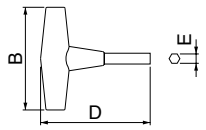
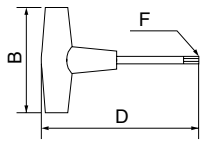
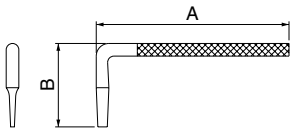
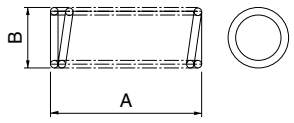
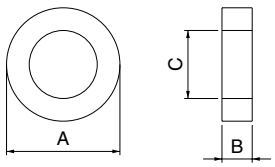
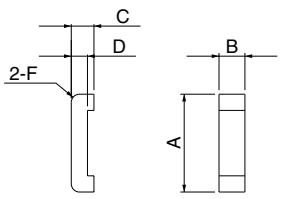
Clamps / Chipbreakers

Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		A	B	C	D	E	F	α	θ	
	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 (L-hand Thread)	10.0	-	15°	-	
	CP -8W	20.9	12.0	8.0	M8X1.25 (L-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	-	-	-	-	

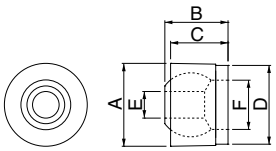
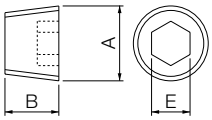
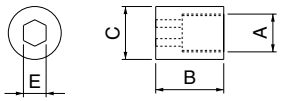
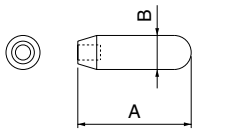
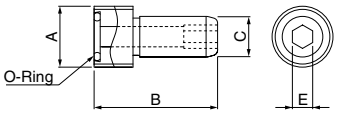
Wrenches

Drawing	Part Number		Dimension (mm)						Angle (°)		Notes
			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			

Wrenches / Springs / Nuts / Punches / Other

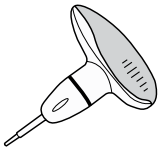
Drawing	Part Number	Dimension (mm)						Angle (°)		Notes
		A	B	C	D	E	F	α	θ	
	LW -1.5	45	14			1.5				
	-2	50	16			2.0				
	-2.5	56	18			2.5				
	-3	63	20			3.0				
	-4	70	25			4.0				
	-4.5	78	26			4.5				
	-5	80	28	-	-	5.0	-	-	-	Hexagon
	-6	90	32			6.0				
	-8	109	36			8.0				
	-10	112	40			10.0				
	-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

Wrenches / Springs / Nuts / Punches / Other

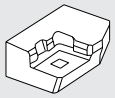
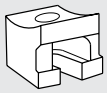
Drawing	Part Number		Dimension (mm)						Angle (°)		Notes
			A	B	C	D	E	F	α	θ	
	**DN**	**10**	6.2	5.1	4.5	5.7	2.6	4.0	-	-	Nozzle
		20	10.1	7.7	7.0	9.6	M4X0.7	6.0			
	**GP**	**-1**	PT1/8	7.0	-	-	5.0	-	-	-	Plug
		-2	PT1/4	9.0	-	-	6.0	-	-	-	
	**WN**	**-1**	M5X8	10.0	7.0	-	3.0	-	-	-	Nut
	**PC**	**-1**	60.0	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				

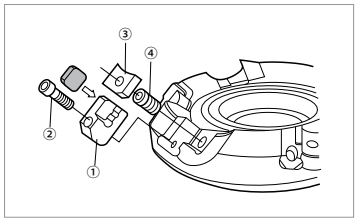
Pre-set Torque Wrench

Pre-set Torque Wrench Selector Guide

Image	Tooling Category	Milling Cutter Family	Milling Cutter Type	Applicable Pre-set Torque Wrench	
	Milling	**MFH**	MFH with10mm Inserts	**PST-IP15**	IP15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
			MFH with14mm Inserts	**PST-IP20**	IP20 Bit Size • Set at 4.5 Nm (39.8 In-lbs)
			MFH-Mini	**PST-IP8**	IP8 Bit Size • Set at 1.2 Nm (10.6 In-lbs)
		MEW	MEW with 10mm Inserts	**PST-IP8**	IP8 Bit Size • Set at 1.2 Nm (10.6 In-lbs)
			MEW with 15mm Inserts	**PST-IP15**	IP15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
		MRX	MRX with 8mm Inserts	**PST-IP9**	IP9 Bit Size • Set at 1.4 Nm (12.4 In-lbs)
			MRX with 10mm Inserts	**PST-IP10**	IP10 Bit Size • Set at 2.0 Nm (17.7 In-lbs)
			MRX with 12mm Inserts	**PST-IP15**	IP15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
			MRX with 16mm Inserts	**PST-IP20**	IP20 Bit Size • Set at 4.5 Nm (39.8 In-lbs)
		MRW	MRW with 12mm Inserts	**PST-IP15**	IP15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
			MRW with 16mm Inserts	**PST-IP20**	IP20 Bit Size • Set at 4.5 Nm (39.8 In-lbs)
		MFK	All Types	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
		MEC	MEC with 11mm Inserts	**PST-T8**	T8 Bit Size • Set at 1.2 Nm (10.6 In-lbs)
			MEC with 17mm Inserts	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
		MECH	MECH with 11mm Inserts	**PST-T8**	T8 Bit Size • Set at 1.2 Nm (10.6 In-lbs)
			MECH with 17mm Inserts	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
		CM	CM with XPMT09 Inserts	**PST-T7**	T7 Bit Size • Set at 0.8 Nm (7.1 In-lbs)
			CM with XPMT15 Inserts	**PST-T10**	T10 Bit Size • Set at 2.0 Nm (17.7 In-lbs)
			CM with APET Inserts	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
		EM	EM with XPMT09 Inserts	**PST-T7**	T7 Bit Size • Set at 0.8 Nm (7.1 In-lbs)
			EM with XPMT15 Inserts	**PST-T10**	T10 Bit Size • Set at 2.0 Nm (17.7 In-lbs)
		FM	FM	**PST-T10**	T10 Bit Size • Set at 2.0 Nm (17.7 In-lbs)
			FM-AL	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
	Drilling	**DRZ**	DRZ…-05G	**PST-T6**	T6 Bit Size • Set at 0.5 Nm (4.4 In-lbs)
			DRZ…-06G	**PST-T7**	T7 Bit Size • Set at 0.8 Nm (7.1 In-lbs)
			DRZ…-08G	**PST-T8**	T8 Bit Size • Set at 1.2 Nm (10.6 In-lbs)
			DRZ…-10G	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
			DRZ…-12G	**PST-T20**	T20 Bit Size • Set at 4.5 Nm (39.8 In-lbs)
			DRZ…-15G	**PST-T20**	T20 Bit Size • Set at 4.5 Nm (39.8 In-lbs)
		DRX	DRX…-04	**PST-T6**	T6 Bit Size • Set at 0.5 Nm (4.4 In-lbs)
			DRX…-05	**PST-T6**	T6 Bit Size • Set at 0.5 Nm (4.4 In-lbs)
			DRX…-06	**PST-T7**	T7 Bit Size • Set at 0.8 Nm (7.1 In-lbs)
			DRX…-07	**PST-T8**	T8 Bit Size • Set at 1.2 Nm (10.6 In-lbs)
			DRX…-09	**PST-T10**	T10 Bit Size • Set at 2.0 Nm (17.7 In-lbs)
			DRX…-11	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
			DRX…-14	**PST-T20**	T20 Bit Size • Set at 4.5 Nm (39.8 In-lbs)
		DR	DR with WCMX 04 Insert	**PST-T7**	T7 Bit Size • Set at 0.8 Nm (7.1 In-lbs)
			DR with WCMX 05 Insert	**PST-T9**	T9 Bit Size • Set at 1.4 Nm (12.4 In-lbs)
			DR with WCMX 06 Insert	**PST-T10**	T10 Bit Size • Set at 2.0 Nm (17.7 In-lbs)
		CD	CD with WCMX 05 Insert	**PST-T9**	T9 Bit Size • Set at 1.4 Nm (12.4 In-lbs)
			CD with WCMX 06 Insert	**PST-T10**	T10 Bit Size • Set at 2.0 Nm (17.7 In-lbs)
		SDR	SDR with TCMT12 Insert	**PST-T6**	T6 Bit Size • Set at 0.5 Nm (4.4 In-lbs)
			SDR with TCMT18 Insert	**PST-T7**	T7 Bit Size • Set at 0.8 Nm (7.1 In-lbs)
	API Ring Groover	**API Ring Groover**	API with DCMT32 Inserts	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)
			API with VCMT22 Inserts	**PST-T7**	T7 Bit Size • Set at 0.8 Nm (7.1 In-lbs)
			API with VCMT33 Inserts	**PST-T15**	T15 Bit Size • Set at 3.5 Nm (30.9 In-lbs)

MSD45 (Face Mills)

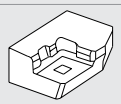
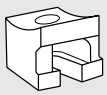
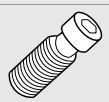
Part Number	Spare Parts				
	① Cartridge	② Clamp Screw	③ Clamp	④ Clamp Screw	Wrench
					
MSD 45...R	LSD-445R	HH4X16	C20R	TH8X15	TH-4

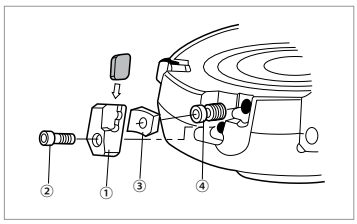


MSO45-09 (Face Mills)

Part Number	Spare Parts	
	Clamp Screw	Wrench
MSO 45...R-09	SB-3060TR	DT-10

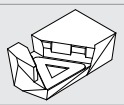
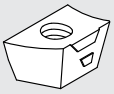
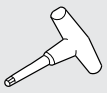
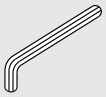
MSP15 (Face Mills)

Part Number	Spare Parts				
	① Cartridge	② Clamp Screw	③ Clamp	④ Clamp Screw	Wrench
					
MSD 15...R	LSP-415R	HH4X16	C25R	TH8X15	TH-4

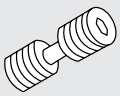


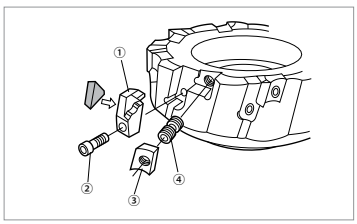
* Mounting bolt (HH12X35) is included with MSP1580R

MTE90-SF

Part Number	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 Screw)

MTE90 (Face Mills)

Part Number	Spare Parts				
	① Cartridge	② Clamp Screw	③ Clamp	④ Clamp Screw	Wrench
					
MTE 90...R	LTE-490R	HH4X16	C17R	W8X18	TH-4



MSO90-09 (Face Mills)

Part Number	Spare Parts	
	Clamp Screw	Wrench
MSO 90...R-09	SB-3060TR	DT-10

MEA / MEB

Part Number	Spare Parts	
	Clamp Screw	Wrench
MEA .. -S..(-...)	SB-2560TR	DT-8
MEB .. -S..	SB-4085TR	DT-15

MRP (Face Mills)

Part Number			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 Mills)

Part Number			Spare Parts				
			Clamp Screw	Wrench	Arbor Bolt		Wrench
					1 Front Piece	2 Front Piece	
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					

MHD (Face Mills and Integral Arbor Type)

Part Number	Spare Parts			
	Clamp Screw	Wrench	Arbor 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)

Part Number	Spare Parts						
	Clamp Screw		Wrench		Arbor Bolt		Wrench
	for Bottom Insert	for Middle Insert	for Bottom Insert	for Middle Insert	1 Front Piece	2 Front Piece	
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

Part Number	Spare Parts	
	Clamp Set	Wrench
MVG ...	CPS-6V	LW-3

Blank Tool

Part Number	Spare Parts
	Coolant Pipe
T63H- BL...-...	CL63-1

TECHNICAL

R

R1 - R29

Inch / Metric Conversion Chart

• Cutting Speed (Vc)

Cutting Speed (Vc)	
SFM	m/min
300	91
600	183
900	274

SFM = (0.262 x rpm) x dia.(inch)
3.28feet/min (SFM) = 1m/min

SFM (Surface Feet per Minute)

• D.O.C. (ap)

D.O.C. (ap)	
inch	mm
0.02	0.5
0.04	1.0
0.08	2.0

1inch = 25.4mm
0.04inch = 1mm

• IPR Feed Rate (f)

Feed Rate (f)	
ipr	m/min
0.002	0.05
0.004	0.1
0.008	0.2

1ipr = 25.4mm/rev
0.004ipr = 0.1mm/rev

ipr (Inch per Revolution)
mm/rev (mm per Revolution)

• IPT Feed Rate (fz)

Feed Rate (fz)	
ipt	mm/t
0.002	0.05
0.004	0.1
0.008	0.2

1ipt = 25.4mm/t
0.004ipt = 0.1mm/t

ipt (Inch per Tooth)
mm/t (mm per Tooth)

• Torque

lbft	Nm
0.738	1

lbft (Pound x Feet)
Nm (Newton x Meter)

SI Derived Units Conversion Chart

(Extracted from JIS Handbook "Iron & Steel")

• Force

N	kgf	dyn
1	$1.019\ 72X10^{-1}$	$1X10^{5}$
9.806 65	1	$9.806\ 65X10^{5}$
$1X10^{-5}$	$1.019\ 72X10^{-6}$	1

• Stress

Pa or N/m^2	MPa or N/mm^2	kgf/mm^2	kgf/cm^2	kgf/m^2
1	$1X10^{-6}$	$1.019\ 72X10^{-7}$	$1.019\ 72X10^{-5}$	$1.019\ 72X10^{-1}$
$1X10^{6}$	1	$1.019\ 72X10^{-1}$	$1.019\ 72X10$	$1.019\ 72X10^{5}$
$9.806\ 65X10^{6}$	9.806 65	1	$1X10^{-2}$	$1X10^{-6}$
$9.806\ 65X10^{4}$	$9.806\ 65X10^{-2}$	$1X10^{-2}$	1	$1X10^{-4}$
9.806 65	$9.806\ 65X10^{-6}$	$1X10^{-6}$	$1X10^{-4}$	1

• Pressure

Pa	kPa	MPa	bar	kgf/cm2
1	$1X10^{-3}$	$1X10^{-6}$	$1X10^{-5}$	$1.019\ 72X10^{-5}$
$1X10^{3}$	1	$1X10^{-3}$	$1X10^{-2}$	$1.019\ 72X10^{-2}$
$1X10^{6}$	$1X10^{3}$	1	1X10	1.019 72X10
$1X10^{5}$	$1X10^{2}$	$1X10^{-1}$	1	1.019 72
$9.806\ 65X10^{4}$	9.806 65X10	$9.806\ 65X10^{-2}$	$9.806\ 65X10^{-1}$	1

• Power

W	kW	kgf · m/s	PS	kcal/h
1	$1X10^{-3}$	$1.019\ 72X10^{-1}$	$1.359\ 62X10^{-3}$	$8.600\ 00X10^{-1}$
$1X10^{3}$	1	$1.019\ 72X10^{-2}$	1.359 62	$8.600\ 00X10^{2}$
9.806 65	$9.806\ 65X10^{-3}$	1	$1.333\ 33X10^{-2}$	8.433 71
$7.355X10^{2}$	$7.355X10^{-1}$	7.5X10	1	$6.325\ 29X10^{2}$
1.162 79	$1.162\ 79X10^{-3}$	$1.185\ 72X10^{-1}$	$1.580\ 95X10^{-3}$	1

• Revolution

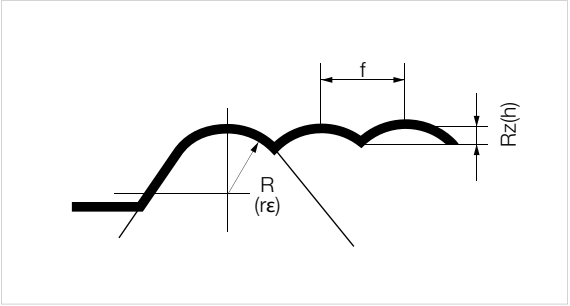
min^{-1}	s^{-1}	r.p.m.
1	0.0167	1
60	1	60

Theoretical (Geometrical) Surface Roughness

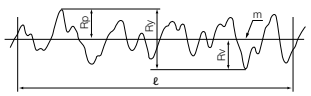
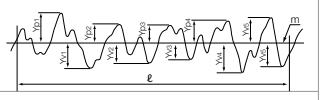
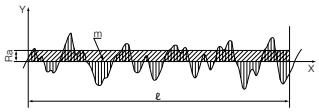
Theoretical Surface Roughness for Turning indicates the minimum roughness value from the cutting conditions and it is shown by the formula as follows:

$$Rz(h)= \frac{f^2}{8R(r\varepsilon)} x10^3$$

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	Ry 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	Rz 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 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 ". $Ra= \frac{1}{\ell} \int_0^{\ell} \{f(x)\} dx$	

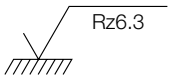
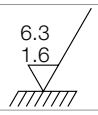
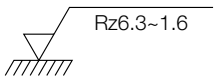
Relationship with Triangle Symbol

Arithmetical Mean Roughness Ra(μm)	Max. Height Roughness Rz(μm)	Ten Points Mean Roughness RzJIS(μm)	※(Relationship with Triangle)
0.025	0.1	0.1	▽▽▽▽
0.050	0.2	0.2	
0.100	0.4	0.4	
0.200	0.8	0.8	
0.400	1.6	1.6	▽▽▽
0.800	3.2	3.2	
1.600	6.3	6.3	
3.200	12.5	12.5	▽▽
6.300	25.0	25.0	
12.500	50.0	50.0	▽
25.000	100.0	100.0	

※ 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 Ry, (Rz) Indication	
① When indicating the upper limit only (when upper limit is 6.3 mRa)		① When indicating upper limit only Indicate surface roughness following the parameter symbol.	
② When indicating both lower and upper limit (when upper limit is 6.3 mRa, lower limit is 1.6 mRa)		② When indicating both lower and upper limit Indicate surface roughness as (upper limit ~ lower limit) following the parameter symbol.	

Note: The indications of Ra and Rz are different.

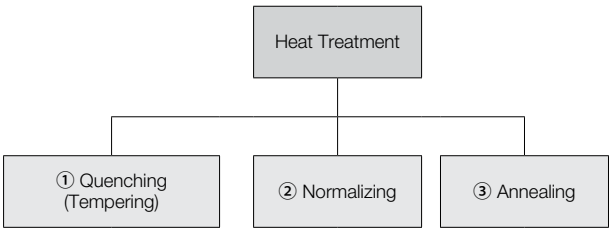
Caution-Symbols for Surface Roughness

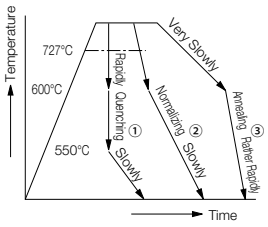
The above information is based on JIS B 0601-2001. However, some symbols were revised as shown in the right table in accordance with ISO Standard from JIS B 0601-2001 version. Ten Points Mean Roughness (Rz) was eliminated from 2001 version but it still remains as RzJIS reference, since it was popular 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

One of the ways to determine the hardness of steel is the heat treatment and it is classified to 3 types.



 Heat Treatment Method	① Quenching (Tempering)	After heating to over 727°C, cool rapidly down to 550°C 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)
	② Normalizing	After heating to over 727°C, cool down rapidly to 600°C 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.
	③ Annealing	After heating to over 727°C, cool down very slowly to 600°C, 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 Value

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: 3000kgf (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 1.60mm (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

Vickers Hardness (HV)	Brinell Hardness 10mm Dia. Ball Load: 3000kgf (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 1.60mm (1/16in) Ball (HRB)	C Scale Load: 150kgf Diamond Point (HRC)		
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/mm²

2) Value in ( ) is not in practical use, but reference only

Metal

Class	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
Steel for Machine Structural Use	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 – Special Steel	Free Cutting Carbon Steel	SUM
	High Carbon Chromium Bearing Steel	SUJ
	Spring Steel	SUP
Special Steel – 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
Special Steel – Heat Resistant Steel	Heat-Resisting Steel Bar	SUH-B, SUH-CB
	Heat-Resisting Steel Plate and Sheet	SUH-HP, SUH-CP
Special Steel – Super Alloy	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 Metal

Class	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 Alloy and Aluminum Alloy 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

Steel

CLASS	USA AISI / SAE	JAPAN JIS	CHINA GB	UK BS	GERMANY DIN	FRANCE NF	RUSSIA ГОСТ
CARBON STEEL FOR MACHINE STRUCTURAL USE	1010	S10C	08 10	040A10 045A10 045M10	C10E C10R	XC10	
	1012	S12C		040A12		XC12	
	1015	S15C	15	055M15	C15E C15R		
	1017	S17C				XC18	
	1020	S20C	20	070M20 C22 C22E C22R	C22 C22E C22R	C22 C22E C22R	
	1023	S22C					
	1025	S25C	25	C25 C25E C22R	C25 C25E C25R	C25 C25E C25R	
	1029	S28C					25Г
	1030	S30C	30	080A30 080M30 C30 C30E C30R	C30 C30E C30R	C30 C30E C30R	30Г
		S33C					30Г
	1035	S35C	35	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35Г
	1038	S38C					35Г
	1039 1040	S40C	40	080M40 C40 C40E C40R	C40 C40E C40R	C40 C40E C40R	40Г
	1042 1043	S43C		080A42			40Г
	1045 1046	S45C	45	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45Г
		S48C		080A47			45Г
	1049	S50C	50	080M50 C50 C50E C50R	C50 C50E C50R	C50 C50E C50R	50Г
	1050 1053	S53C					50Г
	1055	S55C	55	070M55 C55 C55E C55R	C55 C55E C55R	C55 C55E C55R	
	1059 1060	S58C	60	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60Г
		S09CK		045A10 045M10	C10E	XC10	
		S15CK	15F		C15E	XC12	
		S20CK				XC18	

Steel

CLASS	USA AISI / SAE	JAPAN JIS	CHINA GB	UK BS	GERMANY DIN	FRANCE NF	RUSSIA ГОСТ
NICKEL CHROMIUM STEEL		SNC236			36NiCr6		40XH
		SNC415	12CrNi2		14NiCr10		
		SNC631	30CrNi3		36NiCr10		30XH3A
		SNC815	12Cr2Ni4	655M13	15NiCr13		
		SNC836	37CrNi3		31NiCr14		
NICKEL CHROMIUM MOLYBDENUM STEEL	8615 8617 8620 8622	SNCM220	20CrNiMo	805A20 805M20 805A22 805M22	20NiCrMo2 20NiCrMoS2	20NCD 2	
	8637 8640	SNCM240			40NiCrMo2-2		
		SNCM415					
	4320	SNCM420	18CrNiMnMoA		17NiCrMo6-4		20XH2M (20XHM)
		SNCM431			30CrNiMo8		
	4340	SNCM439	40CrNiMoA		40NiCrMo6		
		SNCM447			34CrNiMo6		
		SNCM616					
		SNCM625					
		SNCM630					
		SNCM815					
CHROMIUM STEEL		SCr415	15Cr 15CrA		17Cr3 17CrS3		15X 15XA
	5120	SCr420	20Cr				20X
	5130 5132	SCr430	30Cr	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30X
	5132	SCr435	35Cr	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X
	5140	SCr440	40Cr	530M40 41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X
		SCr445	45Cr 50Cr				45X
CHROMIUM MOLYBDENUM STEEL		SCM415	15CrMo		15CrMo4		
		SCM418	20CrMo		18CrMo4 18CrMoS4		20XM
		SCM420		708M20	20CrMo5		20XM
		SCM421					
	4131	SCM430	30CrMo 30CrMoA				30XM 30XMA
		SCM432					
	4137	SCM435	35CrMo	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	35XM
	4140 4142	SCM440	42CrMo	708M40 709M40 42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	
	4145 4147	SCM445					
		SCM822					

Steel

CLASS	USA AISI / SAE	JAPAN JIS	CHINA GB	UK BS	GERMANY DIN	FRANCE NF	RUSSIA ГОСТ
MANGANESE CHROMIUM STEEL MANGANESE STEEL	1522	SMn420	20Mn2	150M19	20Mn5		
	1534	SMn433	30Mn2 35Mn2	150M36	34Mn5		30Г2 35Г2
	1541	SMn438	40Mn2	150M36	36Mn5		35Г2 40Г2
	1541	SMn443	45Mn2				40Г2 45Г2
	5115	SMnC420	15CrMn		16MnCr5		
	5140	SMnC443	40CrMn				
STRUCTURAL STEEL WITH SPECIFIED HARDENABILITY BAND (H-SHAPE STEEL)	1522H	SMn420H					
		SMn433H					
	1541H	SMn438H					
	1541H	SMn443H					
		SMnC420H					
		SMnC443H					
		SCr415H	15CrH		17Cr3 17CrS3		15X
	5120H	SCr420H	20Cr1H		17Cr3		20X
	5130H 5132H	SCr430H		34Cr4 34CrS4	34Cr4 34CrS3	34Cr4 34CrS4	30X
	5135H	SCr435H		37Cr4 37CrS4	37Cr4 34CrS4	37Cr4 37CrS4	35X
	5140H	SCr440H	40CrH	41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X
	4118H	SCN415H	15CrMoH		15CrMo5		
		SCM418H			18CrMo4 18CrMoS4		
	4118H	SCM420H	20CrMoH	708H20	18CrMo4		
	4135H 4137H	SCM435H		34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	
	4140H 4142H	SCM440H		42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	
	4145H 4147H	SCM445H					
		SCM822H					
		SNC415H					
		SNC631H					
		SNC815H	12Cr2Ni4H	655H13	15NiCr13		
	8617H 8620H 8622H	SNCM220H	20CrNiMoH	805H17 805H20 805H22	21NiCrMo2	20N CD 2	
	4320H	SNCM420H	20CrNi2MoH		20NiCrMoS6-4		

Steel

CLASS	USA		JAPAN	CHINA	UK	GERMANY	FRANCE	RUSSIA
	UNS	AISI	JIS	GB	BS	DIN	NF	ГОСТ
STAINLESS STEEL	S20100	201	SUS 201	1Cr17Mn6Ni5N			Z12CMN17-07Az	
	S20200	202	SUS 202	1Cr18Mn8Ni5N	284S16			12Х17Г9АН4
	S30100	301	SUS 301	1Cr18Mn10Ni5Mo3N 1Cr17Ni7	301S21	X12CrNi17 7	Z11CN17-08	07Х16Н6
			SUS 301L			X2CrNiN18-7		
			SUS 301J1			X12CrNi17 7		
	S30200	302	SUS 302	1Cr18Ni9	302S25		Z12CN18-09	12Х18Н9
	S30215	302B	SUS 302B					
	S30300	303	SUS 303	Y1Cr18Ni9	303S21	X10CrNiS18 9	Z8CNF18-09	
	S30323	303Se	SUS 303Se	Y1Cr18Ni9Se	303S41			12Х18Н10Е
	S30400	304	SUS 304	0Cr18Ni9	304S31	X5CrNi18 10	Z7CN18-09	08Х18Н10
	S30403	304L	SUS 304L	00Cr18Ni10	304S11	X2CrNi19 11	Z3CN19-11	03Х18Н11
	S30451	304N	SUS 304N1	0Cr18Ni9N			Z6CN19-09Az	
	S30452		SUS 304N2	0Cr19Ni10NbN				
	S30453	304LN	SUS 304LN	00Cr18Ni10N		X2CrNiN18 10	Z3CN18-10Az	
			SUS 304J1					
			SUS 304J2					
	S30431	S30431	SUS 304J3					
	S30500	305	SUS 305	1Cr18Ni12	305S19	X5CrNi18 12	Z8CN18-12	06Х18Н11
			SUS 305J1					
	S30908	309S	SUS 309S	0Cr23Ni13			Z10CN24-13	
	S31008	310S	SUS 310S	0Cr25Ni20	310S31		Z8CN25-20	10Х23Н18
	S31600	316	SUS 316	0Cr17Ni12Mo2	316S31	X5CrNiMo17 12 2	Z7CND17-12-02	
						X5CrNiMo17 13 3	Z6CND18-12-03	
	S31603	316L	SUS 316L	00Cr17Ni14Mo2	316S11	X2CrNiMo17 13 2	Z3CND17-12-02	
						X2CrNiMo17 14 3	Z3CND17-13-03	03Х17Н14М3
	S31651	316N	SUS 316N	0Cr17Ni12Mo2N				
	S31653	316LN	SUS 316LN	00Cr17Ni13Mo2N		X2CrNiMoN17 12 2	Z3CND17-11Az	
						X2CrNiMoN17 13 3	Z3CND17-12Az	
	S31635		SUS 316Ti			X6CrNiMoTi17 12 2	Z6CNDT17-12	08Х17Н13М2Т
			SUS 316J1	0Cr18Ni12Mo2Cu2				
			SUS 316J1L	00Cr18Ni14Mo2Cu2				
	S31700	317	SUS 317	0Cr19Ni13Mo3	317S16			
	S31703	317L	SUS 317L	00Cr19Ni13Mo3	317S12	X2CrNiMo18 16 4	Z3CND19-15-04	
	S31753		SUS 317LN				Z3CND19-14Az	
			SUS 317J1	0Cr18Ni16Mo5				
			SUS 317J2					
			SUS 317J3L					
	N08367		SUS 836L					
	N08904	N08904	SUS 890L		904S14		Z2NCDU25-20	
	S32100	321	SUS 321	1Cr18Ni9Ti 0Cr18Ni10Ti	321S31	X6CrNiTi18 10	Z6CNT18-10	08Х18Н10Т
	S34700	347	SUS 347	0Cr18Ni11Nb	347S31	X6CrNiNb18 10	Z6CNNb18-10	08Х18Н12Б
	S38400	384	SUS 384				Z6CN18-16	
	S30430	304Cu	SUS XM7	0Cr18Ni9Cu3	394S17		Z2CNU18-10	
	S38100		SUS XM15J1	0Cr18Ni13Si4			Z15CNS20-12	
	S32900	329	SUS 329J1	0Cr26Ni5Mo2				
	S39240	S31803	SUS 329J3L				Z3CNDU22-05Az	08Х21Н6М2Т
	S39275	S31260	SUS 329J4L				Z3CNDU25-07Az	

Steel

CLASS	USA		JAPAN	CHINA	UK	GERMANY	FRANCE	RUSSIA
	UNS	AISI	JIS	GB	BS	DIN	NF	ГОСТ
STAINLESS STEEL	S40500	405	SUS 405	0Cr13Al 0Cr13	405S17	X6CrAl13	Z8CA12	
			SUS 410L	00Cr12			Z3C14	
	S42900	429	SUS 429					
	S43000	430	SUS 430	1Cr17	430S17	X6Cr17	Z8C17	12X17
	S43020	430F	SUS 430F	Y1Cr17		X7CrMoS18	Z8CF17	
	S43035		SUS 430LX			X6CrTi17	Z4CT17	
			SUS 430J1L			X6CrNb17	Z4CNb17	
	S43400	434	SUS 434	1Cr17Mo	434S17	X6CrMo17 1	Z8CD17-01	
	S43600	436	SUS 436L					
			SUS 436J1L					
	S44400	444	SUS 444				Z3CDT18-02	
	S44700		SUS 447J1	00Cr30Mo2				
	S44627		SUS XM27	00Cr27Mo			Z1CD26-01	
	S40300	403	SUS 403	1Cr12				
	S41000	410	SUS 410	1Cr13	410S21	X10Cr13	Z13C13	
	S41008	410S	SUS 410S		403S17	X6Cr13	Z8C12	08X13
			SUS 410F2					
	S41025		SUS 410J1	1Cr13Mo 1Cr12Mo		X12CrS13		
	S41600	416	SUS 416	Y1Cr13	416S21		Z11CF13	
	S42000	420	SUS 420J1	2Cr13	420S29	X20Cr13	Z20C13	20X13
	S42000	420	SUS 420J2	3Cr13	420S37	X30Cr13	Z33C13	30X13
	S42020	420F	SUS 420F	Y3Cr13			Z30CF13	
			SUS 420F2					
			SUS 429J1					
	S43100	431	SUS 431	1Cr17Ni2	431S29	X20CrNi17 2	Z15CN16-02	20X17H2
	S44002	440A	SUS 440A	7Cr17			Z70C15	
	S44003	440B	SUS 440B	8Cr17				
	S44004	440C	SUS 440C	9Cr18 11Cr17 9Cr18Mo			Z100CD17	95X18
	S44020	S44020	SUS 440F	Y11Cr17				
	S17400	S17400	SUS 630	0Cr17Ni4CuNb		X5CrNiCuNb16-4	Z6CNU17-04	
	S17700	S17700	SUS 631	0Cr17Ni7Al		X7CrNiAl17 7	Z9CNA17-07	09X17H7 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 Hardened Related)

JIS
SUS630
SUS631

Steel

CLASS	USA		JAPAN	CHINA	UK	GERMANY	FRANCE	RUSSIA
	UNS	AISI	JIS	GB	BS	DIN	NF	ГОСТ
HEAT RESISTING STEEL			SUH 31		331S42		Z35CNWS14-14	45Х14Н14В2М
			SUH 35		349S52		Z52CMN21-09Az	
	S63008		SUH 36	5Cr21Mn9Ni4N	349S54	X53CrMnNi21-9	Z55CMN21-09Az	55Х20 Г 9АН4
	S63017		SUH 37	2Cr21Ni12N	381S34			
			SUH 38					
	S30900	309	SUH 309	2Cr23Ni13	309S24		Z15CN24-13	
	S31000	310	SUH 310	2Cr25Ni20	310S24	CrNi2520	Z15CN25-20	20Х25Н20С2
	N08330	N08330	SUH 330	1Cr16Ni35			Z12NCS35-16	
	S66286		SUH 660	0Cr15Ni25Ti2MoAlVB			Z6NCTV25-20	
	R30155		SUH 661					
			SUH 21			CrAl1205		
	S40900	409	SUH 409		409S19	X6CrTi12	Z6CT12	
			SUH 409L				Z3CT12	
	S44600	446	SUH 446	2Cr25N			Z12C25	15Х28
	S65007		SUH 1	4Cr9Si2	401S45	X45CrSi9-3	Z45CS9	
			SUH 3	4Cr10Si2Mo			Z40CSD10	40Х10С2М
			SUH 4	8Cr20Si2Ni	443S65		Z80CSN20-02	
			SUH 11					40Х 9С2
			SUH 600	2Cr12MoVNbN				20Х12ВНМБФР
	S42200		SUH 616	2Cr12NiMoWV				

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

CLASS	USA AISI / SAE	JAPAN JIS	CHINA GB	UK BS	GERMANY DIN	FRANCE NF	RUSSIA ГОСТ
CARBON TOOL STEEL		SK140 (SK1)	T13			C140E3U	Y13
	W1-11½	SK120 (SK2)	T12			C120E3U	Y12
	W1-10	SK105 (SK3)	T11		C105W1	C105E2U	Y11
	W1-9	SK95 (SK4)	T10			C90E2U	Y10
	W1-8	SK85 (SK5)	T8Mn T9		C80W1	C90E2U C80E2U	Y8Г Y9
		SK75 (SK6)	T8		C80W1	C80E2U C70E2U	Y8
		SK65 (SK7)	T7		C70W2	C70E2U	Y7
HIGH SPEED TOOL STEEL	T1	SKH2	W18Cr4V	BT1		HS18-0-1	P18
	T4	SKH3	W18Cr4VCo5	BT4	S18-1-2-5	HS18-1-1-5	P18K5Ф2
	T5	SKH4	W18Cr4V2Co8	BT5		HS18-0-2-9	P18K5Ф
	T15	SKH10	W12Cr4V5Co5	BT15	S12-1-4-5	HS12-1-5-5	
	M2	SKH51	W6Mo5Cr4V2	BM2	S6-5-2	HS6-5-2	P6M5
	M3-1	SKH52	CW6Mo5Cr4V2 W6Mo5Cr4V3				P6M5Ф3
	M3-2	SKH53	CW6Mo5Cr4V3		S6-5-3	HS6-5-3	P6M5Ф3
	M4	SKH54		BM4		HS6-5-4	
	M35 M41	SKH55	W6Mo5Cr4V2Co5 W7Mo5Cr4V2Co5	BM35	S6-5-2-5	HS6-5-2-5HC	P6M5K5
	M36	SKH56					
		SKH57		BT42	S10-4-3-10	HS10-4-3-10	
	M7	SKH58	W2Mo9Cr4V2			HS2-9-2	
	M42	SKH59	W2Mo9Cr4VCo8	BM42	S2-10-1-8	HS2-9-1-8	
ALLOY TOOL STEEL	F2	SKS11					XB4
		SKS2			105WCr6	105WCr5	XBГ
		SKS21	W				
		SKS5					
	L6	SKS51					
		SKS7					
		SKS8	Cr06			C140E3UCr4	13X
	S1	SKS4	5CrW2Si 6CrW2Si				6XB2C 5XB2CФ
	S1	SKS41	4CrW2Si				4XB2C
	W2-9½	SKS43		BW2		100V2	
	W2-8	SKS44					
		SKS3	9CrWMn				9XBГ
		SKS31	CrWMn		105WCr6	105WCr5	XBГ
		SKS93					
		SKS94					
		SKS95	8MnSi				
	D3	SKD1	Cr12	BD3	X210Cr12	X200Cr12	X12
	D2	SKD10	Cr12Mo1V1		X153CrMoV12		X12MФ
	D2	SKD11	Cr12MoV	BD2	X153CrMoV12	X160CrMoV12	
	A2	SKD12	Cr5Mo1V	BA2		X100CrMoV5	
		SKD4				X32WCrV3	
	H21	SKD5	3Cr2W8V	BH21	X30WCrV9-3	X30WCrV9	
	H11	SKD6	4Cr5MoSiV	BH11	X38CrMoV51	X38CrMoV5	4X5MФC
	H13	SKD61	4Cr5MoSiV1	BH13	X40CrMoV51	X40CrMoV5	4X5MФ1C
	H12	SKD62		BH12		X35CrWMoV5	3X3M3Ф
	H10	SKD7	4Cr3Mo3SiV	BH10	X32CrMoV33	32CrMoV12-18	
	H19	SKD8		BH19			
		SKT3				55CrNiMoV4	
		SKT4	5CrNiMo	BH224 / 5	55NiCrMoV6	55NiCrMoV7	5XHM

Steel

CLASS	USA **AISI / SAE**	JAPAN **JIS**	CHINA **GB**	UK **BS**	GERMANY **DIN**	FRANCE **NF**	RUSSIA **ГОСТ**
SPRING STEEL	1075 1078	SUP3					75 80 85
		SUP6	55Si2Mn		56SiCr7	60Si7	60С2
	9260	SUP7	60Si2Mn 60Si2MnA		61SiCr7	60Si7	60С2Г
	5155	SUP9	55CrMnA		55Cr3	55Cr3	
	5160	SUP9A	60CrMnA		55Cr3	60Cr3	
	6150	SUP10	50CrVA	735A51, 735H51	50CrV4	51CrV4	ХФА50ХГФА
	51B60	SUP11A	60CrMnBA		51CrV4		50ХГР
	9254	SUP12		685A57, 685H57	54SiCr6	54SiCr6	
	4161	SUP13	60CrMnMoA	705A60, 705H60	60CrMn3-2	60CrMo4	
FREE CUTTING CARBON STEEL	1110	SUM11					
	1108	SUM12	Y12				
	1212	SUM21					
	1213	SUM22	Y15	(230M07)	9SMn28	S250	
	12L13	SUM22L	Y12Pb		9SMnPb28	S250Pb	
	1215	SUM23					
		SUM23L					
	12L14	SUM24L	Y15Pb		9SMnPb28	S250Pb	
		SUM25			9SMn36	S300	
	1117	SUM31			15S10		
		SUM31L					
		SUM32	Y20	210M15, 210A15		(13MF4)	
	1137	SUM41	Y30 Y35			(35MF6)	
	1141	SUM42	Y40Mn			(45MF6.1)	
	1144	SUM43		(226M44)		(45MF6.3)	
CARBON CHROMIUM BEARING STEEL	51100	SUJ1	GCr4				
	52100	SUJ2	GCr5		100Cr6	100Cr6	ШХ15
	ASTM A 485 Grade 1	SUJ3	GCr15SiMn				
		SUJ4	GCr15SiMo				
		SUJ5	GCr18Mo				

Cast Iron

CLASS	USA AISI / SAE	JAPAN JIS	CHINA GB	UK BS	GERMANY DIN	FRANCE NF	RUSSIA ГОСТ
GRAY CAST IRON	NO.20	FC100	HT100	100			СУ10
	NO.30	FC150	HT150	150	GG15	FGL150	СУ15
	NO.35	FC200	HT200	200	GG20	FGL200	СУ20
	NO.45	FC250	HT250	250	GG25	FGL250	СУ25
	NO.50	FC300	HT300	300	GG30	FGL300	СУ30
	NO.60	FC350	HT350	350	GG35	FGL350	СУ35
					GG40	FGL400	СУ40
NODULAR CAST IRON	60-40-18	FCD400	QT400-18	400/17	GGG40	FGS370-17	ВУ40
	65-45-12	FCD450	QT450-10	420/12		FGS400-12	ВУ45
	70-50-05	FCD500	QT500-7	500/7	GGG50	FGS500-7	ВУ50
	80-60-03	FCD600	QT600-3	600/7	GGG60	FGS600-2	ВУ60
	100-70-03	FCD700	QT700-2	700/2	GGG70	FGS700-2	ВУ70
	120-90-02	FCD800	QT800-2	800/2	GGG80	FGS800-2	ВУ80
			QT900-2	900/2			ВУ100

Non-Ferrous Metal

CLASS	USA AISI / SAE	JAPAN JIS	CHINA GB	UK BS	GERMANY DIN	FRANCE NF	RUSSIA ГОСТ
ALUMINUM ALLOY	1199		1A99		A199.99R		А99
			1A97		A199.98R		А97
			1A95				А95
		A1080	1A80	1080(1A)	A199.90	1080A	А8
	1050	A1050	1A50	1050(1B)	A199.50	1050A	А5
	5052	A5052	5A02	NS4	AlMg2.5	5052	Амг
			5A03	NS5			АМг3
	5056	A5056	5A05	NB6	AlMg5		АМг5В
	5456	A5556	5A30	NG61		5957	
	2036	A2117	2A01		AlCu2.5Mg0.5	2117	Д18
		A2017	2A11	HF15	AlCuMg1	2017S	Д1
	2124	A2024	2A12		AlCuMg2	2024	Д16АВТВ
	2319		2B16				
		A2N01	2A80				АК4
	2218	A2018	2A90				АК2
	2014	A2014	2A14		AlCuSiMn	2014	АК8
	6061	A6061		6061		6061	
	7175	A7075	7A09		AlZnMgCu1.5	7075	В95Р
ALUMINUM ALLOY CASTING	356.2	AC4C	ZAlSi7Mn	LM25	G-AlSi7Mg		
	413.2	AC3A	ZAlSi12	LM6	G-Al12	A-S12-Y4	АЛ2
	355.2		ZAlSi5Cu1Mg				АЛ5
	413.0	AC8A	ZAlSi2Cu2Mg1		G-Al12(Cu)		
			ZAlCu5Mn				АЛ19
	201.0		ZAlCu5MnCdVA				
	520.2		ZAlMg10	LM10	G-AlMg10	AG11	АЛ8
			ZAlMg5Si		G-AlMg5Si		АЛ13

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	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	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	ACM100 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	AMC300 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 (Heat-resistant Alloy)	S10	CA6535 PR1535 PR1210	IC8015 IC5015	PCS08M PTH13S JS1025	MP9120 VP15TF	-	GC1030 GC1025	MS2050	ACM100 ACM200 ACM300	-	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)

• This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	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	-	-	-	-	-	-	-

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	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	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	CA310 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	CA310 CA315 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	CA315 CA320	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	-

R TECHNICAL

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	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	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 Materials)	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

Cermet (Turning)

• This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	Symbol											
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 **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		Kyocera	Dijet	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	Symbol											
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	-	-

Ceramic

• This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	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** Whisker 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	KS20 FX105 CX710	KYK35 **KY3400** KY3500	-
S (Difficult-to-cut Material)	S01	-	-	-	-	-	CC650	-	-	-	KY2100	-
	S10	CF1 KS6030 KS6040	CA200	Whisker WIN	-	WA1 WA5 SX9	CC670 CC6060 CC6065	-	WX120	TH10	**KYS25** KY4300 KY1525 KY1540	-
	S20	-	-	-	-	-	-	-	WX120	KS20	KYS30	-
H (Hardened Material)	H01	A65 KT66 **A66N** **PT600M**	-	NPC-A2	-	HC4 HC7 **ZC7**	CC650 CC670 CC6050	-	**NB100C**	LX11 LX21	**KY4400**	-
	H10	A65 KT66 **A66N** **PT600M**	-	NPC-A2 Whisker WIN	-	**ZC7** WA1 WA5	CC670	-	-	TH10	KY4300	-

• Boldface grade shows Coated Ceramic.

CBN

Classification		Kyocera	Dijet	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	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 (Hardened Material)	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** **CNB400C** CBN500	BNX25 BN350 **BNC300**	BX380 **BXC50** **BXM20**	KB1340 **KB5625** **KB9640**	IB55 **IB25HA**
Stainless Steel	-	KBN65B KBN570 **KBN65M** **KBN70M**	JBN795 JBN500	-	MB4020	-	-	CBN200	BN350 BN7000 BN7500	BX450 BX470 BX480	-	-

• Boldface grade shows PVD Coated CBN.

PCD (Diamond)

Classification		Kyocera	Dijet	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Class	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

Negative Inserts

- This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Cutting Range		Kyocera		Dijet	Hitachi	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 One Side 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	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	K 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	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
		General Chipbreaker	Chipbreaker for Sticky Material / Soft Steel										
Carbon Steel / Alloy Steel	Minute D.O.C.	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	No 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 Small Parts Machining)

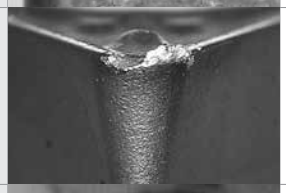
Cutting Range		Kyocera	Dijet	Hitachi	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Carbon Steel / Alloy Steel	Minute D.O.C.	CF	-	-	-	-	-	-	-	01	-	-
	Finishing	CK GF	ASF	JQ	FP FV SMG	AZ7 AMX ZR	PF XF	FF1	SI FC	PF	11 UF FP	PF SM
	Finishing - Medium	GQ SK	ACB FT	JE	LP AM MV	AM3 YL	PM XM	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	-	MF	-	LU	PF PSF	FW FP MW	WF
Non-ferrous Metals	Finishing - Medium	AH	ALU	-	AZ	-	AL	AL	AG AW	AL	HP	AF AS

■ Cera-Notch Conversion Chart

Insert Style	Kyocera	Horizon	Tool-Flo	Kennametal	RTW	Valenite	Sandvik	Mitsubishi
Notch Style Grooving Insert								
Face Grooving	KCFP	HF	FLF	NF	-	-	TLF*	EF
ID/OD Grooving	KCG/KCGP	HG	FLG	NG	PG	VLG	TLG*	EG
ID/OD with Chipbreaker	KCGP MY	HG RK-LK	FLG CB	NG RK-LK	PG RK-LK	-	-	EG RK-LK
ID/OD with Positive Rake	KCGP	HGP	FLGP	NGP	-	VLGP	TLGP*	EGP
ID/OD Deep Grooving	KCGDP	HGD	FLGD	NGD	PGD	-	-	EGD
Full Nose Radius	KCRP	HR	FLR	NR	PR	VLR	TLR*	EGR
Full Nose Radius with Postive Rake	KCRP	HRP	FLRP	NRP	PRP	VLRP	TLRP*	-
Notch Style Threading Insert								
60° V Partial Profile	KCT	HT	FLT	NT	PT	VLT	TLT*	ET
60° V Fine Pitch Positive	KCTK	HTK	FLTK	NTK	PTK	VLTK	TLTK*	-
60° V Postive	KCTP	HTP	FLTP	NTP	PTP	VLTP	TLTP*	-

* Sandvik inserts require a Kyocera or industrial standard clamp due to different clamping system.

Cutting Edges Figuration and Countermeasures

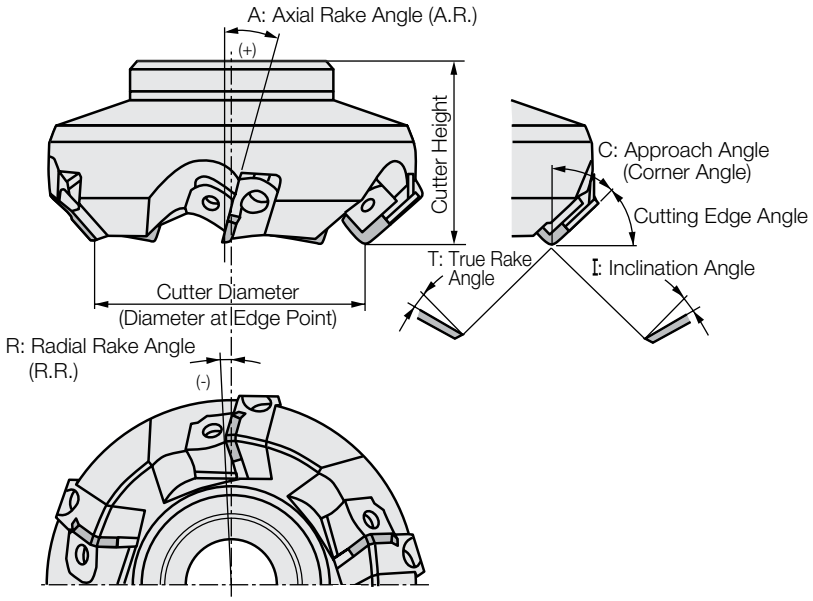
Typical Cutting Edge Figuration		Observation	Causes	Countermeasures
Nose Wear		• Deterioration of surface roughness and dimensional accuracy	• Too high Vc • End of tool life	• Reduce Vc • Change to higher wear resistant grade
Notching		• Burr formation • Cutting force increase	• Too high f and Vc	• Sharper 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 Al2O3 coated insert
Plastic Deformation		• Workpiece dimension's change • Crack at nose	• Too high cutting load • Inappropriate tool grade	• Change to harder grade • Reduce f and ap
Crack from Wear		• Surface finish's sudden deterioration • Workpiece dimension changes	• Too high Vc	• Reduce the pre-set tool life • 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(r) • Change to more rigid toolholder
Fracture from Thermal Crack		• Cracking by heat cycle • Possible in interrupted cutting and milling	• Too high Vc and f	• Reduce f • Reduce Vc • Change to dry cutting
Flaking		• Possible in high-hardness material cutting • Possible in machining with chattering	• Lack of insert toughness • Lack of toolholder's rigidity	• Change to harder grade (TiC-base ceramic to CBN.) • Change to more rigid toolholder • Change edge preparation

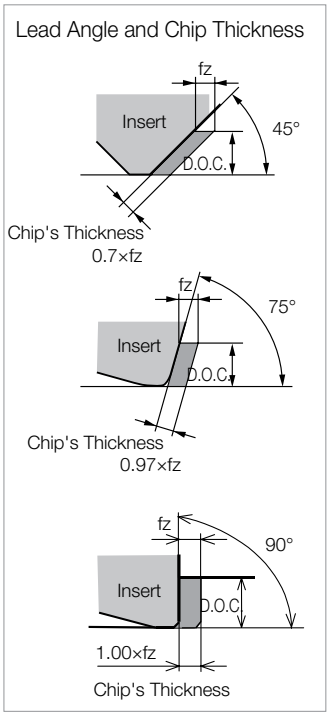
Milling

Problem	Problem Item	Countermeasures	Insert Grade: Change to Harder Grade	Insert Grade: Change to Tougher Grade	Insert Grade: Change to More Thermal Shock Resistant Grade	Insert Grade: Change to More Welding Resistant Grade	Cutting Conditions: Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: fz (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: D.O.C. (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: Tool Path Review	Cutting Conditions: Coolant: Usage of Mist	Cutting Conditions: Coolant: Dry	Tool Geometry: Insert with Chipbreaker	Tool Geometry: Relief Angle (Larger ↑ Smaller ↓)	Tool Geometry: Corner Angle (Larger ↑ Smaller ↓)	Tool Geometry: Approach Angle (Larger ↑ Smaller ↓)	Tool Geometry: Edge Strength / Honing (Larger ↑ Smaller ↓)	Tool Geometry: Number of Inserts (Larger ↑ Smaller ↓)	Tool Geometry: Chip Pocket (Larger ↑ Smaller ↓)	Tool Geometry: Wiper Edge (Relief Angle) Review (Larger ↑ Smaller ↓)	Tool Geometry: Insert Runout Check (Larger ↑ Smaller ↓)	Tool Geometry: Cutter Rigidity (Larger ↑ Smaller ↓)	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.

Terms and Angles of Milling Cutters





Function of Tool Angles

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

True Rake Calculation Formula : $\tan T = \tan R \times \cos C + \tan A \times \sin C$

Cutting Edge Inclination Angle Formula : $\tan I = \tan A \times \cos C - \tan R \times \sin C$

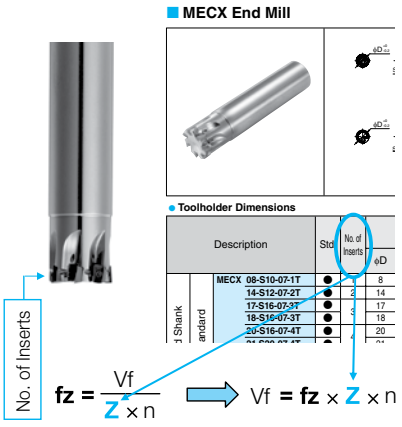
Number of Inserts (Z)

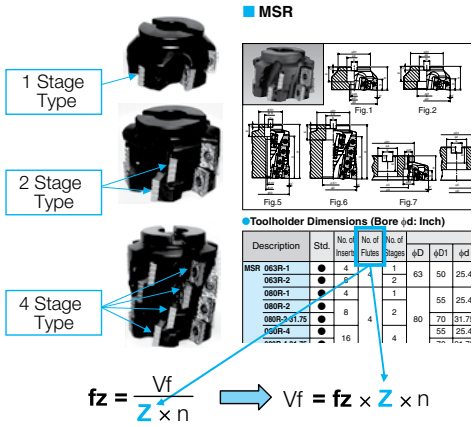
1) If there is one stage

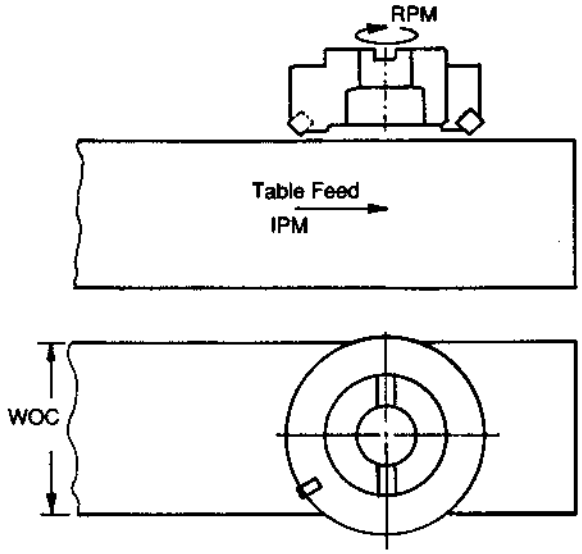
If the number of stage is one, it is not indicated on the catalog. Please use "No. of inserts" of the catalogue for "Z" of the formula to calculate cutting conditions.

2) If the number of stages is more than two

If the number of stages is more than two, it is indicated on the catalog. Please use "No. of Flutes" of the catalogue for "Z" of the formula to calculate cutting conditions.







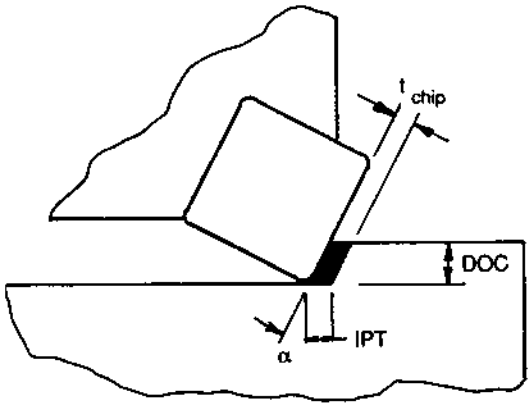


Table Feed with f_1 Compensation (inches/minute)
= IPT × N × RPM × f_1

Surface Speed per Minute

SFM = 0.262 × DIA × RPM

Revolutions per Minute

$$RPM = \frac{3.820 \times SFM}{DIA}$$

Feedrate (inches/minute)

IPM = IPT × N × RPM

Feedrate (inches/tooth)

$$\text{Programmed IPT} = \frac{t_{chip\ Max}}{\cos \alpha}$$

Radial Chip Thinning for 90° Cutters

$$f_1 = \frac{1/2 \left(\frac{Dia}{Ae}\right)}{\sqrt{\left(\frac{Dia}{Ae}\right)^{-1}}}$$

Metal Removal Rate

Q = WOC DOC × IPM (in/min)

Horsepower Required at the Spindle

HPS = Q × UHP

Horsepower Required at the Motor

HPM =

Time in Cut (Seconds)

$$T = \frac{15.7 \times DIA \times LOC}{SFM \times IPR \times N}$$

or

$$T = \frac{60 \times LOC}{IPM}$$

Definition of Terms

DIA = Diameter of the Workpiece (Inches)

D.O.C. = Axial Depth of Cut (Inches)

EFF = Machine Efficiency

f = Feedrate (See IPM, IPR, and IPT)

HPM = Horsepower Required at the Motor (HP)

HPS = Horsepower Required at the Spindle (HP)

IPM = Feedrate (Inches per Minute)

IPR = Feedrate (Inches per Revolution)

IPT = Feedrate (Inches per Tooth)

f_1 = Cutter Compensation Factor

WOC = Width of Cut (Inches)

LOC = Length of Cut (Inches)

N = Number of Effective Teeth in Cutter

Q = Metal Removal Rate (Cubic Inches per Minute)

RPM = Revolutions per Minute

SFM = Surface Speed (Feet per Minute)

T = Time (in Seconds)

$t_{chip\ Max}$ = Maximum Recommended Chip Thickness (Inches)

UHP = Unit Horsepower Factor

α = Lead Angle

Milling

Cutting Speed

$$Vc = \frac{\pi \times Dc \times n}{1{,}000}$$

Vc : Cutting Speed [m/min]
Dc : Cutter Diameter [mm]
n : Spindle Revolution [min^{-1}]

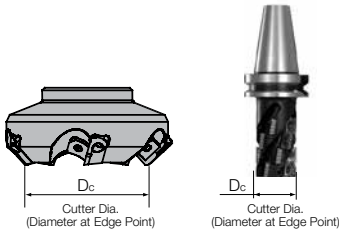
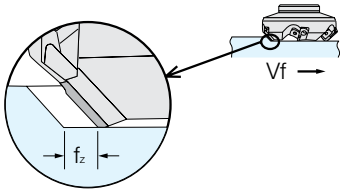


Table Feed & Feed per Tooth

$$Vc = \frac{Vf}{Z \times n}$$

fz : Feed per Tooth [mm/t]
Vf : Table Feed [mm/min]
Z : Number of Inserts
n : Spindle Revolution [min^{-1}]



Power Requirement

$$Pc = \frac{Ks \times Q}{6{,}120 \times \eta} = \frac{Ks \times ae \times Vf \times ap}{6{,}120{,}000 \times \eta}$$

$$= \frac{Ks \times ae \times fz \times Z \times N \times ap}{6{,}120{,}000 \times \eta}$$

Pc : Power Requirement [kW]
Vf : Power Requirement (Horse Power) [HP]
ae : Width of Cut [mm]
Vf : Table Feed [mm/min]
fz : Feed per Tooth [mm/t]
Z : Number 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	
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

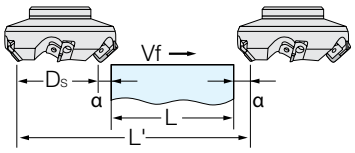
$$Q = \frac{ae \times Vf \times ap}{1{,}000} = \frac{ae \times fz \times Z \times n \times ap}{1{,}000}$$

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 : Number of Inserts
n : Spindle Revolution [min^{-1}]
ap : Depth of Cut [mm]

Cutting Time

$$T = \frac{60 \times L'}{Vf} = \frac{60 \times L'}{fz \times Z \times n}$$

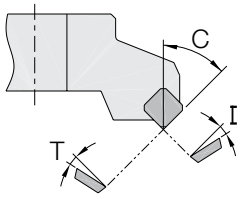
T : Cutting Time [seconds]
L' : Total Table Transfer Length [mm]
(= L + Ds + 2α)
L : Workpiece Length [mm]
Ds : Cutter Diameter [mm]
α : Idling Distance [mm]
Vf : Table Feed [mm/min]
fz : Feed per Tooth [mm/t]
Z : Number of Inserts
n : Spindle Revolution [min^{-1}]



Milling

True Rake Angle

$$\tan T = \tan R \times \cos C + \tan A \times \sin C$$



True Rake 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°)

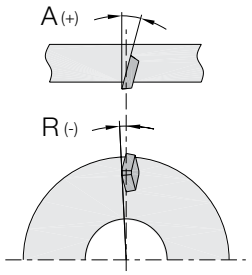
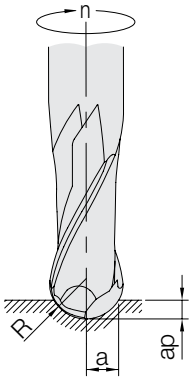


Table Feed & Feed per Tooth

$$n = \frac{1{,}000 \times Va}{2 \times \pi \times \sqrt{a(2R-ap)}}$$

n : Revolution [min^{-1}]
R : Radius of Ball-Nose End Mill (Ball Part's Radius [mm])



INDEX

T2 - T10

Listed in Alphanumeric Order

Part Numbers in Alphanumeric Order

○ : NUMBER □ : LETTER

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Numeric			
556C□		**P8**	Spare Parts (Shim)
○-○○/○○-	(○○K-)SET	**K3**	Toolholder (API Ring Groover)
A			
AJ-	○×○○(-○.○)	**P2**	Spare Parts (Adjustment Screw / Chamfering Attachment)
AJ-412		**C16**	Spare Parts (Adjustment Screw)
AP-1416		**H20-H21**	Spare Parts (Cam Pin)
AP-1820		**H20-H21**	Spare Parts (Cam Pin)
APET	○○○○PDFR	**B25**	Insert (Milling)
APET	○○○○○○	**B25**	Insert (Milling)
API-RG-○	BT○○	**K3**	Body Part (API Ring Groovers)
API-RG-○	CV○○	**K3**	Body Part (API Ring Groovers)
API-RG-○	DIN-○○○○○	**K3**	Body Part (API Ring Groovers)
API-RG-○	NMTB○○	**K3**	Body Part (API Ring Groovers)
APKT	○○○○(○○)PDER-V	**B18**	Insert (Milling)
APMT	○○○○○○E□-NB○	**B18**	Insert (Milling)
APMT	○○○○○○ER-NB○P	**B18**	Insert (Milling)
B			
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BDGT	○○(□)○○○(○)FR-JA	**B18**	Insert (Milling)
BDMT	○○(□)○○○(○)ER-JS	**B18**	Insert (Milling)
BDMT	○○(□)○○○(○)ER-JT	**B18-B19**	Insert (Milling)
BDMT	○○(□)○○○(○)ER-N○	**B19**	Insert (Milling)
BDMT	○○(□)○○○(○)FR	**B26**	Insert (Milling)
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BH3X12		**P2**	Spare Parts (Screw)
BH6X25		**P2**	Spare Parts (Screw)
BH8X30		**P2**	Spare Parts (Screw)
BH6X10TR		**P2**	Spare Parts (Screw)
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BX	○○○-R-SET	**K3**	Cartridge Set (API Ring Groover)
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C17R		**P15**	Spare Parts (Clamp)
C20R		**P15**	Spare Parts (Clamp)
C25R		**P15**	Spare Parts (Clamp)
C43R		**C19**	Spare Parts (Clamp)
C44R		**C19**	Spare Parts (Clamp)
C90SD	○○○○-12□	**H20-H21**	Spare Parts (Cartridge)
C90SP	○○○○-10□	**H20-H21**	Spare Parts (Cartridge)
C91R		**E48**	Spare Parts (Clamp)
C92R		**E48**	Spare Parts (Clamp)
CB-11		**P16**	Spare Parts (Chipbreaker)
CB-12		**P16**	Spare Parts (Chipbreaker)
CB-13		**P16**	Spare Parts (Chipbreaker)
CB-14		**P16**	Spare Parts (Chipbreaker)
CB-15		**P16**	Spare Parts (Chipbreaker)
CB-16		**P16**	Spare Parts (Chipbreaker)
CB-17		**P16**	Spare Parts (Chipbreaker)
CB-51		**P16**	Spare Parts (Chipbreaker)
CB-S3220		**P16**	Spare Parts (Chipbreaker)
CB-S4220		**P16**	Spare Parts (Chipbreaker)
CB-T2212		**P16**	Spare Parts (Chipbreaker)
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CE-020		**P13**	Spare Parts (Clamp Set)
CE-030		**P13**	Spare Parts (Clamp Set)
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CE-040		**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		**P13**	Spare Parts (Clamp Set)
CE-320		**P13**	Spare Parts (Clamp Set)
CE-360S		**P13**	Spare Parts (Clamp Set)
CE-410		**P13**	Spare Parts (Clamp Set)
CE-430		**P13**	Spare Parts (Clamp Set)
CEM	○○○○-○W(-7.5)	**E75**	End Mill
CGA-3□		**P15**	Spare Parts (Clamp)
CGA-4□		**P15**	Spare Parts (Clamp)
CGA-5□		**P15**	Spare Parts (Clamp)
CGB□		**P15**	Spare Parts (Clamp)
CGH-1□		**P15**	Spare Parts (Clamp)
CGH-2□		**P15**	Spare Parts (Clamp)
CGH-3□		**P15**	Spare Parts (Clamp)
CGIA-3R		**P15**	Spare Parts (Clamp)
CGIA-4R		**P15**	Spare Parts (Clamp)
CGIA-5R		**P15**	Spare Parts (Clamp)
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CL100-1		**P19**	Spare Parts (Coolant Pipe)
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CM	○○○○-○○-○○	**K5**	End Mill (Chamfering)
CM	○○○○-○○-AL	**K5**	End Mill (Chamfering)
CP-2D		**P16**	Spare Parts (Clamp)
CP-3D		**P16**	Spare Parts (Clamp)
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CP-RC□		**P13**	Spare Parts (Clamp Set)
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CP8X23TL		**C18, P2**	Spare Parts (Screw)
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CPS-5E		**E69, P14**	Spare Parts (Clamp Set)
CPS-5F		**K12, P14**	Spare Parts (Clamp Set)
CPS-5□		**P14**	Spare Parts (Clamp Set)
CPS-5S		**P14**	Spare Parts (Clamp Set)
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CPS-6S		**P14**	Spare Parts (Clamp Set)
CPS-6V		**K14, P14**	Spare Parts (Clamp Set)
CPS-8V		**P14**	Spare Parts (Clamp Set)
CS-2D		**P2**	Spare Parts (Screw)
CS-3D		**P2**	Spare Parts (Screw)
CS-5D		**P2**	Spare Parts (Screw)
D			
DCMT	○○○○HQ	**B25, K4**	API Insert (Ring Grooving)
DCMT	○○○○CQ	**B25, K4**	API Insert (Ring Grooving)
DC-42		**P8**	Spare Parts (Shim)
DC-44		**P8**	Spare Parts (Shim)
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Part Numbers in Alphanumeric Order

○ : NUMBER □ : LETTER

Part Number	Page	Description
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DMC ○○○H	E67	End Mill
DMC ○○○SX	E66	End Mill
DMC ○○○SXT	E66	End Mill
DMC ○○○SX-○○○	E66	End Mill
DMC ○○○-S○○	E65	End Mill
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DR ○○-○○□	H5	Spare Parts (Drive-Ring)
DR ○○○○-○○○○	H4	Spare Parts (Drive-Ring)
DR ○○○○-○○○○□	H4	Spare Parts (Drive-Ring)
DS-42	P8	Spare Parts (Shim)
DS-44	P8	Spare Parts (Shim)
DT-7	K8, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DT-8	E74, G2, G6, J2, K10, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DT-10	C23, E51, G2, G6, J2, J22-J23, K6, K8, K10, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DT-15	D5, E56, E59, E61, E74, G2, G6, J2, J22-J23, K10, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DT-20	E51, E68, J2, J22-J23, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DT-25	J23, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DT-32	P8	Spare Parts (Shim)
DT-42	P8	Spare Parts (Shim)
DTM-6	E24-E25, G2, G6, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DTM-7	P17	Spare Parts (Torx Wrench / Screwdriver Type)
DTM-8	E12-E13, E15-E17, E30, E32-E33, E35, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DTM-10	P17	Spare Parts (Torx Wrench / Screwdriver Type)
DTM-15	C2, C4, E12, E14-E17, E30, E32-E33, E35, E44, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DTP-9	H20-H21, P17	Spare Parts (Torx Plus Wrench / Screwdriver Type)
DTP-15	C14, H20-H21, P17	Spare Parts (Torx Plus Wrench / Screwdriver Type)
DTP-20	E50, P17	Spare Parts (Torx Plus Wrench / Screwdriver Type)
DTPM-8	E6-E8, E29-E30, F14-F17, J17, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DTPM-10	J13-J14, J17, P17	Spare Parts (Torx Plus Wrench / Screwdriver Type)
DTPM-15	E6-E8, E29-E30, F4, F6-F8, F10, J6-J9, J13-J14, J17, P17	Spare Parts (Torx Wrench / Screwdriver Type)
DV-33	P8	Spare Parts (Shim)
DW-42	P8	Spare Parts (Shim)
DW-44	P8	Spare Parts (Shim)
E		
EM ○○○○	E70	End Mill (Extended Length)
EM ○○○○-○○	E70	End Mill (Extended Length)
EM ○○○○-○○-3F	E70	End Mill (Extended Length)
EM ○○○○-○○○S	E70	End Mill (Extended Length)
EM ○○○○-○.○	E70	End Mill (Extended Length)
EM ○○○○-AL	E73	End Mill (Extended Length)
EM ○○○○-○.○○(○)-AL	E73	End Mill (Extended Length)
EM ○○○○-3F	E70	End Mill (Extended Length)
EM ○○○○-○○○○-LE	E71	End Mill (Extended Length)
F		
FH-2	P17	Spare Parts (Hexagon Wrench / Flag Type)
FH-2.5	P17	Spare Parts (Hexagon Wrench / Flag Type)
FM ○○○○-90RH	E72	Face Mill (Fixed Pocket)
FM ○○○○-90AL-(125)	E73	Face Mill (Fixed Pocket)
FM AL-○○○○-90-○	E73	Face Mill (Fixed Pocket)
FPMT ○○○○○○ER	-	Insert (Milling)
FT-6	P17	Spare Parts (Torx Wrench / Flag Type)
FT-7	P17	Spare Parts (Torx Wrench / Flag Type)
FT-8	E65, E75, P17	Spare Parts (Torx Wrench / Flag Type)
FT-10	E65, E75, P17	Spare Parts (Torx Wrench / Flag Type)
FT-15	E49, E66-E67, E69, E75, K12, P17	Spare Parts (Torx Wrench / Flag Type)
FTP-5	P17	Spare Parts (Torx Wrench / Flag Type)
FTP-6	F22, P17	Spare Parts (Torx Wrench / Flag Type)
FTP-7	P17	Spare Parts (Torx Wrench / Flag Type)
G		
GOMT ○○(□)○○○(○)ER-D	B19	Insert (Milling)
GP-1	P19	Spare Parts (Plug)
GP-2	P19	Spare Parts (Plug)
GS-50	P2	Spare Parts (Screw)
GS-50S	P2	Spare Parts (Screw)
GS-4090T℻W	P2	Spare Parts (Screw)
GVR ○○○□(□)	K13	Insert (Grooving / Previous Description)
GVR ○○○-○○○□(□)	K13	Insert (Grooving)
GVFR ○○○□	K14	Insert (Grooving / Previous Description)
GVFR ○○○-○○○□	K14	Insert (Grooving)
H		
HF16X40HA	P2	Spare Parts (Screw with Coolant Hole)
HF20X53H	P2	Spare Parts (Screw with Coolant Hole)
HF20X53HA	P2	Spare Parts (Screw with Coolant Hole)
HF24X60H	E16, P2	Spare Parts (Screw with Coolant Hole)
HF24X60HA	P2	Spare Parts (Screw with Coolant Hole)
HH3/8-1.25H	E6, E16, E25, E44, F4, J6, P2	Spare Parts (Arbor / Mounting Bolt)
HH1/2-1.25H	E16, E44, F4, J6, P2	Spare Parts (Arbor / Mounting Bolt)
HH3/4-2.3H	E16, P2	Spare Parts (Arbor / Mounting Bolt)
HH1/4-0.75	F16, J13, P2	
HH3/8-1.25	C2, E6, E30, E33, E44, F4, F16, J6, J13, P2	Spare Parts (Arbor / Mounting Bolt)
HH3/8-1.5	E33, P2	Spare Parts (Arbor / Mounting Bolt)
HH1/2-1.25	C2, C10, D5, E30, E44, E56, F4, J6, J13, P2	Spare Parts (Arbor / Mounting Bolt)
HH3/4-2.3	C10, D5, P2	Spare Parts (Arbor / Mounting Bolt)
HH3X6	P2	Spare Parts (Screw)
HH3X12	P2	Spare Parts (Screw)
HH4X12	P3	Spare Parts (Screw)
HH4X16	C22, P2	Spare Parts (Screw)
HH5X15	P2	Spare Parts (Screw)
HH5X16	P2	Spare Parts (Screw)
HH5X20	P2	Spare Parts (Screw)

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HH5X30	P2	Spare Parts (Screw)
HH6X12	P2	Spare Parts (Screw)
HH6X16	P2	Spare Parts (Screw)
HH6X16AA	P2	Spare Parts (Screw)
HH6X18AA	P2	Spare Parts (Screw)
HH6X20	P2	Spare Parts (Screw)
HH6X25	P2	Spare Parts (Screw)
HH6X30	P2	Spare Parts (Screw)
HH8X25	C14, E7, E30, E33, J14, P3	Spare Parts (Screw)
HH8X25H	E7, E16, E25, P3	Spare Parts (Screw with Coolant Hole)
HH8X35	P3	Spare Parts (Screw)
HH8X40	P3	Spare Parts (Screw)
HH8X50	P3	Spare Parts (Screw)
HH8X55	P3	Spare Parts (Screw)
HH8X65	P3	Spare Parts (Screw)
HH8X70	P3	Spare Parts (Screw)
HH8X80	P3	Spare Parts (Screw)
HH8X85	P3	Spare Parts (Screw)
HH8X100	P3	Spare Parts (Screw)
HH8X110	P3	Spare Parts (Screw)
HH10X25	P3	Spare Parts (Screw)
HH10X30	C4, E30, E33, E44, F6, J7, J14, P3	Spare Parts (Screw)
HH10X30H	E25, E16, P3	Spare Parts (Screw with Coolant Hole)
HH10X30M	C14, P3	Spare Parts (Screw)
HH10X30S	C14, P3	Spare Parts (Screw)
HH10X35	H9, P3	Spare Parts (Screw)
HH10X35HK	P3	Spare Parts (Screw)
HH10X40	E33, P3	Spare Parts (Screw)
HH12X25	P3	Spare Parts (Screw)
HH12X35	C4, C12, D5, E30, E33, E35, E44, E56, F6, H9, H20-H21, J7, J14, P3	Spare Parts (Screw)
HH12X35H	E16, P3	Spare Parts (Screw with Coolant Hole)
HH12X35HK	P3	Spare Parts (Screw with Coolant Hole)
HH12X35M	C14, P3	Spare Parts (Screw)
HH12X40	E35, P3	Spare Parts (Screw)
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)
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HH12X120	P3	Spare Parts (Screw)
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HH12X140	P3	Spare Parts (Screw)
HH12X150	P3	Spare Parts (Screw)
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HH16X40	C12, E35, F6, P3	Spare Parts (Screw)
HH16X45	E30, E33, E56, P3	Spare Parts (Screw)
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HH20X75	P3	Spare Parts (Screw)
HH20X90	P3	Spare Parts (Screw)
HH20X110	P3	Spare Parts (Screw)
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HH24X110	P3	Spare Parts (Screw)
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HS3X8	P4	Spare Parts (Screw)
HS3X12	P4	Spare Parts (Screw)
HS3X16	P4	Spare Parts (Screw)
HS4X4	P4	Spare Parts (Screw)
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HS6X4P	P4	Spare Parts (Screw)
HS6X6	P4	Spare Parts (Screw)
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HS8X12	P4	Spare Parts (Screw)
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HS12X30	P4	Spare Parts (Screw)
HS12X35	P4	Spare Parts (Screw)
HS16X12	P4	Spare Parts (Screw)
HS16X18	P4	Spare Parts (Screw)
HS16X20	P4	Spare Parts (Screw)
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JOMT ○○(□)○○○(○)ER-D	B19	Insert (Milling)
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KPT-32	E49, P8	Spare Parts (Shim)
KPT-42	E49, P8	Spare Parts (Shim)
KVN-32	P8	Spare Parts (Shim)
KYO-CAT40- EM(○).○(○)(○)-○.○(○)	O3	Holders (End Mill)
KYO-CAT40- FM(○).○(○)-2.0	O2	Holders (Face Mill)
KYO-CAT50- EM(○).○(○)(○)-○.○	O5	Holders (End Mill)
KYO-CAT50- FM(○).○(○)-3.0	O4	Holders (Face Mill)
L		
LC-4K	P9	Spare Parts (Shim)
LC-32	P9	Spare Parts (Shim)
LC-32N	P9	Spare Parts (Shim)
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LC-42N□□	**P9**	Spare Parts (Shim)
LC-42N□□-20	**P9**	Spare Parts (Shim)
LC-42□□	**P9**	Spare Parts (Shim)
LC-53	**P9**	Spare Parts (Shim)
LC-53N	**P9**	Spare Parts (Shim)
LD-4K	**P9**	Spare Parts (Shim)
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LD-32N	**P9**	Spare Parts (Shim)
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LL-03N	**P7**	Spare Parts (Lock Pin)
LL-03S	**P7**	Spare Parts (Lock Pin)
LL-03SN	**P7**	Spare Parts (Lock Pin)
LL-03T	**P7**	Spare Parts (Lock Pin)
LL-03TN	**P7**	Spare Parts (Lock Pin)
LL-05C	**P7**	Spare Parts (Lock Pin)
LL-1	**P7**	Spare Parts (Lock Pin)
LL-1C	**P7**	Spare Parts (Lock Pin)
LL-1CN	**P7**	Spare Parts (Lock Pin)
LL-1D	**P7**	Spare Parts (Lock Pin)
LL-1DN	**P7**	Spare Parts (Lock Pin)
LL-1K	**P7**	Spare Parts (Lock Pin)
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LL-2	**P7**	Spare Parts (Lock Pin)
LL-2C	**P7**	Spare Parts (Lock Pin)
LL-2K	**P7**	Spare Parts (Lock Pin)
LL-2N	**P7**	Spare Parts (Lock Pin)
LL-3	**P7**	Spare Parts (Lock Pin)
LL-3K	**P7**	Spare Parts (Lock Pin)
LL-3N	**P7**	Spare Parts (Lock Pin)
LL-4	**P7**	Spare Parts (Lock Pin)
LL-5	**P7**	Spare Parts (Lock Pin)
LL-5N	**P7**	Spare Parts (Lock Pin)
LNEU ○○○○-○○(-○)	**H10**	Insert (Milling)
LNEU ○○○○-○○S(-○)	**H10**	Insert (Milling)
LOF07R	**C16**	Spare Parts (Cartridge)
LOGU ○○○○○○ER-GM	**B13**	Insert (Milling)
LOGT ○○○○○○FR-AM	**B13**	Insert (Milling)
LOMU ○○○○○○ER-GH	**B13**	Insert (Milling)
LOMU ○○○○○○ER-GM	**B13**	Insert (Milling)
LOMU ○○○○○○ER-SM	**B13**	Insert (Milling)
LP-2S	**P7**	Spare Parts (Lock Pin)
LP-6S	**P7**	Spare Parts (Lock Pin)
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LS-03N	**P4**	Spare Parts (Lock Screw)
LS-03S	**P4**	Spare Parts (Lock Screw)
LS-03SN	**P4**	Spare Parts (Lock Screw)
LS-05	**P4**	Spare Parts (Lock Screw)
LS-1	**P4**	Spare Parts (Lock Screw)
LS-1N	**P4**	Spare Parts (Lock Screw)
LS-1P	**P4**	Spare Parts (Lock Screw)
LS-1S	**P4**	Spare Parts (Lock Screw)
LS-1SN	**P4**	Spare Parts (Lock Screw)
LS-1T	**P4**	Spare Parts (Lock Screw)
LS-2	**P4**	Spare Parts (Lock Screw)
LS-2N	**P4**	Spare Parts (Lock Screw)
LS-2P	**P4**	Spare Parts (Lock Screw)
LS-3	**P4**	Spare Parts (Lock Screw)
LS-3P	**P4**	Spare Parts (Lock Screw)
LS-4	**P4**	Spare Parts (Lock Screw)
LS-4N	**P4**	Spare Parts (Lock Screw)
LS-11	**P4**	Spare Parts (Lock Screw)
LS-15	**P4**	Spare Parts (Lock Screw)
LS-32	**P9**	Spare Parts (Shim)
LS-42	**P9**	Spare Parts (Shim)
LSD-445R	**P12**	Spare Parts (Cartridge)
LSE-445R	**P12**	Spare Parts (Cartridge)
LSE-445SR	**C19**	Spare Parts (Cartridge)
LSO-445R	**C22, P12**	Spare Parts (Cartridge)
LSP-1	**P7**	Spare Parts (Shim Pin)
LSP-2	**P7**	Spare Parts (Shim Pin)
LSP-2K	**P7**	Spare Parts (Shim Pin)
LSP-3	**P7**	Spare Parts (Shim Pin)
LSP-3K	**P7**	Spare Parts (Shim Pin)
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LT-32	**P9**	Spare Parts (Shim)
LT-32N	**P9**	Spare Parts (Shim)
LT-32N-20	**P9**	Spare Parts (Shim)
LT-42	**P9**	Spare Parts (Shim)
LT-42N	**P9**	Spare Parts (Shim)
LT-42N-20	**P9**	Spare Parts (Shim)
LTE-490R	**P12**	Spare Parts (Cartridge)
LTE-490SR	**E48**	Spare Parts (Cartridge)
LTK-5	**P18**	Spare Parts (Wrench)
LTP-10	**P17**	Spare Parts (Torx Plus Wrench / L-Shape Type)
LTP-15	**P17**	Spare Parts (Torx Plus Wrench / L-Shape Type)
LTW-8SS	**P17**	Spare Parts (Torx Wrench / L-Shape Type)
LTW-10S	**P17**	Spare Parts (Torx Wrench / L-Shape Type)
LTW-10SS	**P17**	Spare Parts (Torx Wrench / L-Shape Type)
LTW-15S	**P17**	Spare Parts (Torx Wrench / L-Shape Type)
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LTW-25	**P17**	Spare Parts (Torx Wrench / L-Shape Type)
LW-1.5	**P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
LW-2	**C18, E49, P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
LW-2.5	**H20-H21, P18**	Spare Parts (Hexagon Wrench / L-Shape Type)

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Part Number	Page	Description
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LW-4.5	**E50, P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
LW-5	**C2, C4, E44, P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
LW-6	**P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
LW-8	**P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
LW-10	**E35, P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
LW-14	**E35, P18**	Spare Parts (Hexagon Wrench / L-Shape Type)
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LW-32	**P9**	Spare Parts (Shim)
LW-32N	**P9**	Spare Parts (Shim)
LW-42	**P9**	Spare Parts (Shim)
LW-42N	**P9**	Spare Parts (Shim)
LW-42N℔	**P9**	Spare Parts (Shim)
LW-42℔	**P9**	Spare Parts (Shim)
M		
M3X8	**P4**	Spare Parts (Screw)
M3X12	**P4**	Spare Parts (Screw)
M4X10	**P4**	Spare Parts (Screw)
MAP-1806	**D5**	Spare Parts (Cartridge)
MAP-1806M	**E56**	Spare Parts (Cartridge)
MAP-1806S	**E56**	Spare Parts (Cartridge)
MAP-2506	**E59, E61, P12**	Spare Parts (Shim)
MAP 100R○○-S100	**E74**	End Mill
MCSE ○○○	**K6**	End Mill (Chamfering)
MCSE ○○○-○○D	**K6**	End Mill (Chamfering)
MEAL ○○-S○○	**E68**	End Mill (for Aluminum Machining)
MEC ○○○○-S○○○-○○	**E12**	End Mill (MEC)
MEC ○○○○-S○○○-○○T	**E12**	End Mill (MEC)
MEC ○○○○-S○○○-○.○-○○	**E12**	End Mill (MEC)
MEC ○○○○-S○○○-○.○-○○T	**E12**	End Mill (MEC)
MEC ○○-M○○-○○(T)-○T	**E17**	Modular Type Head (MEC)
MEC ○○-S○○-○○	**E13-E14**	End Mill (MEC)
MEC ○○-S○○-○○T	**E13**	End Mill (MEC)
MEC ○○-S○○-○○○-○○	**E14**	End Mill (MEC)
MEC ○○-S○○-○○○-○○-○	**E14**	End Mill (MEC)
MEC ○○-S○○-○○○-○○T	**E13**	End Mill (MEC)
MEC ○○-S○○-○○○-○○T-○	**E13**	End Mill (MEC)
MEC ○○○○R-○○(T)-○T(N)	**E15**	Face Mill (MEC)
MEC ○○○R-○○-○(○)T(N)	**E16**	Face Mill (MEC)
MEC ○○○R-○○-○(○)T-M(N)	**E16**	Face Mill (MEC)
MEC ○○○R-○○-○(○)(□)□	**E16**	Face Mill (MEC)
MECH ○○○○-W○○○(○)-○○-○-○T	**E32**	End Mill (MECH)
MECH ○○○-S○○-○○-○-○T	**E32**	End Mill (MECH)
MECH ○○○○R-○○-○-○T	**E33**	End Mill (MECH)
MECH ○○○R-○○-○-○T	**E33**	End Mill (MECH)
MECH ○○○R-○○-○-○T-M	**E33**	Shell Mill (MECH)
MECH ○○○R○○-○-○T-BT○○	**E33**	End Mill (MECH)
MECH ○○○R○○-○T-BT○○-A	**E34**	End Mill (MECH)
MECH ○○○R○○-○T-BT○○SA	**E34**	End Mill (MECH)
MECH ○○○R○○-○T-F	**E35**	End Mill (MECH)
MECX ○○○○-S○○○-○○-○T	**E24**	End Mill (MECX)
MECX ○○-S○○-○○-○T	**E24**	End Mill (MECX)
MECX ○○-S○○-○○○-○○-○T	**E24**	End Mill (MECX)
MECX ○○○○R-○○-○(○)T	**E25**	Face Mill (MECX)
MECX ○○○R-○○-○(○)T-M	**E25**	Face Mill (MECX)
MEF ○○-S○○	**K8**	End Mill (Countersinking)
METS ○○-S○○	**K10**	End Mill (T-Slotting)
METS ○○-S○○-H	**K10**	End Mill (T-Slotting)
MEW ○○-M○○-○○-○T	**E8**	Modular Type Head (MEW)
MEW ○○-S○○-○○-○T	**E5**	End Mill (MEW)
MEW ○○-S○○-○○-○○○-○T	**E5**	End Mill (MEW)
MEW ○○-W○○-○○-○T	**E5**	End Mill (MEW)
MEW ○○○○R-○○-○T	**E6**	Face Mill (MEW)
MEW ○○○R-○○-○T(-M)	**E7**	Face Mill (MEW)
MEW ○○○○-S○○○-○-○○-○T	**E4**	End Mill (MEW)
MEW ○○○○-W○○○-○○-○T	**E4**	End Mill (MEW)
MEWH ○○○R-○○-○-○T-M	**E30**	Shell Mill (MEWH)
MEWH ○○○-S○○-○○-○-○T	**E29**	End Mill (MEWH)
MEWH ○○○○R-○○-○-○T	**E30**	Shell Mill (MEWH)
MEWH ○○○○-W○○○-○○-○-○T	**E29**	End Mill (MEWH)
MEY ○○○○-S○○○-HG	**G2**	End Mill (3-D End Mill)
MEY ○○-S○○	**G2**	End Mill (3-D End Mill)
MEY ○○-S○○-○○○	**G2**	End Mill (3-D End Mill)
MEY ○○-S○○-○○○H	**G2**	End Mill (3-D End Mill)
MEZ ○○-S○○G	**G6**	End Mill (3-D End Mill)
MEZ ○○-S○○-○○○G	**G6**	End Mill (3-D End Mill)
MEZ ○○-S○○-○○○HG	**G6**	End Mill (3-D End Mill)
MFH ○○○○-M○○-○○-○T	**F17**	Modular Type Head (MFH)
MFH ○○○○-S○○○-○○-○T-○(○)	**F7, F14**	End Mill (MFH)
MFH ○○○○-W○○-○○-○T	**F7**	End Mill (MFH)
MFH ○○○○-W○○○-○○-○T-○	**F14**	End Mill (MFH)
MFH ○○○(○)R-○○-○T	**F4-F5, F16**	Face Mill (MFH)
MFH ○○○R-○○-○T-M	**F5**	Face Mill (MFH)
MFH ○○○R-○○-○T-○○M	**F5**	Face Mill (MFH)
MFH ○○○○-S○○○-○○-○T-○(○)	**F22**	End Mill (MFH)
MFH ○○-M○○-○○-○T	**F10, F17**	Modular Type Head (MFH)
MFH ○○-S○○-○○-○T	**F8-F9, F15, F22**	End Mill (MFH)
MFH ○○-S○○-○○-○T-○○○	**F8, F15**	End Mill (MFH)
MFH ○○-W○○-○○-○T	**F8, F15, F22**	End Mill (MFH)
MFK ○○○(○)R-○○-○(○)T	**C10-C11**	Face Mill (MFK)
MFK ○○○R-○○-○(○)T-M	**C11**	Face Mill (MFK)
MFPN-45	**C2, C4, P9**	Spare Parts (Shim)
MFPN 45○○○○(○)R-○(○)T	**C2**	Face Mill (MFPN)
MFPN 45○○○℔-○(○)T	**C3**	Face Mill (MFPN)
MFPN 45○○○R-○(○)T-M	**C3**	Face Mill (MFPN)
MFPN 45○○○R-S32-○T	**C4**	End Mill (MFPN)
MFPN 45○○○○R-W125-○T	**C4**	End Mill (MFPN)
MFWN-90	**E44, P9**	Spare Parts (Shim)
MFWN ○○○○○○(○)R-○(○)T	**E42**	Face Mill (MFWN)
MFWN ○○○○○R-○(○)T	**E43**	Face Mill (MFWN)
MFWN ○○○○○R-○(○)T-M	**E43**	Face Mill (MFWN)
MFWN ○○○○○○R-W125-○T	**E45**	Face Mill (MFWN)
MFWN ○○○○○R-S○○-○T	**E45**	Face Mill (MFWN)
MGI ○○○○-1□(□)	**K12**	End Mill (Grooving for M/C)
MOF 45○○○R-○○-○(○)T	**C14**	Face Mill
MOF 45○○○R-○○-○(○)T-M	**C14**	Face Mill
MOFX 45○○○R-○○-○(○)T-SF	**C16**	Face Mill
MOFX 45○○○R○○-○(○)T-MSF	**C16**	Face Mill
MP-1	**C2, C4, D5, E6-E8, E17, E29-E30, E32-E33, E35, E44-E45, E56, E59, E61, F4, F6-F10, F14-F17, F22, G2, H9, H20-H21, J2, J6-J9, J13-J14, J17**	Spare Parts (Anti-seize Compound)
MRF ○○-S○○	**J2**	End Mill (Ball-Nose)
MRF ○○-S○○-○○○	**J2**	End Mill (Ball-Nose)
MRFW ○○-S○○	**J2**	End Mill (Ball-Nose)

Part Numbers in Alphanumeric Order

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Part Number		Page	Description
MRFW	○○-S○○-○○○	J2	End Mill (Ball-Nose)
MRP	○○○R-○○	J23	Face Mill (Radius Mill)
MRP	○○○R-○○-○T	J23	Face Mill (Radius Mill)
MRP	○○○-S○○-○○	J22	End Mill (Radius Mill)
MRP	○○○-S○○-○○-○○○	J22	End Mill (Radius Mill)
MRP	○○○-S○○-○○-○T	J22	End Mill (Radius Mill)
MRP	○○○-S○○-○○-○T-○○○	J22	End Mill (Radius Mill)
MRW	○○○○-S○○○-○○-○T-○(○)	J8	End Mill (MRW)
MRW	○○○○-W○○○-○○-○T	J8	End Mill (MRW)
MRW	○○○○R-○○-○(○)T	J6	Face Mill (MRW)
MRW	○○○R-○○-○(○)T	J7	Face Mill (MRW)
MRW	○○○R-○○-○(○)T-M	J7	Face Mill (MRW)
MRW	○○-S○○-○○-○T	J9	End Mill (MRW)
MRW	○○-S○○-○○-○T-○○○	J9	End Mill (MRW)
MRW	○○-W○○-○○-○T	J9	End Mill (MRW)
MRX	○○○○-S○○○-○○-○T-○(○)	J15	End Mill (MRX)
MRX	○○○○-W○○○-○○-○T	J15	End Mill (MRX)
MRX	○○○○R-○○-○T	J13	Face Mill (MRX)
MRX	○○○R-○○-○T	J14	Face Mill (MRX)
MRX	○○○R-○○-○T-M	J14	Face Mill (MRX)
MRX	○○-M○○-○○-○T	J17	Modular Type Head (MRX)
MRX	○○-S○○-○○-○T	J16	End Mill (MRX)
MRX	○○-S○○-○○-○T-○○○	J16	End Mill (MRX)
MRX	○○-W○○-○○-○T	J16	End Mill (MRX)
MSD-42		P9	Spare Parts (Shim)
MSE	15○○	D8	Face Mill (with Shank)
MSE	15○○-32	D8	Face Mill (with Shank)
MSE-4215		D8, P9	Spare Parts (Shim)
MSE-4245		P9	Spare Parts (Shim)
MSE-4245S		C18, P9	Spare Parts (Shim)
MSE	45○○○R-○(○)T	C18	Face Mill
MSE	45○○○R-○(○)T-M	C18	Face Mill
MSE	45○○○R-○T-M-SF	C19	Face Mill
MSE	45○○○R-○T-SF	C19	Face Mill
MS-FRW1		H4-H5	Spare Parts (Wrench / for MSTA)
MSO	45○○-S	C22	Face Mill (with Shank)
MSO	45○○-S32-09	C23	Face Mill (with Shank)
MSO	45○○○R	C22	Face Mill
MSO	90○○-S32-○○	E51	Face Mill (with Shank)
MSO	90○○○R-○○-○(○)T	E50	Face Mill
MSO	90○○○R-○○-○(○)T-M	E50	Face Mill
MSO-4T245		C22, P10	Spare Parts (Shim)
MSO-5200		E50, P10	Spare Parts (Shim)
MSP	15○○	D8	Face Mill (with Shank)
MSP-42		D8, P10	Spare Parts (Shim)
MSR	○○○○R-○	E59	Face Mill
MSR	○○○○R-○-1.5ID	E59	Face Mill
MSR	○○○R-○	E60	Face Mill
MSR	○○○R-○M	E60	Face Mill
MSR	○○○R-○-31.75	E60	Face Mill
MSR	○○○R-BT50-○	E61	Face Mill (Integral Arbor Type)
MSRS	15○○○(○)(○)R-○(○)T	D4	Face Mill
MSRS	15○○○R-○(○)T-M	D5	Face Mill
MSRS	90○○○○(○)R-○-○(○)T	E54	Face Mill
MSRS	90○○○R-○-○(○)T	E55	Face Mill
MSRS	90○○○R-○-○(○)T-M	E55	Face Mill
MSTA	○○(○)□○○-○(○)T	H5	Slot Mill
MSTA	○○□○○○-○(○)T	H4	Slot Mill
MSTB	○○(○)□□○○○○-○T	H8, H9	Slot Mill
MSTB	○○○○□□○○○-○T	H8, H9	Slot Mill
MSTC	○○○□□○○○-○○○-○○	H14, H16-H19	Slot Mill
MSTC	○○○□□○○○○-○○-○(○)T	H14-H19	Slot Mill

Part Number		Page	Description
MTE-42		E49, P10	Spare Parts (Shim)
MTE	90○○	E49	Face Mill (with Shank)
MTE	90○○-32	E49	Face Mill (with Shank)
MTE	90○○○R-○T-SF	E48	Face Mill
MTES	○○○	E69	End Mill
MTP	90○○	E49	Face Mill (with Shank)
MTP	90-○○○-○○(○)W	E49	Face Mill (with Shank)
MTP	90-○○○-R○	E49	Face Mill (with Shank)
MTPS	○○○	E69	End Mill
MVG	○○○○	K14	End Mill (Ring Grooving for M/C)
MVN-32		P10	Spare Parts (Shim)
N			
NDCT	○○○TRX	B20	Insert (Milling)
NDCT	○○○□□	B20	Insert (Milling)
NDCT	○○○□(□)-B	B20	Insert (Milling)
NDCW	○○○○FRX	B26	Insert (Milling)
NDCW	○○○○FRX-NE	B26	Insert (Milling)
NDCW	○○○(□)RX	B20	Insert (Milling)
NDCW	○○○(○)TR	B20	Insert (Milling)
NDMM	○○(□)○○○ER-N○	B20	Insert (Milling)
NDMM	○○(□)○○○ER-T	B20	Insert (Milling)
NDMM	○○○ER-SP	B20	Insert (Milling)
NDMT	○○(□)○○○○ER-D	B20	Insert (Milling)
NDMT	○○(□)○○○○ER-DH	B20	Insert (Milling)
NEMT	○○(□)○○○○ER-D	B20	Insert (Milling)
NEMT	○○(□)○○○○ER-DH	B20	Insert (Milling)
O			
OFMR	○○○○○○EN-GT	B21	Insert (Milling)
OFMR	○○○○○○EN-SH	B21	Insert (Milling)
OFMT	○○○○○○EN-GT	B21	Insert (Milling)
OFMT	○○○○○○E□-SH	B21	Insert (Milling)
P			
P-03		P7	Spare Parts (Shim Pin)
P-03S		P7	Spare Parts (Shim Pin)
PC-1		P19	Spare Parts (Punch)
PC-2		P19	Spare Parts (Punch)
PD-42		P10	Spare Parts (Shim)
PNEA	○○○○XNTN-T01020	B14	Insert (Milling)
PNEG	○○○○XNEN-GL	B14	Insert (Milling)
PNEG	○○○○XNER-W	B14	Insert (Milling)
PNEG	○○○○XNTR-T00515	B14	Insert (Milling)
PNEU	○○○○ANEL-GL	B15	Insert (Milling)
PNEU	○○○○ANER-GL	B15	Insert (Milling)
PNEU	○○○○ANER-W	B15	Insert (Milling)
PNMG	○○○○XNEN-GH	B14	Insert (Milling)
PNMG	○○○○XNEN-GM	B14	Insert (Milling)
PNMU	○○○○ANER-GH	B15	Insert (Milling)
PNMU	○○○○ANEL-GM	B15	Insert (Milling)
PNMU	○○○○ANER-GM	B15	Insert (Milling)
PNMU	○○○○ANER-SM	B15	Insert (Milling)
PP-4		P7	Spare Parts (Lock Pin)
PST-IP6		F22	Spare Parts (Pre-Set Torque Wrench)
PST-IP8		E6-E8, E17, E29-E30, F14-F17, P20	Spare Parts (Pre-Set Torque Wrench)
PST-IP9		J17, P20	Spare Parts (Pre-Set Torque Wrench)
PST-IP10		J13, J14, J17, P20	Spare Parts (Pre-Set Torque Wrench)
PST-IP15		E6-E8, E17, E29-E30, F4, F6-F8, F10, J6-J9, J13-J14, J17, P20	Spare Parts (Pre-Set Torque Wrench)

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Part Number	Page	Description
PST-IP20	F4, F6, F9, J6-J9, J13-J14, J17, P20	Spare Parts (Pre-Set Torque Wrench)
PST-T6	P20	Spare Parts (Pre-Set Torque Wrench)
PST-T7	P20	Spare Parts (Pre-Set Torque Wrench)
PST-T8	E12-E13, E15-E16, E32-E33, E35, P20	Spare Parts (Pre-Set Torque Wrench)
PST-T9	P20	Spare Parts (Pre-Set Torque Wrench)
PST-T10	P20	Spare Parts (Pre-Set Torque Wrench)
PST-T15	C10, C12, E12, E14-E16, E32-E33, E35, P20	Spare Parts (Pre-Set Torque Wrench)
PST-T20	P20	Spare Parts (Pre-Set Torque Wrench)
R		
R ○○-(R)(-SET)	K3	Cartridge Set (API Ring Groover)
R ○○-SET	K3	Cartridge Set (API Ring Groover)
RDFG ○○FR	B21	Insert (Milling)
RDGT ○○○○M0ER-GM	B16	Insert (Milling)
RDGT ○○○○M0ER-SM	B16	Insert (Milling)
RDHX ○○(□)○(○)M0T	B21	Insert (Milling)
RDMT ○○(□)○M0-H	B21	Insert (Milling)
RDMT ○○○○M0EN-GH	B16	Insert (Milling)
RDMT ○○○○M0ER-GM	B16	Insert (Milling)
ROMU ○○○○M0ER-GH	B16	Insert (Milling)
ROMU ○○○○M0ER-GM	B16	Insert (Milling)
ROMU ○○○○M0ER-SM	B16	Insert (Milling)
RPGT ○○(□)○M0ER-GM	B16	Insert (Milling)
RPGT ○○(□)○M0ER-SM	B16	Insert (Milling)
RPMT ○○(□)○(○)M0	B21	Insert (Milling)
RPMT ○○(□)○M0EN-GH	B16	Insert (Milling)
RPMT ○○(□)○M0ER-GM	B16	Insert (Milling)
RPMT ○○○○M0-H	B21	Insert (Milling)
RPMW ○○○○M0TN	B16	Insert (Milling)
ROMU ○○○○M0ER-GH	B16	Insert (Milling)
ROMU ○○○○M0ER-GM	B16	Insert (Milling)
ROMU ○○○○M0ER-SM	B16	Insert (Milling)
S		
SB-1STR	P5	Spare Parts (Screw)
SB-1TR	P5	Spare Parts (Screw)
SB-2TR	P5	Spare Parts (Screw)
SB-3STR	P5	Spare Parts (Screw)
SB-3TR	P5	Spare Parts (Screw)
SB-3.5TR	P5	Spare Parts (Screw)
SB-4STR	E75	Spare Parts (Screw)
SB-4TR	P5	Spare Parts (Screw)
SB-5TR	P5	Spare Parts (Screw)
SB-1635TR	P5	Spare Parts (Screw)
SB-1840TRP	F22, P5	Spare Parts (Screw)
SB-2035TR	P5	Spare Parts (Screw)
SB-2035TRG	E24, P5	Spare Parts (Screw)
SB-2040TR	P5	Spare Parts (Screw)
SB-2040TRG	G2, G6, P5	Spare Parts (Screw)
SB-2042TRG	E24-E25, P5	Spare Parts (Screw)
SB-2045TR	P5	Spare Parts (Screw)
SB-2045TRN	P5	Spare Parts (Screw)
SB-2050TR	P5	Spare Parts (Screw)
SB-2060TR	P5	Spare Parts (Screw)
SB-2080TR	P5	Spare Parts (Screw)
SB-2250TR	K8, P5	Spare Parts (Screw)
SB-2255TR	P5	Spare Parts (Screw)
SB-2260TR	K8, P5	Spare Parts (Screw)
SB-2290TR	P5	Spare Parts (Screw)
SB-2545TR	E12-E13, E65, E75, P5	Spare Parts (Screw)
SB-2555TRG	E12-E13, E15-E17, E32, E33, E35, G2, G6, P5	Spare Parts (Screw)
SB-2555TRP	J17, P5	Spare Parts (Screw)
SB-2560TR	E74, K10, P5	Spare Parts (Screw)
SB-2570TR	P5	Spare Parts (Screw)
SB-3060TR	C23, E65, E75, J22, K6, K10, P5	Spare Parts (Screw)
SB-3060TRG	P5	Spare Parts (Screw)
SB-3065TRP	E6-E8, E29-E30, F14-F17, P5	Spare Parts (Screw)
SB-3070TRG	G2, G6, P5	Spare Parts (Screw)
SB-3070TRP	J13-J14, J17, P5	Spare Parts (Screw)
SB-3080TR	E51, J22-J23, K8, P5	Spare Parts (Screw)
SB-3580TR	P5	Spare Parts (Screw)
SB-3590TRP	H20-H21, P5	Spare Parts (Screw)
SB-3592TR	P5	Spare Parts (Screw)
SB-4050TRN	P5	Spare Parts (Screw)
SB-4060TR	E66-E67, P5	Spare Parts (Screw)
SB-4065TR	E66, E67, K12, P5	Spare Parts (Screw)
SB-4070TRG	G2, G6, P5	Spare Parts (Screw)
SB-4070TRN	E12, E14-E17, E32-E33, E35, P5	Spare Parts (Screw)
SB-4070TRS	P5	Spare Parts (Screw)
SB-4070TRW	P6	Spare Parts (Screw)
SB-4075TRP	F7-F8, F10, P5	Spare Parts (Screw)
SB-4082TPR	C14, P5	Spare Parts (Screw)
SB-4085TR	E74, J22-J23, K10, K12, P5	Spare Parts (Screw)
SB-4085TRP	J6-J9, K10, P5	Spare Parts (Screw)
SB-4090TRP	E6, E7-E8, E29-E30, J13-J14, P5	Spare Parts (Screw)
SB-4090TRPN	F4, F6, J17, P5	Spare Parts (Screw)
SB-4590TRWN	P6	Spare Parts (Screw)
SB-5070TR	K6, P5	Spare Parts (Screw)
SB-5085TR	E51, E68, P5	Spare Parts (Screw)
SB-5090TR	K6, P5	Spare Parts (Screw)
SB-25100TR	P5	Spare Parts (Screw)
SB-40115TR	J22-J23, P5	Spare Parts (Screw)
SB-40120TR	P5	Spare Parts (Screw)
SB-40125TRN	P5	Spare Parts (Screw)
SB-40140TR	D5, E56, E59, E61, P5	Spare Parts (Screw)
SB-40140TRN	C2, C4, E44, P5	Spare Parts (Screw)
SB-45130TR	E50, P5	Spare Parts (Screw)
SB-50120TR	J22-J23, P5	Spare Parts (Screw)
SB-50120TRP	F4, F6, F9, J13-J14, J17, P5	Spare Parts (Screw)
SB-50120TRS	C14, P5	Spare Parts (Screw)
SB-50137K	P5	Spare Parts (Screw)
SB-50140TR	C2, C4, E44-E45, P5	Spare Parts (Screw)
SB-50140TRP	J6-J9, P5	Spare Parts (Screw)
SB-60120TR	D5, E56, E59, E61, J23, P5	Spare Parts (Screw)
SC-30067	J2, P6	Spare Parts (Screw)
SC-35085	J2, P6	Spare Parts (Screw)
SC-40100	J2, P6	Spare Parts (Screw)
SC-50130	J2, P6	Spare Parts (Screw)
SC-60160	J2, P6	Spare Parts (Screw)
SC-60210	J2, P6	Spare Parts (Screw)
SCR-01	E70, E73, K4, K5 P6	Spare Parts (Screw)
SCR-02	E73, K4, K5	Spare Parts (Screw)
SCR-03	P5	Spare Parts (Screw)
SCR-04	E70, K5, P6	Spare Parts (Screw)

Part Numbers in Alphanumeric Order

○ : NUMBER □ : LETTER

Part Number	Page	Description
SCR-05	**P6**	Spare Parts (Screw)
SCR-16	**E70-E71, K5, P6**	Spare Parts (Screw)
SCR-30	**E70-E72, K5, P6**	Spare Parts (Screw)
SDCN ○○AUTN	**B10**	Insert (Milling)
SDCT ○○○○○□□-□□	**H23**	Insert (Milling)
SDCT ○○○○○□%-□□	**H23**	Insert (Milling)
SDET ○○○○○□□-□□	**H23**	Insert (Milling)
SDET ○○○○○□%-□□	**H23**	Insert (Milling)
SDKN ○○AUFN	**B10**	Insert (Milling)
SDKN ○○○○AUFN-NE	**-**	Insert (Milling)
SDKN ○○(○)(○)AUTN	**B10**	Insert (Milling)
SDKR ○○AUEN-S	**B10**	Insert (Milling)
SDKW ○○○○AESN	**B22**	Insert (Milling)
SDKW ○○○○AETN	**B22**	Insert (Milling)
SDKW ○○(□)○○○○FN	**B22**	Insert (Milling)
SDKW ○○(□)○○○○TN	**B22**	Insert (Milling)
SDMR ○○AUER-H	**B10**	Insert (Milling)
SDMT ○○.○○C	**B22**	Insert (Milling)
SDMT ○○○○AESR-H	**B22**	Insert (Milling)
SDMT ○○○(○)(○)(○)E-K	**B22**	Insert (Milling)
SDMT ○○○E-K	**B22**	Insert (Milling)
SE-3070TRP	**H20-H21, P6**	Spare Parts (Screw)
SE-40050TRN	**H9-H10, P6**	Spare Parts (Screw)
SE-40055TR	**H9-H10, P6**	Spare Parts (Screw)
SE-40068TR	**H9-H10, P6**	Spare Parts (Screw)
SE-40080TR	**H10, P6**	Spare Parts (Screw)
SE-40090TR	**H9-H10, P6**	Spare Parts (Screw)
SE-40100TR	**H10, P6**	Spare Parts (Screw)
SE-40120TR	**P6**	Spare Parts (Screw)
SE-50125TR	**P6**	Spare Parts (Screw)
SEEN ○○AFFN	**B26**	Insert (Milling)
SEEN ○○AFFR-W	**B10, B26**	Insert (Milling)
SEEN ○○AFTN	**B10**	Insert (Milling)
SEEN ○○AFTR-W	**B10**	Insert (Milling)
SEKN ○○AFFN	**B10**	Insert (Milling)
SEKN ○○AFTN	**B10**	Insert (Milling)
SEKN ○○EFTR	**B10**	Insert (Milling)
SEKR ○○AFEN-S	**B10**	Insert (Milling)
SEKT ○○AFEN-S	**B22**	Insert (Milling)
SEKW ○○AFTN	**B22**	Insert (Milling)
SEKW ○○○FN	**B22**	Insert (Milling)
SEKW ○○○TN	**B22**	Insert (Milling)
SEMM ○○(□)○○○(○)PESR	**B22**	Insert (Milling)
SEMR ○○AFER-H	**B10**	Insert (Milling)
SEMT ○○○C	**B22**	Insert (Milling)
SH-50150TR	**C16, P6**	Spare Parts (Cartridge Clump Screw)
SH3X6	**E49**	Spare Parts (Screw)
SLT ○○-○○□□□	**H6**	Insert (Slot Mill MSTA)
SNCN ○○XNTN	**B11**	Insert (Milling)
SNKN ○○XNTN	**B11**	Insert (Milling)
SNM ○○○	**B11**	Insert (Milling)
SNMF ○○XNTN	**B11**	Insert (Milling)
SOKN 13T3AXFN	**B10**	Insert (Milling)
SOKN 13T3AXFN-NE	**B26**	Insert (Milling)
SOKN 13T3AXTN	**B10**	Insert (Milling)
SOKR 13T3AXEN-J	**B10**	Insert (Milling)
SOMT ○○○○AXEN-J	**B22**	Insert (Milling)
SOMT ○○○○○○ER-FL	**B17**	Insert (Milling)
SOMT ○○○○○○ER-GM	**B17**	Insert (Milling)
SOMT ○○○○○○ER-LD	**B17**	Insert (Milling)
SOMW ○○○○AXFN	**B22**	Insert (Milling)
SOMW ○○○○AXTN	**B22**	Insert (Milling)

Part Number	Page	Description
SP-2D	**P18**	Spare Parts (Spring)
SP-3D	**P18**	Spare Parts (Spring)
SP-5	**P18**	Spare Parts (Spring)
SP-5D	**P18**	Spare Parts (Spring)
SP-6	**P18**	Spare Parts (Spring)
SP-8	**P18**	Spare Parts (Spring)
SP3X4	**P6**	Spare Parts (Screw)
SP3X6	**C22, P6**	Spare Parts (Screw)
SP3X8	**D8, E49, P6**	Spare Parts (Screw)
SP3X10	**P6**	Spare Parts (Screw)
SP4X9	**C18, P6**	Spare Parts (Screw)
SP8X35	**P6**	Spare Parts (Mounting Bolt)
SP-129	**P10**	Spare Parts (Shim)
SP-130A	**P11**	Spare Parts (Shim)
SP-141	**P10**	Spare Parts (Shim)
SP-141P	**P11**	Spare Parts (Shim)
SP-143	**P10**	Spare Parts (Shim)
SP-143P	**P11**	Spare Parts (Shim)
SP-148	**P10**	Spare Parts (Shim)
SP-162	**P10**	Spare Parts (Shim)
SP-210A	**P11**	Spare Parts (Shim)
SP-219	**P10**	Spare Parts (Shim)
SP-221	**P10**	Spare Parts (Shim)
SP-223	**P10**	Spare Parts (Shim)
SP-230P	**P11**	Spare Parts (Shim)
SP-341P	**P11**	Spare Parts (Shim)
SP-342	**P10**	Spare Parts (Shim)
SP-420A	**P11**	Spare Parts (Shim)
SP-429	**P11**	Spare Parts (Shim)
SP-441	**P10**	Spare Parts (Shim)
SP-441P	**P11**	Spare Parts (Shim)
SP-443	**P10**	Spare Parts (Shim)
SP-443P	**P11**	Spare Parts (Shim)
SP-454	**P10**	Spare Parts (Shim)
SP-521	**P11**	Spare Parts (Shim)
SP-521P	**P11**	Spare Parts (Shim)
SP-523	**P11**	Spare Parts (Shim)
SP-523P	**P11**	Spare Parts (Shim)
SP-541	**P11**	Spare Parts (Shim)
SP-543	**P11**	Spare Parts (Shim)
SP-826	**P11**	Spare Parts (Shim)
SP-829	**P11**	Spare Parts (Shim)
SP-841	**P11**	Spare Parts (Shim)
SP-843	**P11**	Spare Parts (Shim)
SP-849	**P11**	Spare Parts (Shim)
SP-861	**P11**	Spare Parts (Shim)
SPCN ○○EDTR	**B11**	Insert (Milling)
SPCN ○○EETR1	**B11**	Insert (Milling)
SPCN ○○XPTR	**B11**	Insert (Milling)
SPCT ○○T○○○□□-□□	**H22**	Insert (Milling)
SPCT ○○T○○○□%-□□	**H22**	Insert (Milling)
SPEN ○○EEER	**B11**	Insert (Milling)
SPEN ○○EESR	**B11**	Insert (Milling)
SPET ○○T○○○□%-□□	**H22**	Insert (Milling)
SPG ○○○	**B11**	Insert (Milling)
SPKN ○○EDER	**B11**	Insert (Milling)
SPKN ○○EDFR	**B11**	Insert (Milling)
SPKN ○○EDT%	**B11**	Insert (Milling)
SPKN ○○XETR	**B11**	Insert (Milling)
SPKN ○○XPFR	**B11**	Insert (Milling)
SPKN ○○XPTR	**B11**	Insert (Milling)

Part Numbers in Alphanumeric Order

○ : NUMBER □ : LETTER

Part Number	Page	Description
SPKR ○○EDER-S	**B11**	Insert (Milling)
SPM ○○○	**B11**	Insert (Milling)
SPMR ○○EDER-H	**B11**	Insert (Milling)
SPMT ○○○○EDER-NB○	**B23**	Insert (Milling)
SPMT ○○○○EDER-NB○P	**B23**	Insert (Milling)
SPMT ○○○○EDER-V	**B23**	Insert (Milling)
SPMT ○○○○EDS%-NB○□	**B23**	Insert (Milling)
SPMT ○○○○○○EN-NB○	**B24**	Insert (Milling)
SPMT ○○○○○○EN-NB○P	**B24**	Insert (Milling)
SPMT ○○○○○○EN-V	**B24**	Insert (Milling)
SPMT ○○○○○○E-Z	**B24**	Insert (Milling)
SP-RC	**P12**	Spare Parts (Shim)
SPW-6045	**E50, P6**	Spare Parts (Screw)
SPW-7050	**C2, C4, E44, P6**	Spare Parts (Screw)
SS-4N	**P6**	Spare Parts (Shim Screw)
SV-60136R	**E48, P6**	Spare Parts (Screw)
SV-60136TR	**C19, P6**	Spare Parts (Screw)
SVN-32	**P12**	Spare Parts (Shim)
SVN-32N	**P12**	Spare Parts (Shim)
T		
T7	**E70, E73, K4, K5**	Spare Parts (Wrench)
T10	**E70-E72, K5**	Spare Parts (Wrench)
T15	**E73, K4, K5**	Spare Parts (Wrench)
TEEN ○○PTFR	**B26**	Insert (Milling)
TEEN ○○PTFR-NE	**B26**	Insert (Milling)
TEEN ○○PTTR	**B12**	Insert (Milling)
TEKN ○○PTFR	**B12, B26**	Insert (Milling)
TEKN ○○PTFR-NE	**B26**	Insert (Milling)
TEKN ○○PTTR	**B12**	Insert (Milling)
TEKR ○○PTER-S	**B12**	Insert (Milling)
TEMR ○○PTER-H	**B12**	Insert (Milling)
TEMT ○○○○○○-AQ	**B24**	Insert (Milling)
TH-3L	**H20-H21**	Spare Parts (Wrench)
TH-4	**C16, C22, P18**	Spare Parts (Hexagon Wrench / T-Shape Type)
TH8X15	**C22, P6**	Spare Parts (Screw)
TN-32	**P12**	Spare Parts (Shim)
TN-43	**P12**	Spare Parts (Shim)
TNW-32	**P12**	Spare Parts (Shim)
TPG ○○○(○)(○)(○)	**B12, B26**	Insert (Milling)
TPK ○○PDFR	**B12**	Insert (Milling)
TPK ○○PDTR	**B12**	Insert (Milling)
TPKR ○○PDER-S	**B12**	Insert (Milling)
TPM ○○○	**B12**	Insert (Milling)
TPMR ○○PDER-H	**B12**	Insert (Milling)
TS-3S	**P7**	Spare Parts (Lock Pin)
TT-15	**C2, C4, C10, C12, E44-E45, P18**	Spare Parts (Torx Wrench / T-Shape Type)
TT-15L	**H9**	Spare Parts (Torx Wrench / T-Shape Type)
TT-25	**J2, P18**	Spare Parts (Torx Wrench / T-Shape Type)
TT-25L	**D5, E56, E59, E61, P18**	Spare Parts (Torx Wrench / T-Shape Type)
TT-30	**J2, P18**	Spare Parts (Torx Wrench / T-Shape Type)
TTC-20	**C16, C19, P18**	Spare Parts (Torx Wrench / T-Shape Type)
TTC-25	**C18, E48, P18**	Spare Parts (Torx Wrench / T-Shape Type)
TTP-20	**F4, F6, F9, J6-J9, J13-J14, J17, P18**	Spare Parts (Torx Wrench / T-Shape Type)
V		
VCMT ○○○HQ	**B25, K4**	API Insert (Ring Grooving)

Part Number	Page	Description
W		
W-6	**P18**	Spare Parts (Washer)
W-8	**P18**	Spare Parts (Washer)
W6-14	**P18**	Spare Parts (Washer)
W6X17	**C19, P6**	Spare Parts (Screw)
W6X18	**H20-H21, P6**	Spare Parts (Wedge Lock Screw)
W6X18N	**C10, C12, P6**	Spare Parts (Wedge Lock Screw)
W6X20	**H20-H21, P6**	Spare Parts (Wedge Lock Screw)
W8X16	**E48, P6**	Spare Parts (Screw)
W8X18	**E49, P6**	Spare Parts (Screw)
W8X21	**C16, P6**	Spare Parts (Wedge Lock Screw)
WB-5	**P18**	Spare Parts (Washer)
WB-6	**P18**	Spare Parts (Washer)
WB-8	**P18**	Spare Parts (Washer)
WC- ○○	**H20-H21**	Spare Parts (Wedge)
WCS-1N	**P14**	Spare Parts (Clamp Set)
WCS-8	**P14**	Spare Parts (Clamp Set)
WN-1	**P19**	Spare Parts (Shim Nut)
WNEU ○○○○○○EN-GL	**B17**	Insert (Milling)
WNGT ○○○○○○FN-AM	**B17**	Insert (Milling)
WNMU ○○○○○○EN-GH	**B17**	Insert (Milling)
WNMU ○○○○○○EN-GM	**B17**	Insert (Milling)
WNMU ○○○○○○EN-SM	**B17**	Insert (Milling)
WOF07R	**C16**	Spare Parts (Wedge)
WP-1S	**P7**	Spare Parts (Shim Pin)
WP5X11	**P7**	Spare Parts (Shim Pin)
WP5X15	**P7**	Spare Parts (Shim Pin)
WSP-1	**P18**	Spare Parts (Spacer)
WTN-33	**P12**	Spare Parts (Shim)
WTN-33-20	**P12**	Spare Parts (Shim)
WWN-42	**P12**	Spare Parts (Shim)
WWP-42	**P12**	Spare Parts (Shim)
WWP-42-16	**P12**	Spare Parts (Shim)
X		
XNS610	**C2, E44, F4, P6**	Spare Parts (Mounting Screw)
XPMT ○○○○○○	**B25**	Insert (Milling)
XPMT ○○T○○○	**B25**	Insert (Milling)

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