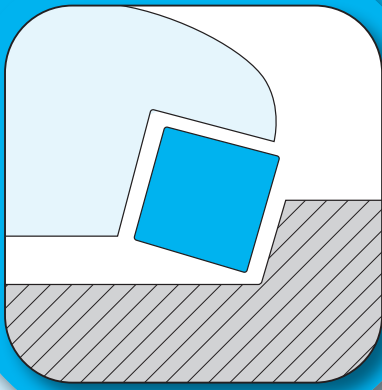


# Milling

**M1~M193**



# M

## Milling Series M2~M8

Product Lineup M2

## Milling Inserts M9~M25

Milling Inserts Identification System M9

Milling Inserts M10



## Lead Angle 45° / 24° / 20° M26~M42

MFPN45 M26

MFPN66 M30

MFK M34

MOF45 M40

MSO45-S / MSO45 M42



## Lead Angle 15° M43~M45

MSRS15 M43



## Lead Angle 0° / 2° M46~M107

MEW M46

MEC / MECX M56

MEWH M70

MECH M74

MFWN M82

MFSN88 M88

MSRS90 M92

MSR / MSR-BT50 M97

MTP90 M103

DMC / DMC-SX / DMC-H M104

MEAL M107

End Mill for Aluminum Alloys Machining

## High Feed Cutter M108~M127

MFH M108

MFH Harrier

MFH M117

MFH Mini

MFH M122

MFH Micro



## Multi-Function Machining End Mill M128~M133

MEY M128

MEZ-G M132



## Slot Mill M134~M159

MSTA M136

Width 1.6, 2.2(2.25), 3.05, 4.05 mm fixed

MSTB M140

Width 6 ~ 13mm Semi-Adjustable

MSTC M145

Width 14 ~ 23.3 mm Full-Adjustable



## Ball-nose End Mill / Radius Series (Face Mill + End Mill) M160~M175

MRF / MRFW M160

Magic Ball

MRW M162

MRX M168

MRP M174

Radius Mill

## Other Applications M176~M192

MCSE M176

Chamfering End Mill

MEF M178

Bolt Countersink End Mill

METS M180

T-Slot Mill

MFAH M182

High Speed Milling Cutter for Aluminum Alloys

MGI M190

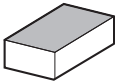
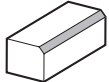
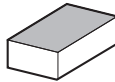
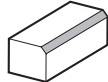

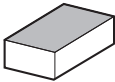
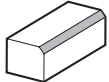
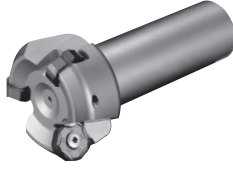
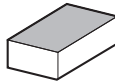
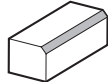



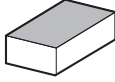
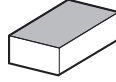

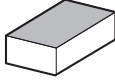

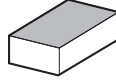



Grooving End Mill for M/C

MVG M192

Ring Grooving End Mill for M/C

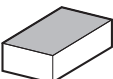
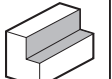
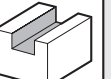
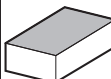
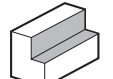
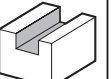







# Product Lineup

## Lead Angle 45°/24°/20°/15°

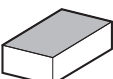
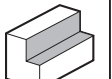
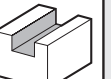
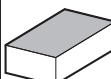
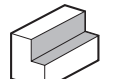
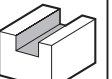

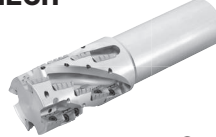






Lead Angle	Applications	Facing	Chamfering	Lead Angle	Applications	Facing	Chamfering
							
Shape				Shape			
45°	 <p><b>MFPN45</b></p> <ul style="list-style-type: none"> <li>● 10-edge pentagonal inserts</li> <li>● Double-sided pentagonal insert</li> <li>● Economical with 10-edge insert</li> <li>● Low cutting force with helical cutting-edge design</li> <li>● Dual Cutting Edge Design (High Toughness)</li> </ul> <p>➔ M26</p>			45°	 <p><b>MFPN45</b></p> <ul style="list-style-type: none"> <li>● 10-edge pentagonal inserts</li> <li>● Double-sided pentagonal insert</li> <li>● Economical with 10-edge insert</li> <li>● Low cutting force due to helical cutting-edge design</li> <li>● Dual Cutting Edge Design (High Toughness)</li> <li>● With ø32 cylindrical shank</li> </ul> <p>➔ M27</p>		
	 <p><b>MOF45</b></p> <ul style="list-style-type: none"> <li>● Octagonal Insert with 8-Edge Insert</li> <li>● Insert sizes are available in 05 and 07 types</li> <li>● Silver coated</li> </ul> <p>➔ M40</p>				 <p><b>MSO45-S</b></p> <ul style="list-style-type: none"> <li>● High efficiency machining of Stainless steel</li> <li>● Stronger edge with Insert Thickness 3.97mm</li> </ul> <p>➔ M42</p>		
	 <p><b>MSO45</b></p> <ul style="list-style-type: none"> <li>● Use insert size with 13.494mm internal circumference</li> </ul> <p>➔ M42</p>						
Lead Angle	Applications	Facing		Lead Angle	Applications	Facing	
Shape				Shape			
24°	 <p><b>MFPN66</b></p> <ul style="list-style-type: none"> <li>● Double-sided 10-edge Insert</li> <li>● Cutting Edge Angle 66°</li> <li>● Reduces Chattering with Low Cutting Force Design</li> </ul> <p>➔ M31</p>			24°	 <p><b>MFPN66</b></p> <ul style="list-style-type: none"> <li>● Double-sided 10-edge Insert</li> <li>● Cutting Edge Angle 66°</li> <li>● Reduces Chattering with a Low Cutting Force Design</li> <li>● With ø32,ø40 cylindrical shank</li> </ul> <p>➔ M32</p>		
	 <p><b>MFK</b></p> <ul style="list-style-type: none"> <li>● High Efficiency Multi-edge Cutter for Cast Iron</li> <li>● 10-edge pentagonal inserts</li> <li>● Economical Double-sided 10-edge Insert</li> <li>● Low cutting force with helical cutting-edge design</li> <li>● Improved surface finish, minimizing chattering and prevented burr formation</li> <li>● Dual Cutting Edge Design (High Toughness)</li> </ul> <p>➔ M36</p>				 <p><b>MSRS15</b></p> <ul style="list-style-type: none"> <li>● For Heavy Milling</li> <li>● Max. ap 12mm</li> <li>● Chip evacuation per unit time is increased</li> </ul> <p>➔ M44</p>		
20°	 <p><b>MFK-SF</b></p> <ul style="list-style-type: none"> <li>● Cutter for Cast Iron with Adjustable Cutting Edge Height</li> <li>● High speed and high precision machining of cast iron by combining ceramic insert and CBN wiper insert</li> </ul> <p>➔ M37</p>			15°			



## Lead Angle 0°/2° (Double-sided Insert)

Lead Angle	Applications			Lead Angle	Applications		
	Facing	Shouldering	Slotting		Facing	Shouldering	Slotting
							
0°	Shape			0°	Shape		
	<b>MEW End Mill</b>  M48				<b>MFWN Face Mill</b>  M84		
	<b>MEW Face Mill</b>  M49				<b>MFWN End Mill</b>  M85		
	<b>MEW Head (Modular type)</b>  M50				<b>MFSN88 Face Mill</b>  M89		
					<b>MFSN88 End Mill</b>  M90		
<ul style="list-style-type: none"> <li>● Economical Double-sided 4-edge Insert</li> <li>● Obtuse edge increases cutting edge toughness</li> <li>● Smooth surface wall with low cutting force and reduced chattering</li> </ul>			<ul style="list-style-type: none"> <li>● Economical Double-sided 6-edge Insert</li> <li>● Superior fracture resistance with thick edge design</li> <li>● "Large slant edge" Design reduces shock when cutting edge enters the workpiece</li> <li>● Low cutting force and reduce chattering</li> <li>● End mills have ø32 cylindrical shank</li> </ul>				
<ul style="list-style-type: none"> <li>● Economical Double-sided 8-edge Insert</li> <li>● Reduces Chattering with Low Cutting Force Design</li> <li>● Contribute to cost-cutting for Shoulder Roughing</li> <li>● End mills have ø32, ø40 cylindrical shank</li> </ul>							

## Lead Angle 0° (Heavy Milling)










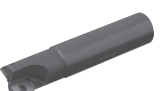




Lead Angle	Applications			Lead Angle	Applications		
	Facing	Shouldering	Slotting		Facing	Shouldering	Slotting
							
0° (Long Cutting Edge)	Shape			0° (Long Cutting Edge)	Shape		
	<b>MEWH</b>  M71				<b>MECH</b>  M74		
	<b>MEWH Shell Mill</b>  M72				<b>MECH Shell Mill</b>  M75		
	<b>MSR</b>  M98				<b>MECH-BT50</b> <b>MECH-BT50SA</b>   M75		
	<b>MSR-BT50</b>  M99						
	<ul style="list-style-type: none"> <li>● Low cutting force and sharp cutting performance</li> <li>● Excellent surface finish quality</li> <li>● Economical Double-sided 4-edge Insert</li> <li>● High quality and stable machining with heavy milling</li> </ul>				<ul style="list-style-type: none"> <li>● Notched insert improves higher productivity</li> </ul>		
	<ul style="list-style-type: none"> <li>● MEWH Shell Mill</li> </ul>				<ul style="list-style-type: none"> <li>● MECH Shell Mill</li> </ul>		
<ul style="list-style-type: none"> <li>● Low cutting force and restrain chattering with notched insert</li> <li>● Chipbreaker design with specialized notches improves chip evacuation</li> <li>● Chipbreaker achieves stabilized machining for heavy milling</li> </ul>			<ul style="list-style-type: none"> <li>● Highly rigid BT50 Arbor integrated for MECH</li> <li>● Head exchangeable type is available (MECH-BT50SA)</li> </ul>				
<ul style="list-style-type: none"> <li>● Highly rigid BT50 Arbor integrated for MSR</li> </ul>							

Insert Grades  
Turnable Inserts  
CNC & PCO Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Spare Parts  
Technical  
Index








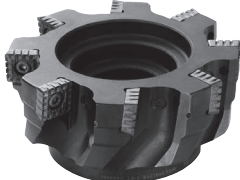

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

# Product Lineup

## Lead Angle 0°

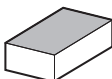

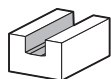
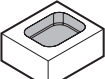


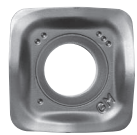
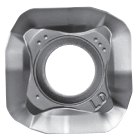
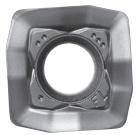
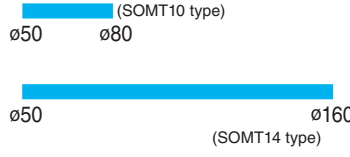

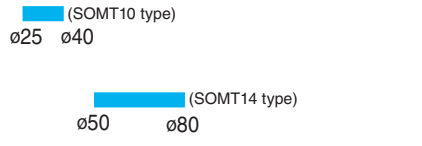














Lead Angle	Applications	Facing	Shouldering	Slotting	Lead Angle	Applications	Facing	Shouldering	Slotting
									
0°	Shape				0°	Shape			
	<b>MEC</b>  M56	<ul style="list-style-type: none"> <li>● Good squareness</li> <li>● Low cutting force</li> <li>● The silver coating prevents chip wear on the tool body</li> <li>● With coolant hole (Over <math>\phi 16</math>)</li> </ul>				<b>DMC</b>  M104	<ul style="list-style-type: none"> <li>● For small milling machine and M/C</li> </ul>		
	<b>MEC Head (Modular type)</b>  M59					<b>DMC-H</b>  M106	<ul style="list-style-type: none"> <li>● High Rake</li> <li>● For small milling machine and M/C</li> </ul>		
	<b>MECX</b>  M66	<ul style="list-style-type: none"> <li>● Good squareness</li> <li>● Small size insert with multi-edge specification</li> <li>● Low cutting force</li> <li>● The silver coating prevents chip wear on the tool body</li> <li>● With coolant hole</li> </ul>				<b>DMC-SX</b>  M105	<ul style="list-style-type: none"> <li>● For small milling machine and M/C</li> </ul>		
<b>MTP90</b>  M103	<ul style="list-style-type: none"> <li>● Medium to Roughing of Steel / Cast iron</li> <li>● For small machines and M/C</li> </ul>			<b>MEAL</b>  M107	<ul style="list-style-type: none"> <li>● For Aluminum alloys</li> <li>● With coolant hole</li> </ul>				

## Lead Angle 0°

Lead Angle	Applications	Facing	Shouldering	Slotting	Lead Angle	Applications	Facing	Shouldering	Slotting
									
0°	Shape				0°	Shape			
	<b>MEC</b>  M58	<ul style="list-style-type: none"> <li>● The twisted cutting edge improves cutting performance</li> <li>● Smooth surface of shoulder wall</li> <li>● Good squareness</li> <li>● The silver coating prevents chip wear on the tool body</li> <li>● With coolant hole</li> </ul>				<b>MSRS90</b>  M94	<ul style="list-style-type: none"> <li>● High efficiency, low cutting force and stable machining without chatter</li> <li>● Various expansive possibilities with combining neutral insert and custom-ordered cutter</li> </ul>		
<b>MECX</b>  M67	<ul style="list-style-type: none"> <li>● Efficient machining with small diameter cutter that holds multiple inserts</li> <li>● Recommended for small machines : low cutting force and high strength design</li> <li>● The silver coating prevents chip wear on the tool body</li> <li>● With coolant hole</li> </ul>								

M  
Milling

# High Feed Cutter

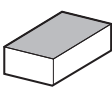


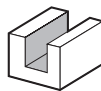
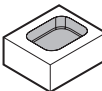
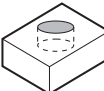

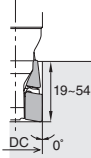


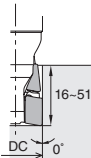

Applications	Facing	Shouldering	Slotting	Pocketing	Cutting Dia. DC
					
Shape					
<b>MFH Harrier Face Mill</b>  M110	● Various applications with 3 types of inserts   				
<b>MFH Harrier End Mill</b>  M112	● 3D convex cutting edge reduces shock of biting workpiece ● Multi-functional cutter for ramping, helical milling vertical milling (plunging) etc. (GM type) GM type (General purpose) LD type (Large ap) MAX.ap=5mm FL type (With Wiper Edge) Applicable for both roughing and finishing				
<b>MFH Harrier Head (Modular type)</b>  M114					
<b>MFH Mini Face Mill</b>  M119	● Economical Double-sided 4-edge Insert  GM type				
<b>MFH Mini End Mill</b>  M118	● High efficiency and high feed machining at small dia. machining and small machining center				
<b>MFH Mini Head (Modular type)</b>  M119					
<b>MFH Micro End Mill</b>  M124	● Micro Dia. Cutter for High Feed Machining ● High efficiency machining with low cutting force and reduced chattering 				
<b>MFH Micro Head (Modular type)</b>  M125					

Insert Grades  
 Turning  
 Indexable Inserts  
 CNC & PC D Tools  
 External  
 Small Parts  
 Machining  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Tools for  
 Turning Mill  
 Spare Parts  
 Technical  
 Information  
 Index

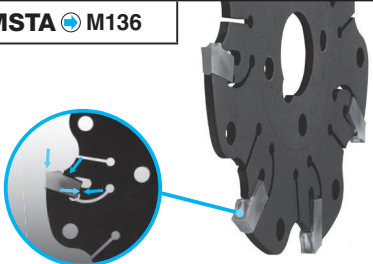
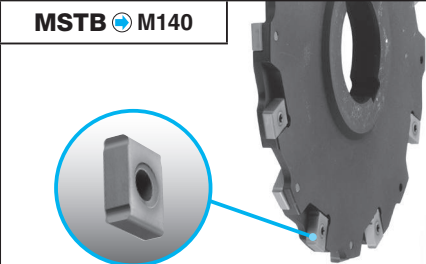
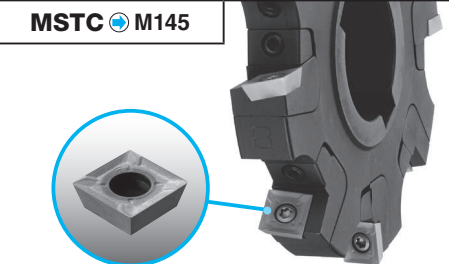
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 B  
 C  
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# Product Lineup

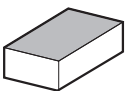
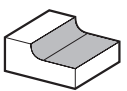
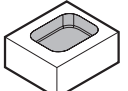
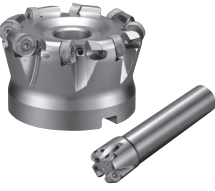
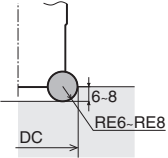


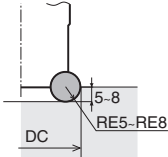


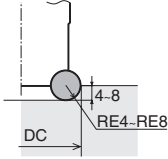


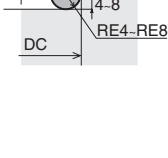


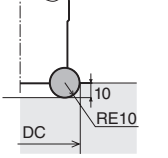

## Multi-Function Machining End Mill

Applications Shape	Facing	Shouldering	Slotting	Deep Slotting	Pocketing	Drilling	Lead Angle and Max. ap	Cutting Dia. DC ø16 ø25 ø50
								
<b>MEY</b>  M128	<ul style="list-style-type: none"> <li>● Multi-function machining (Drilling / Ramping / Shouldering / Grooving)</li> <li>● High efficiency mold machining</li> <li>● Low cutting force, Good chip evacuation</li> </ul>	<ul style="list-style-type: none"> <li>● Full 2-Flute structure and high stability</li> <li>● Good chip control when Ramping</li> </ul>	<ul style="list-style-type: none"> <li>● Cutting diameters that are larger than the shank diameters enables wall shouldering</li> <li>● The silver coating prevents chip wear on the tool body</li> </ul>					
<b>MEZ-G</b>  M132	<ul style="list-style-type: none"> <li>● Multi-function machining (Drilling / Ramping / Shouldering / Grooving)</li> <li>● High efficiency mold machining</li> <li>● Low cutting force, Good chip evacuation</li> </ul>	<ul style="list-style-type: none"> <li>● The silver coating prevents chip wear on the tool body</li> <li>● The clearance groove prevents chip welding</li> </ul>						

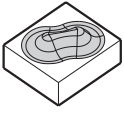
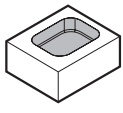

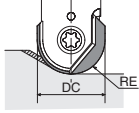


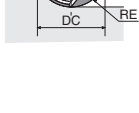

## Slot Mill MST

MSTA M136	MSTB M140	MSTC M145
		
<ul style="list-style-type: none"> <li>● Self-clamping type</li> <li>● Remove insert with appropriate wrench</li> </ul>	<ul style="list-style-type: none"> <li>● Easy screw on tangential clamped insert</li> </ul>	<ul style="list-style-type: none"> <li>● Adjustable slotting width due to unique cam adjustment structure</li> </ul>

## Radius

Applications Shape	Facing	Shouldering	Pocketing	Lead Angle and Max. ap	Cutting Dia. DC
					
<b>MRW Face Mill End Mill</b>  M164	<ul style="list-style-type: none"> <li>High efficiency radius cutter with double-sided insert</li> <li>Combine sharpness and cutting edge strength (A.R. Max. +12°)</li> <li>Prevent insert rotation during machining with Flat Lock Structure</li> <li>Wide application range from steel to heat-resistant alloys</li> </ul>				
<b>MRX Face Mill</b>  M169	<ul style="list-style-type: none"> <li>Low cutting force and high performance Radius Cutter</li> <li>Low cutting force with helical cutting-edge design (A.R. Max. +10°)</li> <li>Prevent insert rotation during machining with Flat Lock Structure</li> </ul>				
<b>MRX End Mill</b>  M170	<ul style="list-style-type: none"> <li>Wide application from facing, grooving, pocketing to plunging</li> <li>Wide application range from steel to heat-resistant alloys</li> </ul>				
<b>MRX Head (Modular type)</b>  M171					
<b>MRP</b>  M174					

## Ball-nose End Mill

Applications Shape	Contouring / Profiling	Pocketing	Lead Angle and Max. ap	Cutting Dia. DC
				
<b>MRF</b>  M160	<ul style="list-style-type: none"> <li>For high quality mold finishing</li> <li>High R-accuracy (Insert's R-accuracy: ±0.01mm or under)</li> <li>The bushing ensures insert installation accuracy</li> </ul>			
<b>MRFW</b>  M160	<ul style="list-style-type: none"> <li>Carbide Shank</li> <li>For high quality mold finishing</li> <li>High R-accuracy (Insert's R-accuracy: ±0.01mm or under)</li> <li>The bushing ensures insert installation accuracy</li> <li>Superior to anti vibration, and stable machining is possible with long overhang length without chattering</li> </ul>			

Insert Grades  
Turning  
Indexable Inserts  
CNC & PCO Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

# Product Lineup

## Chamfering

Applications	Chamfering	Back Chamfering	V Shape Slotting	Countersinking	Lead Angle and Max. ap
Shape					
<b>MCSE</b>  M176	<ul style="list-style-type: none"> <li>● For 30°, 45°, 60° Chamfering</li> <li>● Economical 4-edge Insert</li> <li>● Available back chamfering</li> </ul>				

## Bolt Countersinking

Applications	Bolt Countersinking	Facing	Shouldering	Lead Angle and Max. ap
Shape				
<b>MEF</b>  M178	<ul style="list-style-type: none"> <li>● Countersink for hexagon socket bolt (M6 ~ M30)</li> <li>● Economical 4-edge Insert</li> </ul>			

## T-Slotting

Applications	T-Slotting	Back side milling	Lead Angle and Max. ap
Shape			
<b>METS</b>  M180	<ul style="list-style-type: none"> <li>● T-Slotting</li> <li>● Recommended for high feed machining with 2 flute design</li> <li>● Economical 4-edge Insert</li> </ul>		

## Cutter for Aluminum Alloys

<b>MFAH</b>  M182	<ul style="list-style-type: none"> <li>● High Efficiency Milling Cutter for Finishing Aluminum Alloys</li> <li>● Light-weight Hybrid Body with Internal Coolant Available / Steel Body</li> <li>● Adjustable Cutting Edge Height</li> <li>● 3 Different Cutting Edge Design</li> </ul>
-------------------------	--

## Grooving

Applications	Internal Grooving	Ring Grooving	Lead Angle and Max. ap
Shape			
<b>MGI</b>  M190	<ul style="list-style-type: none"> <li>● Edge Width 1.0 ~ 4.0mm</li> <li>● Grooving for M/C</li> </ul>		
<b>MVG</b>  M192		<ul style="list-style-type: none"> <li>● Cutting Dia. ø30 ~ ø75</li> <li>● Edge Width 4.0 ~ 4.9mm</li> <li>● O-Ring Grooving (G Series)</li> </ul>	



# Milling Inserts Identification System

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

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

(1) Shape

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

(2) Relief Angle

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

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

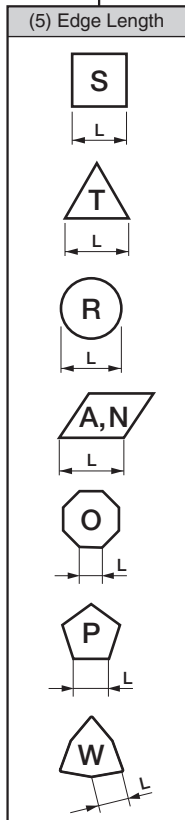
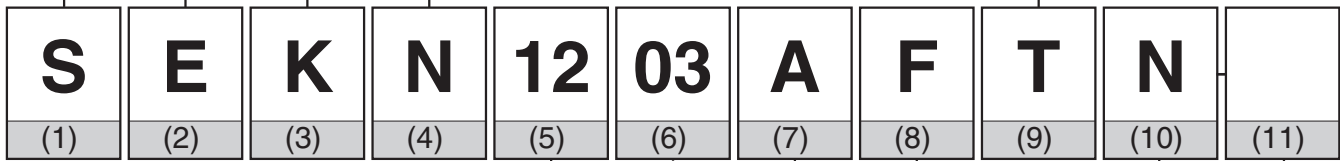
(3) Tolerance

Symbol	Shape
W	No chipbreaker, with hole
T	Single-sided chipbreaker, with hole
F	Double-sided chipbreakers, without hole
N	No Chipbreaker, without hole
R	Single-sided chipbreaker, without hole
M	Single-sided chipbreaker, with hole
A	No chipbreaker, with hole

(4) Chipbreaker / Hole

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

(9) Edge Preparation



(6) Thickness

Symbol	Thickness (mm)
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35

(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) Hand of Tool

Symbol	Hand of Tool
R	Right-hand
L	Left-hand
N	Neutral

(11) Manufacturer's Option  
Chipbreaker, etc.

In case of indicating corner-R(RE) at (7) and (8)

(7) (8) Corner-R(RE) (mm)

04	0.4
08	0.8
12	1.2
16	1.6
20	2.0

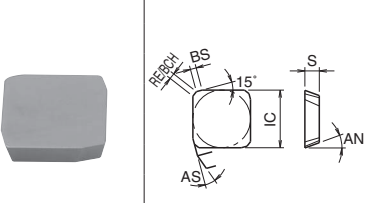
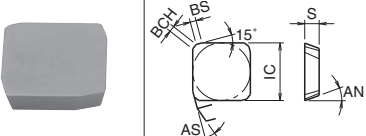
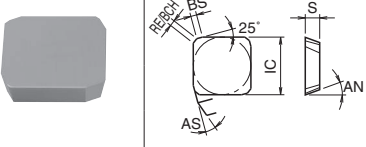
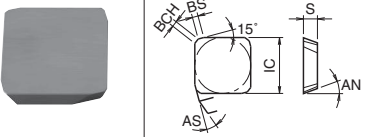
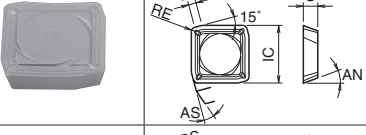
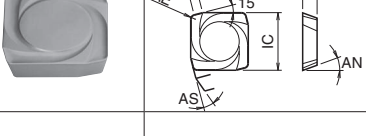
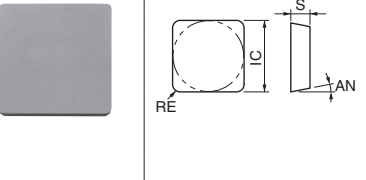
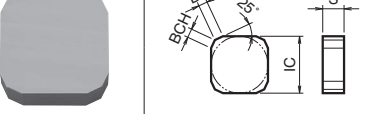
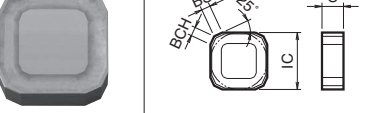
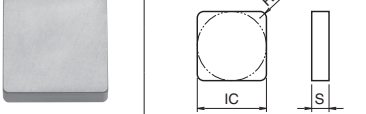
Insert Grades  
Turnable  
Indexable Inserts  
CNC & PCD Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T



# Milling Inserts

Classification of usage		P	M	K	N	S	H
★	Roughing / 1st Choice	Carbon Steel / Alloy Steel Mold Steel	Stainless Steel	Gray Cast Iron Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys Titanium Alloys	Hard Materials
☆	Roughing / 2nd Choice						
■	Finishing / 1st Choice						
□	Finishing / 2nd Choice						
(In case hardness is 45HRC or under)							

Insert Handed Insert shows Right-hand	Description	Dimension (mm)							Angle		Cermet										See Page for Applicable Toolholders				
		IC	S	BCH	BS	RE	AN	AS	TN60	TN100M	TC60M	CA6535	CA420M	MN	MEGACOAT	PR1225	PR1210	PR830	KW10						
	SPCN 1203EDTR	12.70	3.18	-	1.0	11°	15°	●																	
	SPKN 1203EDTR			1.0	2.0																				
	1203EDTL			-	1.0																				
	1203EDER																								
	1203EDFR							1.0	1.6																
SPKN 1504EDTR	15.875	4.76		2.2				●																	
1504EDFR																									
	SPEN 1203EEER	12.70	3.18	1.0	1.4	11°	20°						●												
	1203EESR																								
	SPCN 1203XPTR	12.70	3.18	-	1.0	11°	11°	●																	
	SPKN 1203XPTR				2.0																				
	1203XPFR																								
SPKN 1504XETR	15.875	4.76	1.0	-			20°	●																	
	SPCN 1904EETR1	19.05	4.76	0.7	1.2	-	11°	20°	●																
	SPKR 1203EDER-S	12.70	3.18	-	2.0	1.0	11°	15°	●																
	SPMR 1203EDER-H	12.70	3.18	-	2.0	1.0	11°	15°																	
	SPMN 120308	12.70	3.18	-	-	-	11°	-	●	●															
	120312								●	●															
	SPMN 120408	4.76	0.8																						
	120412								1.2																
	SPGN 090304	9.525	3.18						0.4																
	090308									0.8															
SPGN 120304	12.70	0.4																							
120308			0.8																						
	SNCN 1204XNTN	12.70	4.76	2.0	2.0	-	-	-	●																
	SNKN 1204XNTN								●																
	SNMF 1204XNTN	12.70	4.76	2.0	2.0	-	-	-	●																
	SNMN 120408	12.70	4.76	-	-	-	-	-																	
	120412								0.8																
	120424								1.2																

\* MN indicates MEGACOAT NANO.

● : Std. Item

Inserts are sold in 10 piece boxes

Insert Grades  
Turnable Inserts  
CN & PCD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Spare Parts  
Technical  
Index


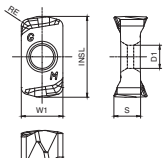




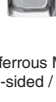


A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T



# Milling Inserts (With Hole)

Classification of usage		P	Carbon Steel / Alloy Steel			☆	★												
	Mold Steel					☆	★												
M Stainless Steel	Austenitic related					★	☆												
	Martensitic related					★													
	Precipitation Hardening						★												
K	Gray Cast Iron																		
	Nodular Cast Iron																		
N	Non-ferrous Metals																		
S	Heat-resistant Alloys																		
	Titanium Alloys																		
H	Hard Materials																		

★ : Roughing / 1st Choice  
 ☆ : Roughing / 2nd Choice  
 ● : Finishing / 1st Choice  
 □ : Finishing / 2nd Choice  
 (In case hardness is 45HRC or under)

Insert	Description	Dimension (mm)						Cermert TN100M	CVD Coated Carbide CA6535	CA420M	MEGACOAT NANO			MEGA COAT			Silicon Nitride Ceramic KS6050	CVD Coated Silicon Nitride/Ceramic CS7050	DLC Coated Carbide PDL025	Carbide GW25	See Page for Applicable Toolholders		
		W1	S	D1	L INSL	BS	RE				PR1535	PR1525	PR1510	PR1225	PR1210	PR1205							
 General purpose	 <b>LOGU 030310ER-GM</b>	6.2	3.96	3.45	11.9	-	1.0	●			●	●	●							M118 M119			
 General purpose	<b>LOMU 100404ER-GM</b> <b>LOMU 100408ER-GM</b> <b>LOMU 100412ER-GM</b> <b>LOMU 100416ER-GM</b> <b>LOMU 100420ER-GM</b>	6.6	4.0	3.4	10.9		2.1	0.4	●	●	●	●								M48 M49 M50			
						1.7	0.8	●	●	●	●												
						1.3	1.2	●	●	●	●												
						1.0	1.6	●	●	●	●												
						1.0	2.0	●	●	●	●												
		2.2	0.4	●	●	●	●																
		1.8	0.8	●	●	●	●																
		1.6	1.0				●																
		1.4	1.2	●	●	●	●																
		1.0	1.6	●	●	●	●																
	1.6	2.0	●	●	●	●																	
 Low cutting force	<b>LOMU 100408ER-SM</b>	6.6	4.0	3.4	10.9	1.7	0.8	●	●	●	●												
 Low cutting force	<b>LOMU 150508ER-SM</b>	9.2	5.6	4.8	15.7	1.8	0.8	●	●	●	●												
 Tough Edge (For Heavy Milling)	<b>LOMU 100408ER-GH</b>	6.6	4.0	3.4	10.9	1.7	0.8	●	●	●	●												
 Tough Edge (For Heavy Milling)	<b>LOMU 150508ER-GH</b>	9.2	5.6	4.8	15.7	1.8	0.8	●	●	●	●												
 Non-ferrous Metals (Single-sided / 2-edge)	<b>LOGT 100408FR-AM</b>	6.8	4.0	3.6	11.2	2.8	0.8											●	●				
	<b>LOGT 150508FR-AM</b>	8.9	5.6	4.9	15.9	2.9	0.8												●	●			
 General purpose	<b>LPGT 010210ER-GM</b>	4.19	2.19	2.1	6.26	-	1.0	●	●	●										M124 M125			

- Insert Grades
- Indexable Inserts
- Turned Inserts
- CBN & PCD Tools
- External
- Small Parts
- Boring
- Grooving
- Cut-off
- Threading
- Drilling
- Solid Tools
- Milling
- Tools for Turning Mill
- Spare Parts
- Technical Information
- Index

- A
- B
- C
- D
- E
- F
- G
- H
- J
- K
- L
- M
- N
- P
- R
- T


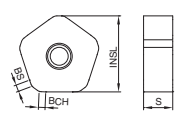
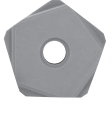
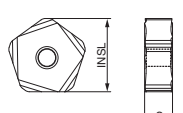
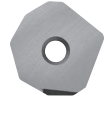


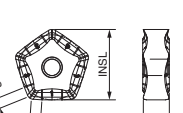

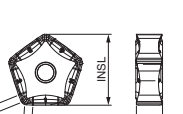
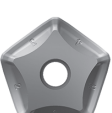
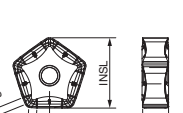
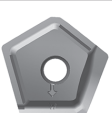
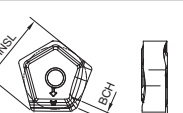
● : Std. Item

Inserts are sold in 10 piece boxes

# Milling Inserts

## Milling Inserts (With Hole)

Classification of usage		P	Carbon Steel / Alloy Steel																
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	M	Carbon Steel / Alloy Steel																	
	Stainless Steel	Austenitic related																	
		Martensitic related																	
		Precipitation Hardening																	
	K	Gray Cast Iron	★																
		Nodular Cast Iron	★																
	N	Non-ferrous Metals																	
	S	Heat-resistant Alloys																	
		Titanium Alloys																	
	H	Hard Materials																	

Insert	Description	Dimension (mm)					Cermert	CVD Coated Carbide	MEGACOAT NANO			MEGA COAT		Silicon Nitride CVD Coated Carbide	Silicon Nitride Ceramic	CBN	See Page for Applicable Toolholders	
		INSL	S	D1	BCH	BS			TN100M	CA6535	CA420M	PR1535	PR1525					PR1510
 High speed machining Handed Insert shows Right-hand	 PNEA 1106XNTN-T01020	16.94	6.5	-	1.5	1.5												
 High speed machining (With Chipbreaker)	 PNEG 1106XNTR-T00515	17.07	6.35	-	-	-												
 Wiper Insert (2-edge)	 PNEG 1106XNTR-T01015W	18.06	6.5	-	1.7	4.8												
 Surface-Finish Oriented	 PNEG 1106XNEN-GL	17.18			2.6	2.6												M36 M37
 General purpose	 PNMG 1106XNEN-GM	17.23	6.35	-		2.0												
 Tough Edge	 PNMG 1106XNEN-GH				2.0													
 Wiper Insert (2-edge)	 PNEG 1106XNER-W	18.02				10.0												

M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

Inserts are sold in 10 piece boxes

PNEG1106XNER-W Inserts are sold in 5 piece boxes

PNEG1106XNTR-T01015W Inserts are sold in 1 piece boxes

● : Std. Item



# Milling Inserts (With Hole)

Classification of usage		P	M	K	N	S	H
Carbon Steel / Alloy Steel	Mold Steel	■				☆	★
Austenitic related	Martensitic related		★			☆	☆
Precipitation Hardening	Gray Cast Iron			★			
	Nodular Cast Iron					★	☆
	Non-ferrous Metals						
	Heat-resistant Alloys					★	☆
	Titanium Alloys					★	☆
	Hard Materials						□

★ : Roughing / 1st Choice  
 ☆ : Roughing / 2nd Choice  
 ■ : Finishing / 1st Choice  
 □ : Finishing / 2nd Choice  
 (In case hardness is 45HRC or under)

Insert	Description	Dimension (mm)					Cermet		CVD Coated Carbide		MEGACOAT NANO			MEGA COAT		See Page for Applicable Toolholders
		INSL	S	D1	BCH	BS	TN620M	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	
General purpose							●				●	●	●			M31 M32
Low cutting force		14.6	5.56	4.7	2.0	2.0					●	●	●			
Tough Edge (For Heavy Milling)											●	●	●			
Surface-Finish Oriented (Precision Class)		17.51			2.7	2.7	●	●		●	●	●	●	●		M26 M27
General purpose			5.56				●	●		●	●	●	●	●		
Low cutting force					2.0	2.0			●	●	●	●	●	●		
Tough Edge (For Heavy Milling)		17.98	6.17	6.2					●	●	●	●	●	●		
Wiper Insert (2-edge)		17.85			2.3	8.1	●	●	●	●	●	●	●	●		
Surface-Finish Oriented (Precision Class)		17.51	5.56		2.7	2.7	●	●		●	●	●	●	●		
General purpose		17.88			2.0	2.0	●	●		●	●	●	●	●		M26

● : Std. Item

Inserts are sold in 10 piece boxes

PNEU1205ANER-W Inserts are sold in 5 piece boxes










Insert Grades  
Indexable Inserts  
Turned Inserts  
CNC & PCD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

# Milling Inserts

## Milling Inserts (With Hole)

Classification of usage		P	Carbon Steel / Alloy Steel	■	☆	★														
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	M	Mold Steel	■		☆	★														
	Stainless Steel	Austenitic related			☆	★														
		Martensitic related			★	☆														
		Precipitation Hardening				★														
	K	Gray Cast Iron																		
	N	Nodular Cast Iron																		
	S	Non-ferrous Metals																		
	S	Heat-resistant Alloys			★	☆														
	H	Titanium Alloys			★															
	H	Hard Materials																		

Insert	Description	Dimension (mm)							Angle	Cermert	CVD Coated Carbide	MEGACOAT NANO	MEGA COAT	Silicon Nitride	Aluminum Nitride	See Page for Applicable Toolholders	
		IC	S	D1	INSL	BS	RE	AN									
 General purpose (G Class)	RDGT 0803M0ER-GM	8	3.18	3.0				4	15°		●	●	●			M170 M171	
	RPGT 10T3M0ER-GM	10	3.97	3.5				5			●	●	●			M169	
	1204M0ER-GM	12	4.76	4.6				6	11°		●	●	●			M170	
	1605M0ER-GM	16	5.56	5.8				8			●	●	●			M171	
 General purpose (M Class)	RDMT 0803M0ER-GM	8	3.18	3.0				4	15°		●	●	●			M170 M171	
	RPMT 10T3M0ER-GM	10	3.97	3.5				5			●	●	●			M169	
	1204M0ER-GM	12	4.76	4.6				6	11°		●	●	●			M170	
	1605M0ER-GM	16	5.56	5.8				8			●	●	●			M171	
 Stainless Steel / Low cutting force	RDGT 0803M0ER-SM	8	3.18	3.0				4	15°		●	●				M170 M171	
	RPGT 10T3M0ER-SM	10	3.97	3.5				5			●	●				M169	
	1204M0ER-SM	12	4.76	4.6				6	11°		●	●				M170	
	1605M0ER-SM	16	5.56	5.8				8			●	●				M171	
 Tough Edge (For Heavy Milling)	RDMT 0803M0EN-GH	8	3.18	3.0				4	15°		●	●	●			M170 M171	
	RPMT 10T3M0EN-GH	10	3.97	3.5				5			●	●	●			M169	
	1204M0EN-GH	12	4.76	4.6				6	11°		●	●				M170	
	1605M0EN-GH	16	5.56	5.8				8			●	●				M171	
 General purpose	ROMU 1204M0ER-GM	12	4.75	4.6	11.8			6			●	●	●				
	1605M0ER-GM	16	5.48	6.2	15.8			8			●	●	●				
	 Low cutting force	ROMU 1204M0ER-SM	12	4.75	4.6	11.8			6			●	●				M164 M165
		1605M0ER-SM	16	5.48	6.2	15.8			8			●	●				
	 Tough Edge (For Heavy Milling)	ROMU 1204M0ER-GH	12	4.75	4.6	11.8			6			●	●	●			
		1605M0ER-GH	16	5.48	6.2	15.8			8			●	●	●			
 General purpose	SNMU 130508EN-GM										●		●	●			
	 Low cutting force	SNMU 130508EN-SM	13	5.51	4.7		1.0	0.8					●	●	●		M89 M90
		SNMU 130508EN-GH												●	●		

M

Milling

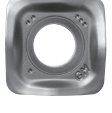
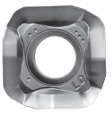
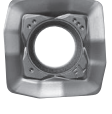
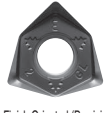

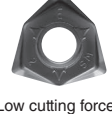
- Insert
- Lead Angle 45°-20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Inserts are sold in 10 piece boxes

● : Std. Item

# Milling Inserts (With Hole)

Classification of usage	P	Carbon Steel / Alloy Steel	■	☆	★															
	M	Mold Steel	■	☆	★															
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	Stainless Steel	Austenitic related		☆	★															
		Martensitic related		☆	★															
		Precipitation Hardening		★	☆															
	K	Gray Cast Iron																		
		Nodular Cast Iron																		
	N	Non-ferrous Metals																		★ ☆
	S	Heat-resistant Alloys		★	☆															
		Titanium Alloys		★	☆															
	H	Hard Materials																		

Insert	Description	Dimension (mm)					Angle	AN	CVD Coated Carbide										See Page for Applicable Toolholders							
		IC	S	D1	BS	RE			TN620M	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	K56050		CS7050	PDL025	GW25				
 General purpose	SOMT 100420ER-GM	10.30	4.58	4.6			-	2.0	16°		●	●	●	●												
	140520ER-GM	14.14	5.56	5.8							●	●	●	●												
 Large ap	SOMT 100420ER-LD	10.45	4.58	4.6	0.9			2.0	16°		●	●	●	●											M110	
	140520ER-LD	14.76	5.56	5.8	1.6						●	●	●	●											M112	
 With Wiper Edge	SOMT 100420ER-FL	10.44	4.58	4.6	1.4	2.0			16°		●	●	●	●											M113	
	140514ER-FL	14.57	5.56	5.8	3.1	1.4					●	●	●	●											M114	
 Surface-Finish Oriented (Precision Class)	WNEU 080608EN-GL					1.5	0.8			●	●	●	●	●												
	WNMU 080604EN-GM					1.7	0.4			●	●	●	●	●												
 General purpose	080608EN-GM									●	●	●	●	●												
	WNMU 080608EN-SM	14.02	6.65	6.2		1.3					●	●	●	●											M84	
 Low cutting force	WNMU 080608EN-GH						0.8				●	●	●	●											M85	
	WNGT 080608FN-AM					1.5															●	●				

- Insert Grades
- Indexable Inserts
- Turnings
- CBN & PCD Tools
- External
- Small Parts Machining
- Boring
- Grooving
- Cut-off
- Threading
- Drilling
- Solid Tools
- Milling
- Tools for Turning Mill
- Spare Parts
- Technical Information
- Index

- A
- B
- C
- D
- E
- F
- G
- H
- J
- K
- L
- M
- N
- P
- R
- T

● : Std. Item









Inserts are sold in 10 piece boxes

# Milling Inserts

## Milling Inserts (With Hole)

Classification of usage		P	Carbon Steel / Alloy Steel	☆	★	★	☆		
			Mold Steel		☆	★	★	☆	
M Stainless Steel	Austenitic related				☆	☆		☆	
	Martensitic related		★						
	Precipitation Hardening			★					
K	Gray Cast Iron						★		
	Nodular Cast Iron						★		
N	Non-ferrous Metals							★	☆
S	Heat-resistant Alloys		★	☆	★	★			
	Titanium Alloys			★			★		☆
H	Hard Materials				□			□	

★ : Roughing / 1st Choice  
 ☆ : Roughing / 2nd Choice  
 ■ : Finishing / 1st Choice  
 □ : Finishing / 2nd Choice  
 (In case hardness is 45HRC or under)

Insert	Description	Dimension (mm)				Angle		Cement	TiN Coated Surface	MN	MEGACOAT			TiN Coated Carbide	DLC Coated Carbide	Carbide	See Page for Applicable Toolholders					
		W1	S	D1	L	RE	AS				AN	TN100M	CA6535					PR1535	PR1225	PR1230	PR1210	PR830
 3-Notched Handed Insert shows Right-hand	APMT 250608ER-NB3	15.875	6.35	6.5	25	0.8	15°	11°				●	●				M98					
	250616ER-NB3					1.6					●	●				M99						
	250640ER-NB3					4.0					●											
	APMT 250616EL-NB3					1.6					●											
 4-Notched	APMT 250608ER-NB4	15.875	6.35	6.5	25	0.8	15°	11°				●	●				M98					
	250616ER-NB4					1.6					●	●									M99	
	250640ER-NB4					4.0					●											
	APMT 250616EL-NB4					1.6					●											
 3-Notched / Low cutting force	APMT 250616ER-NB3P	15.875	6.35	6.5	25	1.6	15°	11°					●	●			M98					
 4-Notched / Low Cutting Force	APMT 250616ER-NB4P	15.875	6.35	6.5	25	1.6	15°	11°					●	●			M99					
 BDMT 070302ER-JS BDMT 070304ER-JS BDMT 070308ER-JS	BDMT 070302ER-JS	4.6	2.6	2.3	6.7	0.2	16°	15°	●	●	●			□			M66					
	070304ER-JS					0.4			●	●	●			□								
	070308ER-JS					0.8			●	●	●			□								
 BDMT 070302ER-JT BDMT 070304ER-JT BDMT 070308ER-JT	BDMT 070302ER-JT	4.6	2.6	2.3	6.7	0.2	16°	15°	●	●	●		●	□			M67					
	070304ER-JT					0.4			●	●	●		●	□								
	070308ER-JT					0.8			●	●	●		●	□								
 BDGT 11T302FR-JA BDGT 11T304FR-JA BDGT 11T308FR-JA BDGT 170404FR-JA BDGT 170408FR-JA BDGT 170420FR-JA BDGT 170431FR-JA	BDGT 11T302FR-JA	6.7	3.8	2.8	11.0	0.2	18°	13°							●	●	M56					
	11T304FR-JA					0.4														●	●	M57
	11T308FR-JA					0.8														●	●	M58
	BDGT 170404FR-JA	9.6	4.9	4.4	17.0	0.4	18°	13°								●	●	M59				
	170408FR-JA					0.8													●	●		
	170420FR-JA					2.0														●	●	
	170431FR-JA					3.1														●	●	
 BDMT 110302ER-JS BDMT 110304ER-JS BDMT 110308ER-JS BDMT 11T302ER-JS BDMT 11T304ER-JS BDMT 11T308ER-JS BDMT 170404ER-JS BDMT 170408ER-JS	BDMT 110302ER-JS	6.3	3.0	2.8	11.0	0.2	18°	15°	●	●	●			□			M56					
	110304ER-JS					0.4			●	●	●			□								M57
	110308ER-JS					0.8			●	●	●			□								
	BDMT 11T302ER-JS	6.7	3.8	2.8	11.0	0.2	18°	13°	●	●	●			□			M56					
	11T304ER-JS					0.4			●	●	●			□							M57	
	11T308ER-JS					0.8			●	●	●			□								M58
	BDMT 170404ER-JS	9.6	4.9	4.4	17.0	0.4	18°	13°	●	●	●			□			M59					
	170408ER-JS					0.8			●	●	●			□								

\* MN indicates MEGACOAT NANO.

M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

Inserts are sold in 10 piece boxes

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

# Milling Inserts (With Hole)

Classification of usage		P	Carbon Steel / Alloy Steel	☆	★	★	☆
		■	Mold Steel	☆	★	★	☆
M Stainless Steel	Austenitic related			★	☆	☆	☆
	Martensitic related	★		☆			
	Precipitation Hardening			★			
K	Gray Cast Iron					★	
	Nodular Cast Iron					★	
N	Non-ferrous Metals						
S	Heat-resistant Alloys	★	☆	★	★		
	Titanium Alloys			★		★	
H	Hard Materials				□		□

★ : Roughing / 1st Choice  
 ☆ : Roughing / 2nd Choice  
 ■ : Finishing / 1st Choice  
 □ : Finishing / 2nd Choice  
 (In case hardness is 45HRC or under)

Insert Handed Insert shows Right-hand	Description	Dimension (mm)				Angle			Cermel TN100M	DVO Coated Carbide CA6535	MN PR1535	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR630	Carbide GW25	See Page for Applicable Toolholders
		W1	S	D1	L	RE	AS	AN									
	<b>BDMT 110302ER-JT</b>	6.3	3.0	2.8	11.0	0.2	18°	15°	●	●	●	●	●	□	M56 M57		
	<b>110304ER-JT</b>					0.4			●	●	●	●	□				
	<b>110308ER-JT</b>					0.8			●	●	●	●	□				
	<b>BDMT 11T302ER-JT</b>	6.7	3.8	2.8	11.0	0.2	18°	13°	●	●	●	●	●	□	M56 M57 M58 M59		
	<b>11T304ER-JT</b>					0.4			●	●	●	●	□				
	<b>11T308ER-JT</b>					0.8			●	●	●	●	□				
	<b>11T312ER-JT</b>					1.2			●	●	●	●	□				
	<b>11T316ER-JT</b>					1.6			●	●	●	●	□				
	<b>11T320ER-JT</b>					2.0			●	●	●	●	□				
	<b>11T324ER-JT</b>					2.4			●	●	●	●	□				
	<b>11T331ER-JT</b>					3.1			●	●	●	●	□				
	<b>BDMT 170404ER-JT</b>	9.6	4.9	4.4	17.0	0.4	18°	13°	●	●	●	●	●	□	M56 M57 M58 M59		
	<b>170408ER-JT</b>					0.8			●	●	●	●	□				
	<b>170412ER-JT</b>					1.2			●	●	●	●	□				
<b>170416ER-JT</b>	1.6					●			●	●	●	□					
<b>170420ER-JT</b>	2.0					●			●	●	●	□					
<b>170424ER-JT</b>	2.4					●			●	●	●	□					
<b>170431ER-JT</b>	3.1					●			●	●	●	□					
<b>170440ER-JT</b>	4.0					●			●	●	●	□					
	<b>BDMT 11T308ER-N2</b>	6.7	3.8	2.8	11.0	0.8	18°	13°	●	●	●	●	□	M74 M75 M76 M77			
	<b>BDMT 11T308ER-N3</b>	6.7	3.8	2.8	11.0	0.8	18°	13°	●	●	●	●	□				
	<b>BDMT 170408ER-N3</b>	9.6	4.9	4.4	17.0	0.8	18°	13°	●	●	●	●	□				
	<b>BDMT 170408ER-N4</b>	9.6	4.9	4.4	17.0	0.8	18°	13°	●	●	●	●	□	M128			
	<b>GOMT 08T208ER-D</b>	5.21	2.78	2.3	8.7	0.8	13°	17°	●	●	●	●	□				
	<b>100308ER-D</b>	6.56	3.30	2.8	10.7				●	●	●	□					
	<b>13T308ER-D</b>	8.36	3.85	3.4	13.2				●	●	●	□					
	<b>160408ER-D</b>	10.03	4.76	4.4	16.7				●	●	●	□					
	<b>JOMT 08T208ER-D</b>	5.14	2.78	2.3	8.5	0.8	17°	13°	●	●	●	●	□				
	<b>100308ER-D</b>	6.41	3.18	2.8	10.2				●	●	●	□					
	<b>13T308ER-D</b>	8.07	3.70	3.4	13.2				●	●	●	□					
	<b>160408ER-D</b>	9.72	4.50	4.4	16.7				●	●	●	□					

\* MN indicates MEGACOAT NANO.  
 ● : Std. Item  
 □ : Deleted from the next catalog

Inserts are sold in 10 piece boxes

Insert Grades  
 Turnable Inserts  
 CNX & PCD Tools  
 External  
 Small Parts  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Tools for Turning Mill  
 Spare Parts  
 Technical Information  
 Index



# Milling Inserts

## Milling Inserts (With Hole)

Classification of usage		P	M	K	N	S	H
★ : Roughing / 1st Choice	☆ : Roughing / 2nd Choice	■	■	■	■	■	■
■ : Finishing / 1st Choice	□ : Finishing / 2nd Choice	■	■	■	■	■	■
(In case hardness is 45HRC or under)		■	■	■	■	■	■

Insert Handed Insert shows Right-hand	Description	Dimension (mm)						Angle	Cermel TN100M	TiN Coated Carbide CA6535	MN PR1535	MEGACOAT				TiN Coated Carbide PR830	Carbide KW10	See Page for Applicable Toolholders
		IC	S	D1	L	RE	AN	PR125				PR1230	PR1210	PR1210				
	NDCT 090204TR 090204FR	6.35	2.38	2.8	9.5	0.4	15°	●									M104	
	NDCT 120208TR 120208FR	7.94	2.38	3.4	12.7	0.8	15°	●										
	NDCT 150308TR 150308FR	9.525	3.18	4.5	15.0	0.8	15°	●										M105
	NDCT 150308TRX	9.525	3.18	4.4	15.0	0.8	15°	●									M105 M106	
	NDCW 150302TR	9.525	3.18	4.5	15.0	0.2	15°	●									M105	
	150304TR					0.4		●										
	150308TR					0.8		●										
	150320TR					2.0		●										
	150330TR					3.0		●										
	150340TR					4.0		●										
	NDCW 150308TRX 150308FRX	9.525	3.18	4.4	15.0	0.8	15°	●								M105 M106		
	NDMM 090204ER-SP	6.35	2.38	2.8	9.5	0.4	15°	○								M104		
	NDMM 120204ER-SP 120208ER-SP	7.94	2.38	3.4	12.7	0.4 0.8		○ □										
	NDMM 150304ER-SP	9.525	3.18	4.4	15.0	0.4		○									M105	
	150308ER-SP					0.8		○							M106			
	NDMM 12T308ER-T	7.58	3.97	3.4	12.7	0.8	15°	□										
	NDMM 12T308ER-N2	7.79	3.97	3.4	12.7	0.8	15°	□									-	
	NDMM 12T308ER-N3	7.79	3.97	3.4	12.7	0.8	15°	□										
	NDMT 080208ER-D	5.086	2.38	2.2	8.5	0.8	15°	●			●	●	●	●	●	M132		
	10T208ER-D	6.276	2.78	2.8	10.2			●			●	●	●	●	●			
	NEMT 120308ER-D	7.669	3.18	3.4	12.7	0.8	20°	●			●	●	●	●	●			
	16T308ER-D	9.254	3.97	4.4	16.2			●			●	●	●	●	●			
	NDMT 080208ER-DH	5.086	2.38	2.2	8.5	0.8	15°	●			●	●	●	●	●			
	10T208ER-DH	6.276	2.78	2.8	10.2			●			●	●	●	●	●			
NEMT 120308ER-DH	7.669	3.18	3.4	12.7	0.8	20°	●			●	●	●	●	●				
16T308ER-DH	9.254	3.97	4.4	16.2			●			●	●	●	●	●				

\* MN indicates MEGACOAT NANO.


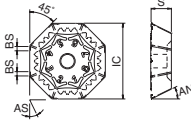

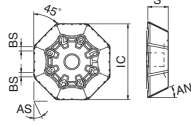

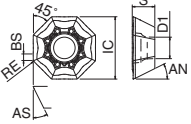

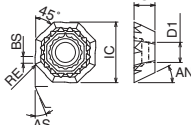
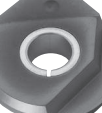
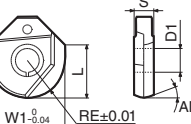

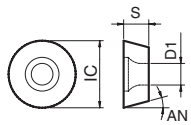

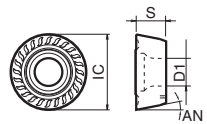





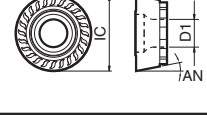
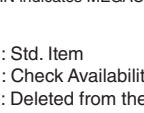
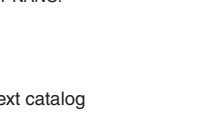

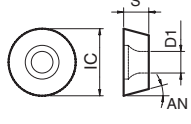

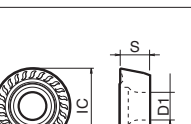



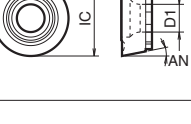

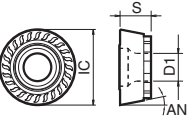
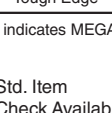
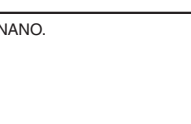
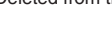

Inserts are sold in 10 piece boxes

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



# Milling Inserts (With Hole)

Classification of usage		P	M	K	N	S	H
★ : Roughing / 1st Choice	☆ : Roughing / 2nd Choice	★	★	★		★	
■ : Finishing / 1st Choice	□ : Finishing / 2nd Choice	■					
(In case hardness is 45HRC or under)							

Insert Handed Insert shows Right-hand	Description	Dimension (mm)					Angle			Cermetal	TiN Coated Carbide	MN	MEGACOAT	TiN Coated Carbide	Carbide	See Page for Applicable Toolholders
		IC L	S	D1	BS W1	RE	AN	AS								
		17.98	4.94	-	1.2	-	-	-	-	-	-	-	○	○	-	-
		17.85	5.14	-	1.1	-	-	26°	26°	-	-	-	○	○	-	-
		13.35	4.83	4.6	1.4	0.5	-	26°	26°	-	-	●	●	□	-	-
		17.85	5.12	5.9	1.2	0.8	-	26°	26°	-	-	●	●	□	-	-
		13.47	4.76	4.4	1.7	-	-	22°	26°	-	-	●	●	□	-	-
		17.98	4.87	5.8	-	-	-	26°	26°	-	-	●	●	□	-	-
		6.6	2.1	3.1	8.0	4.0	15°	-	-	-	-	-	-	-	●	-
		8.0	2.7	3.6	10.0	5.0	15°	-	-	-	-	-	-	-	●	-
		9.4	3.2	4.1	12.0	6.0	15°	-	-	-	-	-	-	-	●	-
		11.3	4.2	5.1	16.0	8.0	15°	-	-	-	-	-	-	-	●	-
		14.1	5.2	6.1	20.0	10.0	10°	-	-	-	-	-	-	-	●	-
		15.5	6.2	6.1	25.0	12.5	10°	-	-	-	-	-	-	-	●	-
		7.0	2.39	2.8	-	-	15°	-	-	-	-	-	●	-	-	-
		10.0	3.18	-	-	-	15°	-	-	-	-	-	●	-	-	-
		12.0	3.97	3.8	-	-	15°	-	-	-	-	-	●	-	-	-
		8.0	2.78	3.4	-	-	15°	-	-	-	-	-	●	●	●	-
		10.0	3.97	3.4	-	-	11°	-	-	-	-	-	●	●	●	-
		12.0	4.76	4.4	-	-	11°	-	-	-	-	-	●	●	●	-
		12.0	4.76	4.4	-	-	11°	-	-	●	-	-	●	●	●	-
		16.0	6.35	5.5	-	-	11°	-	-	●	-	-	●	●	●	-
		20.0	6.35	6.5	-	-	11°	-	-	●	-	-	●	●	●	M174

\* MN indicates MEGACOAT NANO.

- : Std. Item
- : Check Availability
- : Deleted from the next catalog

RDFG Inserts are sold in 2 piece boxes

Inserts are sold in 10 piece boxes


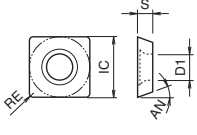

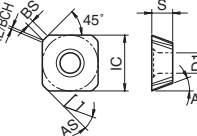

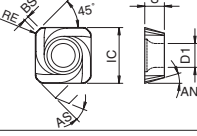

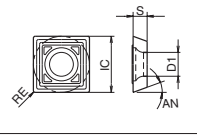

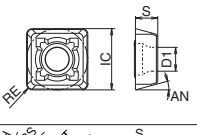

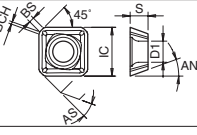

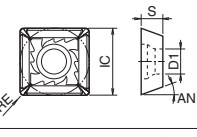

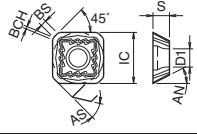

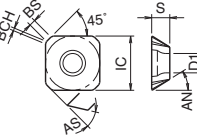
Insert Grades  
Turnable  
Indexable Inserts  
CN & PCD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Spare Parts  
Technical  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

# Milling Inserts

## Milling Inserts (With Hole)

Classification of usage		P	Carbon Steel / Alloy Steel	■	★	★	☆	☆
		M	Mold Steel	■	★	★	☆	☆
		M	Stainless Steel	■	★	★	☆	☆
★ : Roughing / 1st Choice		K	Gray Cast Iron	■			★	☆
☆ : Roughing / 2nd Choice		K	Nodular Cast Iron	■			★	☆
■ : Finishing / 1st Choice		N	Non-ferrous Metals	■				★
□ : Finishing / 2nd Choice		S	Heat-resistant Alloys	■		★	★	
(In case hardness is 45HRC or under)		S	Titanium Alloys	■			★	☆
		H	Hard Materials	■	□	□	□	□

Insert	Description	Dimension (mm)			Angle			Cermel	TiN Coated Carbide	MN	MEGACOAT	TiN Coated Carbide	Carbide	See Page for Applicable Toolholders	
		IC	S	D1	RE BCH	BS	AN								AS
 	SDKW 09T204TN	9.525	2.78	3.4	0.4	-	15°	-	●	●				M176	
	09T204FN														
	SEKW 120304TN	12.70	3.18	5.5	0.8	-	20°	-	●	●					
	120304FN														
	120308TN														
120308FN															
 	SDKW 1204AESN	12.70	4.76	5.5	RE=	1.5	15°	20°		●				-	
	1204AETN				1.0										
	SEKW 1204AFTN	BCH=	1.7	20°	25°		●	●							
 	SDMT 1204AESR-H	12.70	4.76	5.5	1.0	0.8	15°	20°		●					-
  Low cutting force	SDMT 09T204C	9.525	2.78	3.4	0.4	-	15°	-	●		●				M176
	SEMT 120304C	12.70	3.18	5.5	0.4	-	20°	-			●				
 	SDMT 060304E-K	6.35	3.18	2.8	0.4	-	15°	-			●	●	●		M180
	080308E-K	8.00		3.4											
	120408E-K	12.70	4.76	4.4	0.8										
 	SEKT 1204AFEN-S	12.70	4.76	5.5	0.5	1.7	20°	25°			●				-
 	SEMM 09T308PESR	9.525	3.97	3.4	0.8	-	20°	-	○						-
	150408PESR	15.875	4.76	5.5											
 	SOMT 0903AXEN-J	9.525	3.18	3.4	0.5	1.1	27°	32°	○						-
 	SOMW 0903AXTN	9.525	3.18	3.4	0.5	1.1	27°	32°	○						-
	0903AXFN														

\* MN indicates MEGACOAT NANO.

M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

Inserts are sold in 10 piece boxes

● : Std. Item  
○ : Check Availability

# Milling Inserts (With Hole)

Classification of usage		P	M	K	N	S	H
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	Carbon Steel / Alloy Steel	★	★	★			
	Mold Steel	★	★	★			
	Stainless Steel	★	★				
	Gray Cast Iron				★		
	Nodular Cast Iron				★		
	Non-ferrous Metals						
	Heat-resistant Alloys					★	★
Titanium Alloys						★	
Hard Materials							□

Insert Handed Insert shows Right-hand	Description	Dimension (mm)						Angle		Cermel	TiD Coated Carbide	MN	MEGACOAT			TiD Coated Carbide	Carbide	See Page for Applicable Toolholders
		IC	S	D1	RE	BS	AN	AS	TN100M				CA6535	PR1535	PR1225			
 2-Notched / General purpose	SPMT 1806EDER-NB2	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●	□		M44	
 3-Notched / General purpose	SPMT 1806EDER-NB3	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●	□			
 2-Notched / Tough Edge	SPMT 1806EDSR-NB2T	18	6.35	6.8	1.2	3.1	11°	15°						●	●	□	M44	
 3-Notched / Tough Edge	SPMT 1806EDSL-NB2T														□			
 2-Notched / Tough Edge	SPMT 1806EDSR-NB3T	18	6.35	6.8	1.2	3.1	11°	15°						●	●	□	M44	
 3-Notched / Tough Edge	SPMT 1806EDSL-NB3T														□			
 4-Notched / Low cutting force	SPMT 1806EDER-NB2P	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●	□	M44		
 5-Notched / Low cutting force	SPMT 1806EDER-NB3P	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●	□			
 Without notch	SPMT 1806EDER-V	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●	□			

\* MN indicates MEGACOAT NANO.

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

Inserts are sold in 10 piece boxes


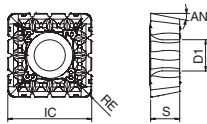

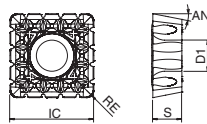

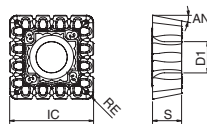

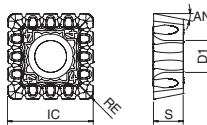

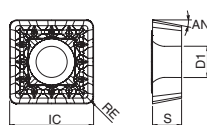

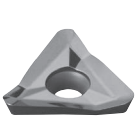
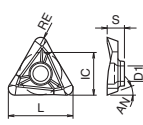
Insert Grades  
Turnable Inserts  
CN & PCD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

# Milling Inserts

## Milling Inserts (With Hole)

Classification of usage		P	Carbon Steel / Alloy Steel			★	★			
		M	Mold Steel			★	★			
		K	Stainless Steel			★	★			
		K	Gray Cast Iron						★	☆
		K	Nodular Cast Iron						★	
		N	Non-ferrous Metals							★
		S	Heat-resistant Alloys					★	★	
		S	Titanium Alloys						★	☆
		H	Hard Materials						□	□

★ : Roughing / 1st Choice  
 ☆ : Roughing / 2nd Choice  
 ■ : Finishing / 1st Choice  
 □ : Finishing / 2nd Choice  
 (In case hardness is 45HRC or under)

Insert Handed Insert shows Right-hand	Description	Dimension (mm)					Angle		Cermel	TiD Coated Carbide	MN	MEGACOAT				TiD Coated Carbide	Carbide	See Page for Applicable Toolholders		
		IC	S	D1	L	RE	AN	TN100M				CA6535	PR1535	PR1225	PR1230				PR1210	PR830
 3-Notched		18	6.35	6.8	-	1.6	11°													
 4-Notched		18	6.35	6.8	-	1.6	11°													
 3-Notched / Low cutting force		18	6.35	6.8	-	1.6	11°													
 4-Notched / Low cutting force		18	6.35	6.8	-	1.6	11°													
 Without notch		18	6.35	6.8	-	1.6	11°													
	SPMT 060204E-Z	6.35	2.38	2.5	-	0.4	11°													
	SPMT 060208E-Z					0.8														
	SPMT 090304E-Z	9.525	3.18	3.4	-	0.4	11°													
	SPMT 090308E-Z					0.8														
		15.875	6.35	5.5	23.0	2.4	20°													

\* MN indicates MEGACOAT NANO.

M

Milling

Insert

Lead Angle

45°~20°

Lead Angle

15°

Lead Angle

0°/2°

High Feed

Cutter

Multi-

Function

Slot Mill

Ball-nose

Radius

Others

Inserts are sold in 10 piece boxes

● : Std. Item

# Milling Inserts (PCD)

Classification of usage		P	M	K	N	S	H
★ : Roughing / 1st Choice		Carbon Steel / Alloy Steel					
☆ : Roughing / 2nd Choice		Mold Steel					
■ : Finishing / 1st Choice		Stainless Steel					
□ : Finishing / 2nd Choice		Gray Cast Iron					
		Nodular Cast Iron					
		Non-ferrous Metals	□		■		
		Heat-resistant Alloys					
		Titanium Alloys	□		■		
		Hard Materials					

Insert Handed Insert shows Right-hand	Description	Dimension (mm)						Angle		PCD			See Page for Applicable Toolholders
		IC	S	BCH	BS	LE	INSL	AN	AS	KPD001	KPD010	KPD230	
	<b>SDKN 1203AUFN-NE</b>	12.70	3.18	0.5	1.2	3.1	-	15°	23°	●			-
	<b>1203AUFN</b>					3.6				●	●		
	<b>SEEN 1203AFFN-NE</b>	12.70	3.18	0.5	1.4	3.0	-	20°	25°	●			-
	<b>1203AFFN</b>					3.5				●	●		
	<b>SEEN 1203AFFR-W</b>	12.50	3.18	-	3.5	1.7	14.56	20°	25°	●			-
	<b>SOKN 13T3AXFN-NE</b>	13.494	3.97	0.4	1.1	3.0	-	27°	32°			○	-
	<b>TEEN 1603PTFR-NE</b>	9.525	3.18	0.6	1.4	4.1	-	20°	22°	●		●	-
	<b>1603PTFR</b>					4.7				●	●		
	<b>TEKN 2204PTFR-NE</b>	12.70	4.76	0.7	1.8	4.2	-	20°	22°	●		●	-
	<b>2204PTFR</b>					4.8				●	●		

Insert	Description	Dimension (mm)				AN	PCD			See Page for Applicable Toolholders
		IC	S	RE	LE		KPD001	KPD010	KPD230	
	<b>TPGN 110302</b>	6.35	3.18	0.2	3.9	11°	●	●		-
	<b>110304</b>			0.4	3.7		●	●		
	<b>110308</b>			0.8	3.4			●		

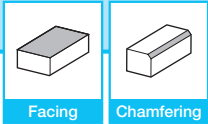
Insert Handed Insert shows Right-hand	Description	Dimension (mm)						Angle		PCD			See Page for Applicable Toolholders
		W1	S	D1	L	RE	LE	AS	AN	KPD001	KPD010	KPD230	
	<b>BDGT 11T302FR</b>	6.7	3.8	2.8	11.5	0.2	3.8	18°	13°	●	●		M56 M57 M58 M59
	<b>11T304FR</b>					0.4				●	●		
	<b>11T308FR</b>					0.8				●	●		
	<b>BDGT 11T302FR-LE</b>					0.2	5.2			●	●		
	<b>11T304FR-LE</b>					0.4				●	●		
	<b>11T308FR-LE</b>					0.8				●	●		
	<b>BDMT 11T302FR</b>	6.7	3.8	2.8	11.0	0.2	3.6	18°	13°	●	●		M56 M57 M58 M59
	<b>11T304FR</b>					0.4				●	●		
	<b>BDMT 170402FR</b>	9.6	4.9	4.4	17.0	0.2	4.4	18°	13°	●	●		
	<b>170404FR</b>					0.4				●	●		
	<b>NDCW 150302FRX-NE</b>	9.525	3.18	4.4	15.0	5.1	-	15°	-	●	●		M106
	<b>150302FRX</b>					5.7				●	●		

● : Std. Item  
○ : Check Availability

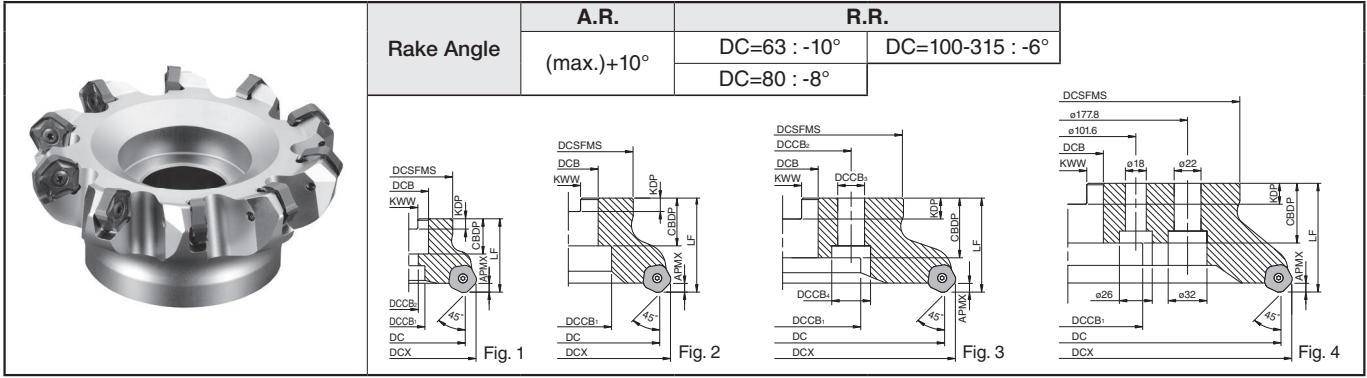
CBN & PCD Inserts are sold in 1 piece boxes

Insert Grades  
Turnable Inserts  
CBN & PCD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Turning Mill  
Tools for Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T



## MFPN45 Face Mill



### Toolholder Dimensions

Description		Stock		No. of Inserts	Dimension (mm)											Drawing	Weight (kg)	Shim			
		R	L		DC	DCX	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW	DCCB <sub>3</sub>				DCCB <sub>4</sub>		
Metric	Coarse pitch	MFPN 45063R-4T-M	●		4	63	76	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5	Yes	
		MFPN 45080R-5T-M	●		5	80	93	60	27	22	13		24	7	12.4			Fig. 1	1.1		
		MFPN 45100R-6T-M	●		6	100	113	70	32	48		50	30	8	14.4				Fig. 2		1.4
		MFPN 45125R-7T-M	●		7	125	138	87		58								Fig. 2			2.6
		MFPN 45160R-8T-M	●		8	160	173	102	40	68	66.7		63	32	9	16.4	14		20		Fig. 3
		MFPN 45200R-10T-M	●		10	200	213											Fig. 3	6.4		
		MFPN 45250R-12T-M	●		12	250	263	142	60	110	101.6			40	14	25.7	18		26		Fig. 3
	MFPN 45315R-14T-M	MTO		14	315	328	220					80						Fig. 4	21.3		
	Fine pitch	MFPN 45063R-5T-M	●		5	63	76	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5		
		MFPN 45080R-6T-M	●		6	80	93	60	27	22	13		50	24	7	12.4			Fig. 1		1.0
		MFPN 45100R-8T-M	●		8	100	113	70	32	48			50	30	8	14.4					Fig. 2
		MFPN 45125R-10T-M	●		10	125	138	87		58									Fig. 2		
		MFPN 45160R-12T-M	●		12	160	173	102	40	68	66.7		63	32	9	16.4	14	20			Fig. 3
		MFPN 45200R-14T-M	●		14	200	213												Fig. 3		
MFPN 45250R-16T-M		●		16	250	263	142	60	110	101.6			40	14	25.7	18	26	Fig. 3		9.1	
MFPN 45315R-18T-M	MTO		18	315	328	220					80						Fig. 4		21.7		
Extra fine pitch	MFPN 45063R-6T-M	●		6	63	76	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5			
	MFPN 45080R-8T-M	●		8	80	93	60	27	22	13		50	24	7	12.4			Fig. 1	1.1		
	MFPN 45100R-10T-M	●		10	100	113	70	32	48			50	30	8	14.4				Fig. 2	1.3	
	MFPN 45125R-13T-M	●		13	125	138	87		58									Fig. 2		2.6	
	MFPN 45160R-16T-M	●		16	160	173	102	40	68	66.7		63	32	9	16.4	14	20		Fig. 3	3.9	
	MFPN 45200R-18T-M	●		18	200	213												Fig. 3		6.6	
	MFPN 45250R-20T-M	●		20	250	263	142	60	110	101.6			40	14	25.7	18	26		Fig. 3	9.3	
Bore Dia. Inch spec	Coarse pitch	MFPN 45080 <sup>R</sup> /L-5T	●	●	5	80	93	60	25.4	22	13	50	27	6	9.5			Fig. 1	1.1		
		MFPN 45100 <sup>R</sup> /L-6T	●	●	6	100	113	70	31.75	48			50	32	8	12.7			Fig. 1	1.4	
		MFPN 45125 <sup>R</sup> /L-7T	●	●	7	125	138	87	38.1	58				36	10	15.9				Fig. 2	2.6
		MFPN 45160 <sup>R</sup> /L-8T	●	●	8	160	173	102	50.8	72				38	11	19.1			Fig. 2		4.0
		MFPN 45200R-10T	●		10	200	213						63							Fig. 3	6.7
		MFPN 45250R-12T	●		12	250	263	142	47.625	110	101.6			40	14	25.4	18	26	Fig. 3		9.4
		MFPN 45315R-14T	MTO		14	315	328	220					80							Fig. 4	21.2
	Fine pitch	MFPN 45080R-6T	●		6	80	93	60	25.4	22	13	50	27	6	9.5			Fig. 1	1.1		
		MFPN 45100R-8T	●		8	100	113	70	31.75	48			50	32	8	12.7			Fig. 1	1.4	
		MFPN 45125R-10T	●		10	125	138	87	38.1	58				36	10	15.9				Fig. 2	2.7
		MFPN 45160R-12T	●		12	160	173	102	50.8	72				38	11	19.1			Fig. 2		4.0
		MFPN 45200R-14T	●		14	200	213						63							Fig. 3	6.9
		MFPN 45250R-16T	●		16	250	263	142	47.625	110	101.6			40	14	25.4	18	26	Fig. 3		9.6
		MFPN 45315R-18T	MTO		18	315	328	220					80							Fig. 4	21.5
Extra fine pitch	MFPN 45080R-8T	●		8	80	93	60	25.4	22	13	50	27	6	9.5			Fig. 1	1.1			
	MFPN 45100R-10T	●		10	100	113	70	31.75	48			50	32	8	12.7			Fig. 1	1.3		
	MFPN 45125R-13T	●		13	125	138	87	38.1	58				36	10	15.9				Fig. 2	2.7	
	MFPN 45160R-16T	●		16	160	173	102	50.8	72				38	11	19.1			Fig. 2		4.0	
	MFPN 45200R-18T	●		18	200	213						63							Fig. 3	6.9	
MFPN 45250R-20T	●		20	250	263	142	47.625	110	101.6			40	14	25.4	18	26	Fig. 3	9.6			

\* APMX : 6 mm (GM, SM, GH Chipbreakers), 5 mm (GL Chipbreaker), 3 mm (W Chipbreaker)

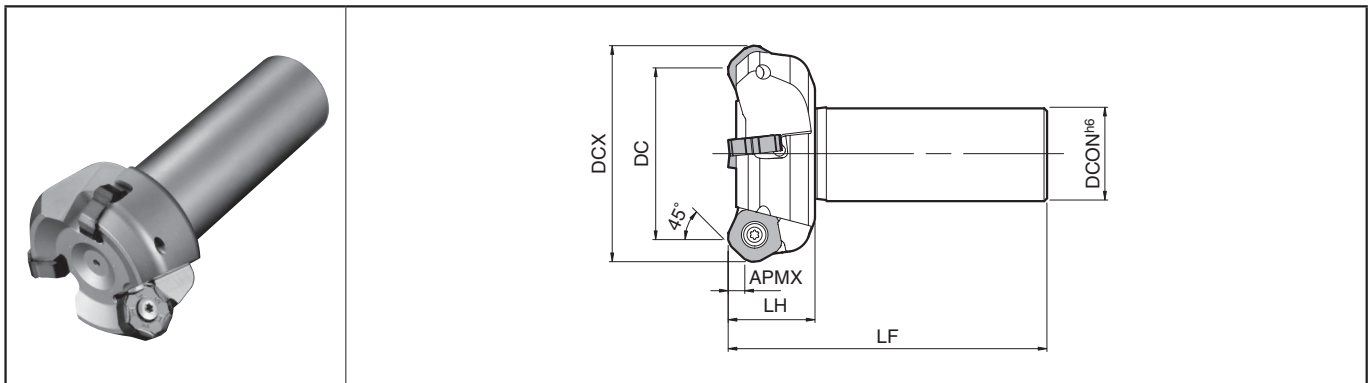


● Spare Parts (common to Metric / Inch spec)

Description		Spare Parts							
		Clamp Screw	Wrench		Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt
			TTW	DTM					
Coarse pitch	MFPN 45063R-4T-M	SB-50140TR	TTW-15	-	MFPN-45	SPW-7050	LW-5	P-37	HH10X30
	MFPN 45080 <sup>9/16</sup> -5T(-M)								HH12X35
	MFPN 45100 <sup>11/16</sup> -6T(-M) 45315R-14T(-M)								-
Fine pitch	MFPN 45063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFPN 45080R-6T(-M)								HH12X35
	MFPN 45100R-8T(-M) 45315R-18T(-M)								-
Extra fine pitch	MFPN 45063R-6T-M	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH10X30
	MFPN 45080R-8T(-M)								HH12X35
	MFPN 45100R-10T(-M) 45250R-20T(-M)								-

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

■ MFPN45 with cylindrical shank



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Rake Angle		Spare Parts			
			DC	DCX	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.	Clamp Screw	Wrench	Anti-seize Compound	
MFPN 45050R-S32-3T	●	3	50	63	32	110	30	6	+ 10°	- 12°	SB-50140TR	TTW-15	P-37	
MFPN 45063R-S32-4T	●	4	63	76										- 10°
MFPN 45080R-S32-5T	●	5	80	93										

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

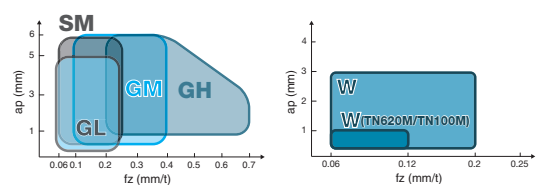
\* APMX : 6 mm (GM, SM, GH Chipbreakers), 5 mm (GL Chipbreaker), 3 mm (W Chipbreaker)

● Applicable Inserts (Common to face mill and end mill)

Description	Applicable Inserts ● M15						
	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 ● M28

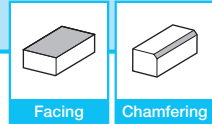
● Applicable Chipbreaker Range



● : Std. Item

Insert Grades  
Turnable Inserts  
CNC & PC Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T



## ● Cutter type and chipbreaker selection

Milling Purpose	Cutter Type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	W
General milling for steel and alloy steel		●		●				
Steel and alloy steel (at chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) (ap=4mm or Over, fz=0.35mm/t or Over)	●					●		
Surface finish oriented	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (to prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (for processing efficiency improvement)			●	●				
Cast iron (ap=4mm or Over, fz=0.35mm/t or Over)	●					●		
Improved Surface Finish in High Efficiency Milling		●	●					●

## ● How to use wiper insert

1) Please use one wiper insert on one cutter.  
 (If you use 2 inserts or more on one cutter, the workpiece surface may be muddy white.)

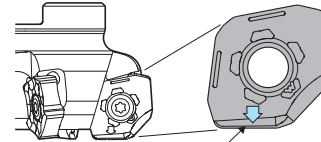
## 2) Combination of Wiper Insert with Other Chipbreakers

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

The combinations of GH+W and GL+W are not recommended.

3) For checking the protrusion amount of the wiper insert, use tool presetter. (Appropriate protrusion : 0.1mm)

## ● 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 (mm/t) ( ):TN620M	Recommended Insert Grades (Cutting Speed Vc: m/min)				
			Cermet	MEGACOAT NANO (MEGACOAT)		CVD Coated Carbide	
			TN620M	PR1535	PR1525 (PR1225)	PR1510 (PR1210)	CA6535
GM	Carbon Steel	0.1-0.2-0.4(0.06-0.12-0.20)	200- <b>250</b> -300	120- <b>180</b> -250	120- <b>180</b> -250	-	-
	Alloy Steel	0.1-0.2-0.4(0.06-0.12-0.20)	180- <b>220</b> -250	100- <b>160</b> -220	100- <b>160</b> -220	-	-
	Mold Steel	0.1-0.2-0.35(0.06-0.08-0.15)	150- <b>180</b> -220	80- <b>140</b> -180	80- <b>140</b> -180	-	-
	Stainless Steel (Austenitic related)	0.1-0.2-0.4	-	100- <b>160</b> -200	100- <b>160</b> -200	-	-
	Stainless Steel (Martensitic related)	0.1-0.2-0.4	-	150- <b>200</b> -250	-	-	180- <b>240</b> -300
	Stainless Steel (Precipitation Hardening)	0.1-0.2-0.3	-	90- <b>120</b> -150	-	-	-
	Gray Cast Iron	0.1-0.2-0.4	-	-	-	120- <b>180</b> -250	-
	Nodular Cast Iron	0.1-0.2-0.35	-	-	-	100- <b>150</b> -200	-
	Ni-base heat-resistant alloys	0.1-0.12-0.2	-	20- <b>30</b> -50	-	-	20- <b>30</b> -50
SM *1GL	Carbon Steel	0.06-0.12-0.25(0.06-0.10-0.15)	200- <b>250</b> -300	120- <b>180</b> -250	120- <b>180</b> -250	-	-
	Alloy Steel	0.06-0.12-0.25(0.06-0.10-0.15)	180- <b>220</b> -250	100- <b>160</b> -220	100- <b>160</b> -220	-	-
	Mold Steel	0.06-0.1-0.2(0.06-0.08-0.12)	150- <b>180</b> -220	80- <b>140</b> -180	80- <b>140</b> -180	-	-
	Stainless Steel (Austenitic related)	0.06-0.12-0.25	-	100- <b>160</b> -200	100- <b>160</b> -200	-	-
	Stainless Steel (Martensitic related)	0.06-0.12-0.25	-	150- <b>200</b> -250	-	-	180- <b>240</b> -300
	Stainless Steel (Precipitation Hardening)	0.06-0.12-0.25	-	90- <b>120</b> -150	-	-	-
	Gray Cast Iron	0.06-0.12-0.25	-	-	-	120- <b>180</b> -250	-
	Nodular Cast Iron	0.06-0.1-0.2	-	-	-	100- <b>150</b> -200	-
	Ni-base heat-resistant alloys	0.06-0.1-0.15	-	20- <b>30</b> -50	-	-	20- <b>30</b> -50
Titanium Alloys	0.06-0.08-0.15	-	40- <b>60</b> -80	-	-	-	
*2GH	Carbon Steel	0.2-0.4-0.7	-	120- <b>180</b> -250	120- <b>180</b> -250	-	-
	Alloy Steel	0.2-0.4-0.6	-	100- <b>160</b> -220	100- <b>160</b> -220	-	-
	Mold Steel	0.2-0.35-0.5	-	80- <b>140</b> -180	80- <b>140</b> -180	-	-
	Stainless Steel (Austenitic related)	0.2-0.3-0.4	-	100- <b>160</b> -200	100- <b>160</b> -200	-	-
	Stainless Steel (Martensitic related)	0.2-0.3-0.4	-	150- <b>200</b> -250	-	-	180- <b>240</b> -300
	Stainless Steel (Precipitation Hardening)	0.2-0.3-0.4	-	90- <b>120</b> -150	-	-	-
	Gray Cast Iron	0.2-0.4-0.7	-	-	-	120- <b>180</b> -250	-
	Nodular Cast Iron	0.2-0.35-0.5	-	-	-	100- <b>150</b> -200	-
	Ni-base heat-resistant alloys	0.2-0.3-0.4	-	20- <b>30</b> -50	-	-	20- <b>30</b> -50

· The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★ : 1st Recommendation ☆ : 2nd Recommendation

· Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

\*1. GL Chipbreaker is recommended for Surface finish oriented milling.

\*2. GH Chipbreaker : Fine pitch fz ≤ 0.4 (mm/t)

Extra fine pitch Not recommended

## ● Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM (GL)	GH
Coarse pitch (with shim)	✓	✓	✓
Fine pitch (without shim)	✓	✓	△ (Feed rate is recommended fz=0.4mm/t or under)
Extra fine pitch (without shim)	✓	✓	Not recommended

## ■ Precautions for use (How to mount an insert)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, while pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten the screw with appropriate torque. (Ref. to Fig. 1 and Fig. 2)  
Recommended tightening torque : The torque for coarse pitch (using M5 screw) is 4.2 N·m  
The torque for extra fine pitch (using M4 screw) is 3.5 N·m.
3. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder and between the insert side surfaces and the constraint surface of the toolholder.
4. To change the cutting edge of the insert, turn the insert counterclockwise. (Fig. 3)  
Insert corner identification number is stamped on the top surface of insert. (Fig. 4) To protect the wiper edge, use the corners of insert in the sequence of corner numbers.

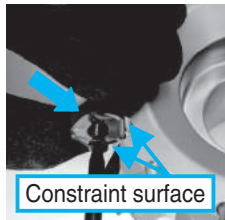


Fig. 1



Fig. 2



Fig. 3

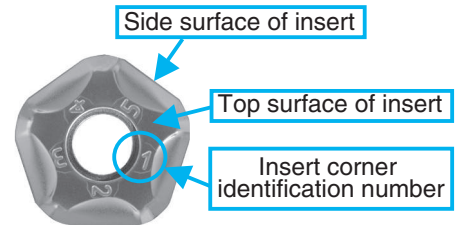


Fig. 4 (Right-hand insert)

## ■ How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (ref. to Fig. 5) and lightly pressing the shim toward the constraint surface, insert the screw into the hole of the shim and tighten it (ref. to Fig. 6).  
When tightening the screw, make sure that the screw is vertical to the bearing surface. Recommended tightening torque is 6.0 N·m.
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.

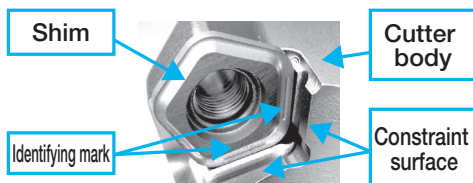


Fig. 5

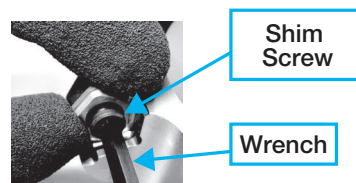


Fig. 6

Cutting Edge Angle 66°, High Efficiency Cutter

# MFPN66

Economical Double-sided 10-edge Insert

Reduces Chattering with Low Cutting Force Design

Reduces Cutting Costs when Machining Auto Parts and Other General Purpose Machining Applications

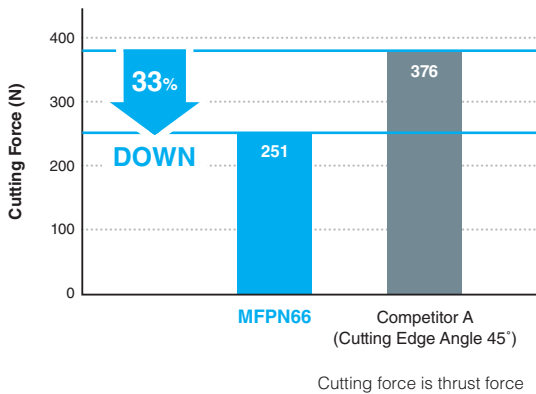
- 1** Economical Double-sided 10-edge Insert  
Applicable to various machining applications with wide size range from  $\phi 32$

Cost reduction in various applications from general parts to automotive parts machining

- 2** Reduces Chattering with Low Cutting Force Design  
Available for Application from Small  $a_p$  to Medium  $a_p$

Suppresses Vibration for Excellent Surface Finish with 66° Cutting Edge Angle

Cutting Force Comparison (Internal evaluation)



Cutting Conditions :  $V_c = 200$  m/min,  $f_z = 0.15$  mm/t,  $a_p = 3$  mm  
Cutter Dia.  $\phi 63$  Workpiece Material : S50C

Surface Finish (Machining with Workpiece Overhang Length of 80mm)



Excellent Surface Finish with Low Workpiece Clamping Rigidity

Cutting Conditions :  $V_c = 200$  m/min,  $f_z = 0.2$  mm/t,  $a_p = 0.5$  mm  
Cutter Dia.  $\phi 63$  Workpiece Material : S50C

- 3** Extended Tool Life by MEGACOAT NANO Technology  
Insert Lineup Also Contains Cermet Grade for Better Surface Finish



1st Recommendation (General purpose)  
GM Chipbreaker

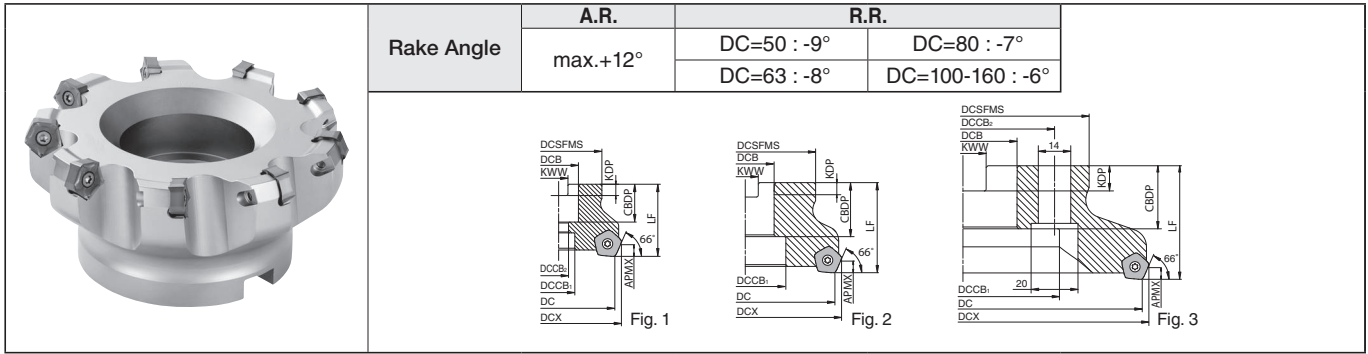


Tough Edge  
GH Chipbreaker



For Stainless Steel  
SM Chipbreaker

# MFPN66 Face Mill



## Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Shim	
				DC	DCX	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW				
Metric	Fine pitch	MFPN 66050R-4T-M-G	●	4	50	58	48	22	18	11	40	21	6.3	10.4	Fig. 1	0.3	No
		66063R-5T-M-G	●	5	63	71	48	22	18	11	40	21	6.3	10.4		0.5	
		66080R-6T-M-G	●	6	80	88	70	27	20	13	50	24	7	12.4	1.2		
		66100R-7T-M-G	●	7	100	107	78	32	45	30		8	14.4	1.6			
		66125R-9T-M-G	●	9	125	132	89	40	55	-	63	33	9	16.4	2.8		
		66160R-11T-M-G	●	11	160	167		63	33		9	16.4	3.8				
	Extra fine pitch	MFPN 66050R-5T-M-G	●	5	50	58	48	22	18	11	40	21	6.3	10.4	Fig. 1	0.4	No
		66063R-7T-M-G	●	7	63	71	48	22	18	11	40	21	6.3	10.4		0.5	
		66080R-9T-M-G	●	9	80	88	70	27	20	13	50	24	7	12.4	1.2		
		66100R-11T-M-G	●	11	100	107	78	32	45	30		8	14.4	1.6			
		66125R-13T-M-G	●	13	125	132	89	40	55	-	63	33	9	16.4	3		
		66160R-15T-M-G	●	15	160	167		63	33		9	16.4	4				
Bore Dia. Inch spec	Fine pitch	MFPN 66080R-6T-G	●	6	80	88	70	25.4	20	13	50	27	6	9.5	Fig. 1	1.2	No
		66100R-7T-G	●	7	100	107	78	31.75	45	34		8	12.7	1.7			
		66125R-9T-G	●	9	125	132	89	38.1	55	-	63	38	10	15.9	2.9		
		66160R-11T-G	●	11	160	167	110	50.8	72		11	19.1	4.5				
	Extra fine pitch	MFPN 66080R-9T-G	●	9	80	88	70	25.4	20	13	50	27	6	9.5	Fig. 1	1.2	No
		66100R-11T-G	●	11	100	107	78	31.75	45	34		8	12.7	1.7			
		66125R-13T-G	●	13	125	132	89	38.1	55	-	63	38	10	15.9	3		
		66160R-15T-G	●	15	160	167	110	50.8	72		11	19.1	4.8				

Recommended Cutting Conditions M33

## Spare Parts (common to Metric / Inch spec)

Description		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
Fine pitch	MFPN 66050R-4T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
	66063R-5T-M-G				HH10X30
	66080R-6T(-M)-G				HH12X35
	66100R-7T(-M)-G				-
	66125R-9T(-M)-G				-
	66160R-11T(-M)-G				-
Extra fine pitch	MFPN 66050R-5T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
	66063R-7T-M-G				HH10X30
	66080R-9T(-M)-G				HH12X35
	66100R-11T(-M)-G				-
	66125R-13T(-M)-G				-
	66160R-15T(-M)-G				-

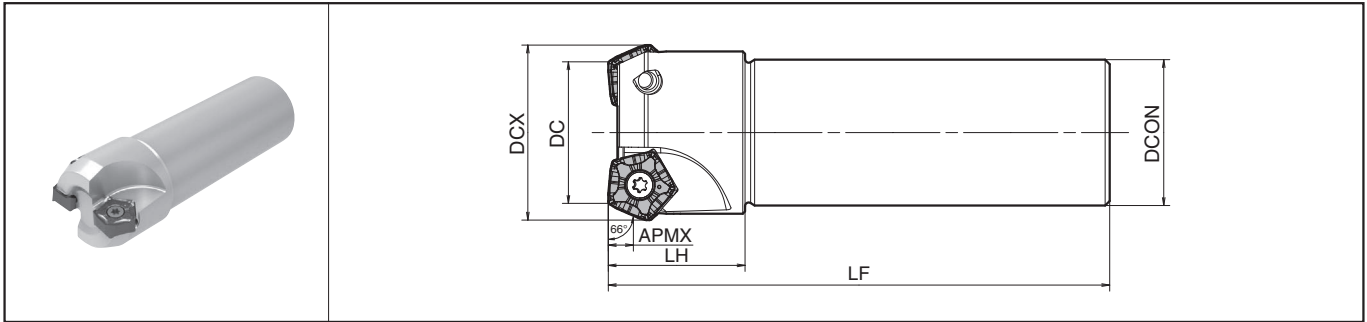
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Insert Grades  
Turnable  
Indexable Inserts  
CN & PCD Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Turning Mill  
Tools for  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

## MFPN66 End Mill




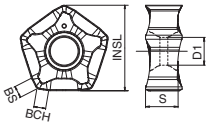

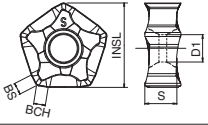

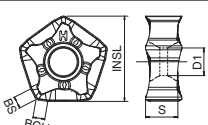
Recommended Cutting Conditions ➡ **M33**

### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Rake Angle		Spare Parts		
			DC	DCX	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.	Clamp Screw	Wrench	Anti-seize Compound	
<b>MFPN 66032R-S32-2T-G</b>	●	2	32	39.5	32	110	30	5	+12°	-14°	SB-4090TRP	DTPM-15	P-37	
<b>66040R-S32-3T-G</b>	●	3	40	47.5	32	110	30	5	+12°	-12°	Tightening Torque 3.5N·m			

### Applicable Inserts

Classification of usage	Material			
	Carbon Steel / Alloy Steel	Mold Steel	Stainless Steel (Austenitic related)	Stainless Steel (Martensitic related)
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	M	Stainless Steel (Precipitation Hardening)	★	☆
	K	Gray Cast Iron		
	K	Nodular Cast Iron		★
	N	Non-ferrous Metals		
	S	Ni-base heat-resistant alloys		★
	S	Titanium Alloys		★
	H	Hard Materials		□

Insert	Description	Dimension (mm)					MEGACOAT NANO			
		INSL	S	D1	BCH	BS	TN620M Cermet	PR1535	PR1525	PR1510
 General purpose	 <b>PNMU 0905XNER-GM</b>						●	●	●	●
 Low cutting force	 <b>PNMU 0905XNER-SM</b>	14.6	5.56	4.7	2.0	2.0		●	●	●
 Tough Edge (For Heavy Milling)	 <b>PNMU 0905XNER-GH</b>							●	●	●

M

Milling

Insert

Lead Angle 45°~20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

● : Std. Item



# ◆ Recommended Cutting Conditions

## ● Coated Carbide

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)		
			MEGACOAT NANO		
			PR1535	PR1525	PR1510
GM	Carbon Steel	0.1-0.2-0.3	120-180-250	120-180-250	-
	Alloy Steel	0.1-0.2-0.3	100-160-220	100-160-220	-
	Mold Steel	0.1-0.18-0.25	80-140-180	80-140-180	-
	Stainless Steel (Austenitic related)	0.1-0.18-0.25	100-150-200	100-150-200	-
	Stainless Steel (Martensitic related)	0.1-0.18-0.25	100-150-200	-	-
	Stainless Steel (Precipitation Hardening)	0.1-0.18-0.25	90-120-150	-	-
	Gray Cast Iron	0.1-0.2-0.3	-	-	120-180-250
	Nodular Cast Iron	0.1-0.18-0.25	-	-	100-150-200
	Ni-base heat-resistant alloys	0.1-0.12-0.2	20-30-50	-	-
SM	Carbon Steel	0.06-0.12-0.2	-	120-180-250	-
	Alloy Steel	0.06-0.12-0.2	-	100-160-220	-
	Mold Steel	0.06-0.1-0.15	-	80-140-180	-
	Stainless Steel (Austenitic related)	0.06-0.12-0.2	100-150-200	100-150-200	-
	Stainless Steel (Martensitic related)	0.06-0.12-0.2	100-150-200	-	-
	Stainless Steel (Precipitation Hardening)	0.06-0.12-0.2	90-120-150	-	-
	Gray Cast Iron	0.06-0.12-0.2	-	-	120-180-250
	Nodular Cast Iron	0.06-0.1-0.15	-	-	100-150-200
	Ni-base heat-resistant alloys	0.06-0.08-0.15	20-30-50	-	-
	Titanium Alloys	0.06-0.08-0.15	40-60-80	-	-
GH	Carbon Steel	0.15-0.25-0.35	-	120-180-250	-
	Alloy Steel	0.15-0.25-0.35	-	100-160-220	-
	Mold Steel	0.1-0.2-0.3	-	80-140-180	-
	Gray Cast Iron	0.15-0.25-0.35	-	-	120-180-250
	Nodular Cast Iron	0.1-0.2-0.3	-	-	100-150-200

★ : 1st Recommendation ☆ : 2nd Recommendation

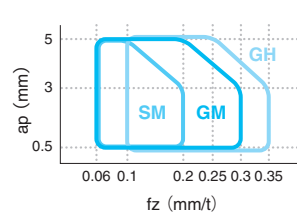
## ● Cermet

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
			Cermet TN620M
GM	Carbon Steel	0.06-0.12-0.15	200-250-300
	Alloy Steel	0.06-0.12-0.15	180-220-250
	Mold Steel	0.06-0.1-0.13	150-180-220

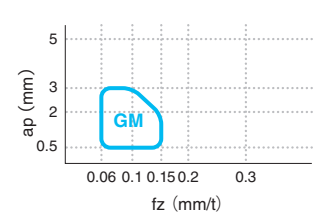
★1st Recommendation

## ● Applicable Chipbreaker Range

Coated Carbide



Cermet



## ● Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	△ (Feed rate is recommended fz=0.2mm/t or under)

Insert Grades  
 Turnable  
 Indexable Inserts  
 CNX & PCD Tools  
 External  
 Small Parts  
 Machining  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Tools for  
 Turning Mill  
 Spare Parts  
 Technical  
 Information  
 Index

A

B

C

D

E

F

G

H

J

K

L

M

N

P

R

T

# MFK Cutter for Cast Iron NEW

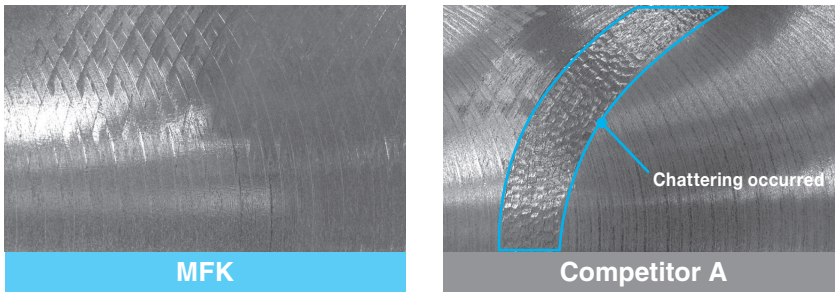
## MFK

- Multi edge cutter realizes the high efficiency cast iron machining
- 10-edge pentagonal inserts for stable and economical machining



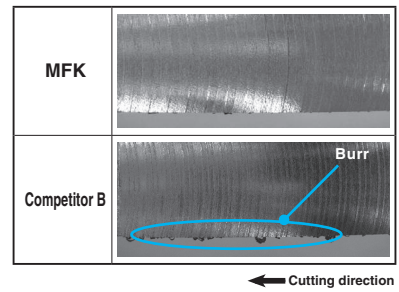
**MFK reduces cutting force by good balanced design**  
**Excellent surface finish by controlling chattering**

### Surface finish comparison (Internal evaluation)



<Cutting Conditions>  
 Workpiece Material : FCD600, Dry,  $V_c=180\text{m/min}$ ,  $f_z=0.3\text{mm/t}$ ,  $a_{p \times a_e}=3 \times 78\text{mm}$

### Burr comparison (Internal evaluation)

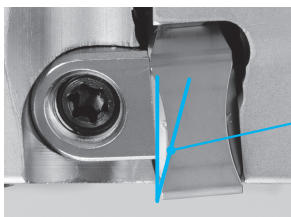


Sharp cutting prevents burr formation

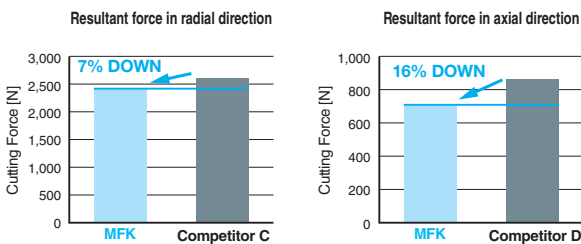
## Two points

Two special insert structures reduce cutting force and improve edge strength

### POINT.1 Low cutting force with helical cutting-edge design

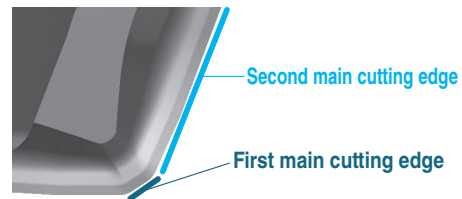


### Cutting Force Comparison (Internal evaluation)

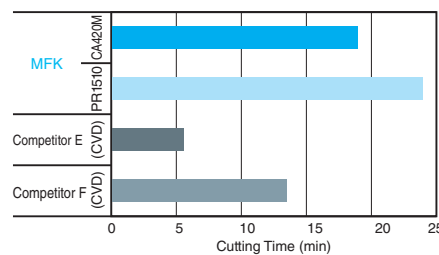


<Cutting Conditions>  
 Workpiece Material : FCD600, Dry,  $\phi 125$   
 $V_c=180\text{m/min}$ ,  $f_z=0.3\text{mm/t}$ ,  $a_{p \times a_e}=3.0 \times 62\text{mm}$

### POINT.2 Dual Cutting Edge Design (High Toughness)



### Fracture Resistance Comparison (Internal evaluation)



<Cutting Conditions>  
 Workpiece Material : FCD450 with 4 bores  
 $V_c=300\text{m/min}$   
 $f_z=0.5\text{mm/t}$   
 $a_p=2.0\text{mm}$   
 Wet

Reducing impact load when biting into the workpiece

M

Milling

Insert

Lead Angle 45°~20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

## Toolholder lineup to meet various applications

Fine pitch type and extra fine pitch type are available  
Choose most suitable cutter for your application



### Fine pitch (Example : $\phi 125$ 12 inserts)

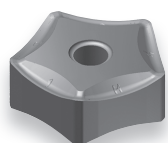
- Recommended for low rigid workpiece
- For wide application range



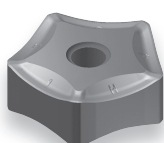
### Extra fine pitch (Example : $\phi 125$ 18 inserts)

- Recommended for high rigid workpiece
- For high efficiency machining

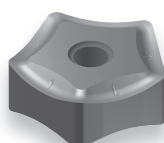
## Applicable to various applications with wide range lineup of chipbreakers



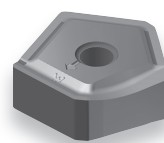
General purpose :  
GM Chipbreaker



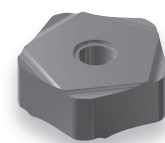
Tough Edge :  
GH Chipbreaker



Finishing:  
GL Ground Chipbreaker



With Wiper Edge:  
W Ground Chipbreaker

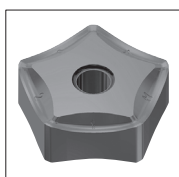


High speed machining :  
Ceramic with chipbreaker

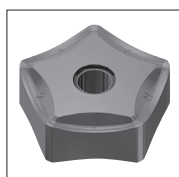
## Insert grade lineup



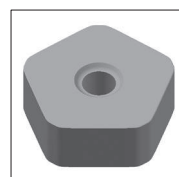
Long tool life  
(1st recommendation)  
**CA420M**  
(CVD)



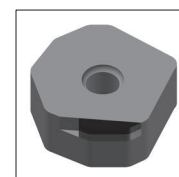
Stable machining  
**PR1510**  
(PVD)



Fracture resistance  
**PR1525**  
(PVD)



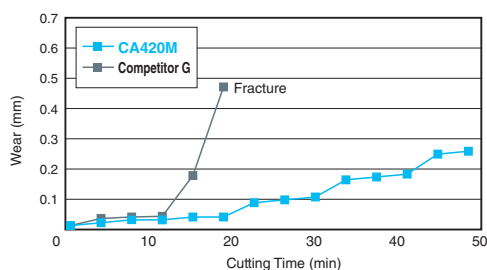
High speed machining  
**KS6050/CS7050**  
(Ceramic)



High speed and high  
precision machining  
**KBN475**  
(CBN Wiper Insert)

[Use CBN wiper inserts together with  
ceramic (KS6050/CS7050) inserts.]

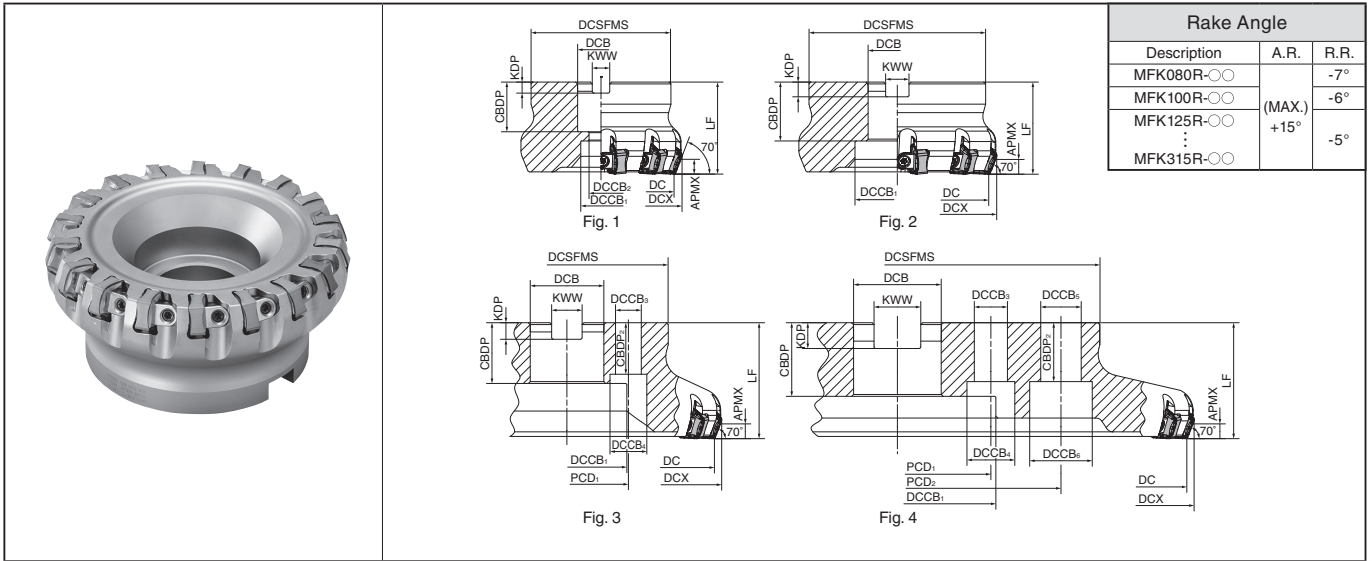
## Wear Resistance Comparison (Internal evaluation)



<Cutting Conditions>  
Workpiece Material : FCD450, Dry  
 $V_c=200\text{m/min}$ ,  $f_z=0.3\text{mm/t}$ ,  $ap_{xae}=2.0 \times 80\text{mm}$

# MFK Face Mill

## MFK Face Mill



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

### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)															Drawing	Weight (kg)																					
			DC	DCX	DCSFSMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	DCCB <sub>3</sub>	DCCB <sub>4</sub>	DCCB <sub>5</sub>	PCD <sub>1</sub>			PCD <sub>2</sub>	CBDP <sub>2</sub>																			
Metric Fine pitch	MFK 080R-11-8T-M	●	8	80	89	76	27	20	13	63	24	7	12.4	6.0	14	20	66.7	177.8	28	Fig. 1	1.87																			
	100R-11-10T-M	●	10	100	109	96	32	26	17		28	8	14.4							-	-	-	-	-	-	Fig. 2	2.99													
	125R-11-12T-M	●	12	125	134	100	40	55	70		33	9	16.4							-	-	-	-	-	-	-	-	-	Fig. 3	3.56										
	160R-11-16T-M	●	16	160	169																								142	60	110	40	14	25.7	18	26	101.6	32	10.43	
	200R-11-20T-M	●	20	200	209	142	60	110	-		40	14	25.7							18	26	22	32	101.6	177.8	-	-	-	-	-	Fig. 4	10.43								
	250R-11-24T-M	●	24	250	259																										315	324	220	40	14	25.7	18	26	22	32
315R-11-28T-M	MTO	28	315	324	220	60	110	-	40	14	25.7	18	26	22	32	101.6	177.8	32	19.41																					
Metric Extra fine pitch	MFK 080R-11-10T-M	●	10	80	89	76	27	20	13	63	24	7	12.4	6.0	14	20	66.7	177.8	28	Fig. 1	1.81																			
	100R-11-14T-M	●	14	100	109	96	32	26	17		28	8	14.4							-	-	-	-	-	-	-	-	-	Fig. 2	2.86										
	125R-11-18T-M	●	18	125	134	100	40	55	70		33	9	16.4							-	-	-	-	-	-	-	-	-	-	Fig. 3	3.38									
	160R-11-22T-M	●	22	160	169																									142	60	110	40	14	25.7	18	26	101.6	32	10.07
	200R-11-28T-M	●	28	200	209	142	60	110	-		40	14	25.7							18	26	22	32	101.6	177.8	-	-	-	-	-	-	Fig. 4	7.10							
	250R-11-36T-M	●	36	250	259																											315	324	220	40	14	25.7	18	26	22
315R-11-44T-M	MTO	44	315	324	220	60	110	-	40	14	25.7	18	26	22	32	101.6	177.8	32	18.92																					
Bore Dia. Inch spec Fine pitch	MFK 080R-11-8T	●	8	80	89	76	31.75	26	17	63	32	8	12.7	6.0	-	-	-	-	-	-	-	-	-	Fig. 1	1.76															
	100R-11-10T	●	10	100	109	96					38	10	15.9											38	10	15.9	-	-	-	-	-	-	-	-	-	-	Fig. 2	2.98		
	125R-11-12T	●	12	125	134	100	38.1	55	70		38	10	15.9											-	-	-	-	-	-	-	-	-	-	-	-	Fig. 3	3.65			
	160R-11-16T	●	16	160	169																															50.8	70	40	14	25.4
	200R-11-20T	●	20	200	209	142	47.625	110	-		40	14	25.4											18	26	22	32	101.6	177.8	-	-	-	-	-	-	-	Fig. 4	7.65		
	250R-11-24T	●	24	250	259																																315	324	220	40
315R-11-28T	MTO	28	315	324	220	47.625	110	-	40	14	25.4	18	26	22	32	101.6	177.8	32	19.71																					
Bore Dia. Inch spec Extra fine pitch	MFK 080R-11-10T	●	10	80	89	76	31.75	26	17	63	32	8	12.7	6.0	-	-	-	-	-	-	-	-	-	-	Fig. 1	1.70														
	100R-11-14T	●	14	100	109	96					38	10	15.9												38	10	15.9	-	-	-	-	-	-	-	-	-	-	-	Fig. 2	2.85
	125R-11-18T	●	18	125	134	100	38.1	55	70		38	10	15.9												-	-	-	-	-	-	-	-	-	-	-	-	-	Fig. 3	3.44	
	160R-11-22T	●	22	160	169																																	50.8	70	40
	200R-11-28T	●	28	200	209	142	47.625	110	-		40	14	25.4												18	26	22	32	101.6	177.8	-	-	-	-	-	-	-	-	Fig. 4	7.40
	250R-11-36T	●	36	250	259																																		315	324
315R-11-44T	MTO	44	315	324	220	47.625	110	-	40	14	25.4	18	26	22	32	101.6	177.8	32	19.21																					

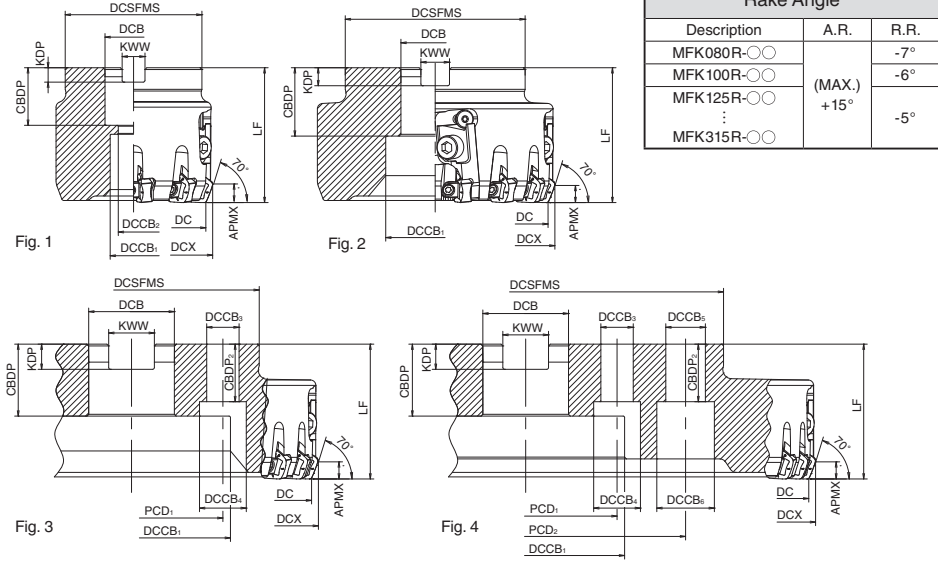
### Spare Parts and Applicable Inserts

Description	Spare Parts				Applicable Inserts M14	Description	Spare Parts				Applicable Inserts M14
	Wedge	Wedge screw	Wrench	Mounting bolt			Wedge	Wedge screw	Wrench	Mounting bolt	
MFK 080R-11-8T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W	MFK 080R-11-8T	C09N	W6X18N	TT-15	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-10T-M				HH16X40		MFK 100R-11-10T				HH16X40	
125R-11-12T-M				MFK 125R-11-12T		HH16X40					
160R-11-16T-M				MFK 160R-11-16T		HH16X40					
200R-11-20T-M				MFK 200R-11-20T		HH16X40					
250R-11-24T-M				MFK 250R-11-24T		HH16X40					
315R-11-28T-M	MFK 315R-11-28T	HH16X40									
MFK 080R-11-10T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W	MFK 080R-11-10T	C09N	W6X18N	TT-15	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-14T-M				HH16X40		MFK 100R-11-14T				HH16X40	
125R-11-18T-M				MFK 125R-11-18T		HH16X40					
160R-11-22T-M				MFK 160R-11-22T		HH16X40					
200R-11-28T-M				MFK 200R-11-28T		HH16X40					
250R-11-36T-M				MFK 250R-11-36T		HH16X40					
315R-11-44T-M	MFK 315R-11-44T	HH16X40									

● : Std. Item

MTO : Made to order

# MFK-SF Face Mill



## Toolholder Dimensions

Description	Stock	* No. of Inserts	Dimension (mm)																Drawing	Weight (kg)			
			DC	DCX	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	DCCB <sub>3</sub>	DCCB <sub>4</sub>	DCCB <sub>5</sub>	DCCB <sub>6</sub>	PCD <sub>1</sub>			PCD <sub>2</sub>	CBDP <sub>2</sub>	
Metric	MFK 080R-11-9T-M-SF	●	9(3)	80	89	76	27	20	13		24	7	12.4									Fig. 1	2.21
	100R-11-12T-M-SF	●	12(4)	100	109	96	32	26	17		28	8	14.4									Fig. 2	3.49
	125R-11-15T-M-SF	●	15(5)	125	134																	Fig. 2	4.47
	160R-11-18T-M-SF	●	18(6)	160	169	100	40	55			33	9	16.4	6.0								Fig. 3	6.99
	200R-11-24T-M-SF	●	24(8)	200	209																	Fig. 3	9.89
	250R-11-30T-M-SF	●	30(10)	250	259	142	60	110			35	14	25.7									Fig. 3	16.35
315R-11-39T-M-SF	MTO	39(13)	315	324	220																Fig. 4	28.14	
Bore Dia. Inch spec	MFK 080R-11-9T-SF	●	9(3)	80	89	76					32	8	12.7									Fig. 1	2.08
	100R-11-12T-SF	●	12(4)	100	109	96	31.75	26	17													Fig. 1	3.49
	125R-11-15T-SF	●	15(5)	125	134		38.1	55			38	10	15.9									Fig. 2	4.54
	160R-11-18T-SF	●	18(6)	160	169	100	50.8	70						6.0								Fig. 2	6.82
	200R-11-24T-SF	●	24(8)	200	209																	Fig. 3	10.39
	250R-11-30T-SF	●	30(10)	250	259	142	47.625	110			40	14	25.4									Fig. 3	16.85
315R-11-39T-SF	MTO	39(13)	315	324	220																Fig. 4	28.65	

\* Numbers in parentheses ( ) are the number of adjustable cutting edge pockets  
Please install wiper inserts in the adjustable cutting edge pockets

## Spare Parts

Description	Spare Parts								Applicable Inserts ➡ M14	
	Wedge	Wedge Screw	Wrench	Cartridge	Cartridge Clamp Screw	Wrench	Adjustment Screw	Mounting bolt		
MFK 080R-11-9T-M-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W	
100R-11-12T-M-SF								HH16X40		
125R-11-15T-M-SF										
160R-11-18T-M-SF										
200R-11-24T-M-SF										
250R-11-30T-M-SF										
315R-11-39T-M-SF										
MFK 080R-11-9T-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH16X40		PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-12T-SF										
125R-11-15T-SF										
160R-11-18T-SF										
200R-11-24T-SF										
250R-11-30T-SF										
315R-11-39T-SF										

● : Std. Item  
MTO : Made to order


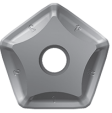


Insert Grades  
Turnable  
Indexable Inserts  
CN & PCD Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Turning Mill  
Tools for  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
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N  
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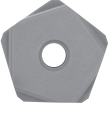
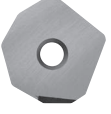


# MFK Face Mill

## ● Applicable Inserts

Description	Applicable Inserts <b>M14</b>			
	 General purpose	 Tough Edge	 Surface-Finish Oriented	 Wiper Insert (2-edge)
MFK...-11-...	PNMG1106XNEN-GM	PNMG1106XNEN-GH	PNEG1106XNEN-GL	PNEG1106XNER-W

Description	Applicable Inserts <b>M14</b>		
	 High speed machining	 High speed machining (With Chipbreaker)	 Wiper Insert (2-edge)
MFK...-11-...	PNEA1106XNTN-T01020	PNEG1106XNTR-T00515	PNEG1106XNTR-T01015W

## ◆ Recommended Cutting Conditions (Ceramic / CBN)

### Without Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Edge Preparation	fz (mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray Cast Iron	KS6050★ CS7050☆	600~900~1,200	0.10x20°					
Nodular Cast Iron	KS6050☆ CS7050★	400~600~900						

### With Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Edge Preparation	fz (mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray Cast Iron	KS6050★ CS7050☆	600~900~1,200	0.05x15°					
Nodular Cast Iron	KS6050☆ CS7050★	400~600~900						

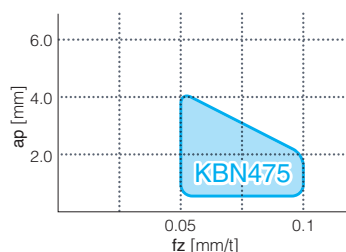
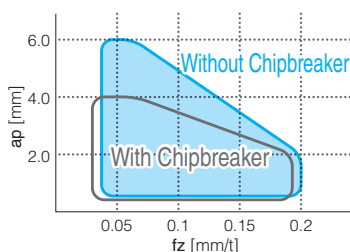
### CBN Wiper Insert

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Edge Preparation	fz (mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray Cast Iron	KBN475	600~900~1,200	0.10x15°					
Nodular Cast Iron		400~600~900						

★ : 1st Recommendation ☆ : 2nd Recommendation

## ■ Recommended application range (Ceramic / CBN)

### Workpiece Material : Cast Iron (Ceramic)      Workpiece Material : Cast Iron (CBN)



#### When Using CBN Wiper Inserts

1. Please use CBN wiper inserts together with ceramic inserts. Feed rate should be fz=0.1mm/t or under.
2. The main cutting edge of CBN wiper insert is slightly higher than that of ceramic inserts. Therefore, the feed rate for the inserts next to CBN wiper inserts is double that of other inserts.

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others



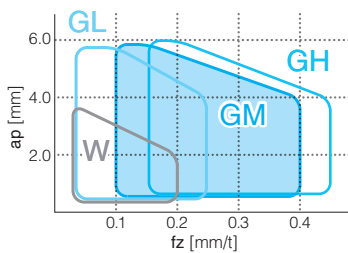
## ◆ Recommended Cutting Conditions (Coated Carbide)

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Chipbreaker	fz (mm/t)				
				0.06	0.1	0.2	0.3	0.4
Gray Cast Iron	CA420M	170~230~300	GM★			●0.25		
	PR1510	120~180~250	GH☆				●0.3	
	PR1525		GL		●0.12			
Nodular Cast Iron	CA420M	150~200~250	GM★			●0.2		
	PR1510	100~150~200	GH☆				●0.25	
	PR1525		GL		●0.1			

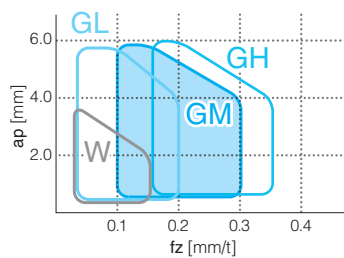
★ : 1st Recommendation ☆ : 2nd Recommendation

## ■ Recommended application range

### Workpiece Material : Gray Cast Iron



### Workpiece Material : Nodular Cast Iron



#### Notes)

1. When using W, please use together with GM or GH.
2. If machining fz=0.2 or over, insert corner will be damaged. The main cutting edge of W 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.

## ■ How to Adjust Cutting Edge Height

1. Assemble all related parts into the cutter.
2. Make sure the back end of cartridge makes contact with adjustment screw (Fig. 1), and pull them lightly inwards (Fig. 2). Tighten the cartridge clamp screw temporary.
3. Install the insert (Fig. 3), and tighten the wedge screw temporary. Temporarily tighten the screw with a 40 to 45 degree rotation after the wedge contacts the insert.
4. Loosen the cartridge clamp screw. (Fig. 4)
5. Adjust the extruding amount with adjustment screw. (Fig. 5)
6. Tighten the wedge screw and firmly fix the insert. (Recommended tightening torque : 6N · m)
7. Tighten the cartridge clamp screw firmly. (Recommended tightening torque : 10N · m)

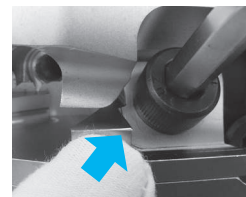
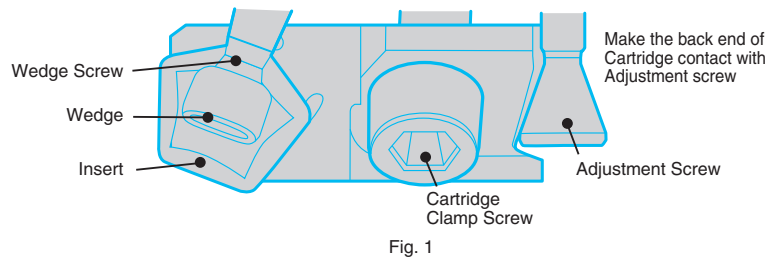


Fig. 2

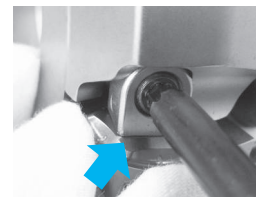


Fig. 3

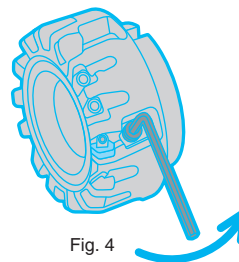


Fig. 4

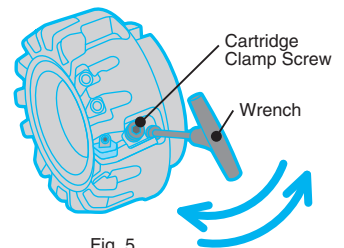
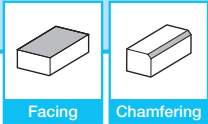


Fig. 5

#### Notes :

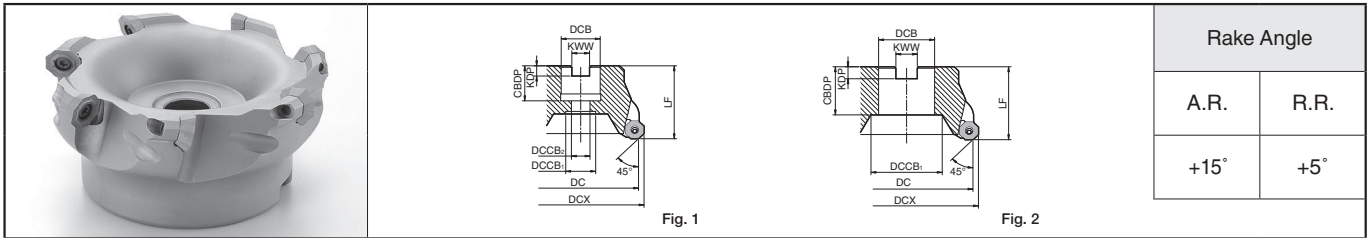
1. Follow steps 1 ~ 7 above for adjustment.
2. To adjust the edge height adjust the wedge screw and loosen the cartridge clamp screw. Tightening the adjustment screw with the clamp screw fixed firmly may damage the adjustment screw.
3. The adjusted edge height difference must be within 5µm.



Facing

Chamfering

## MOF45 Face Mill (05 type / 07 type)



Rake Angle	
A.R.	R.R.
+15°	+5°

### Toolholder Dimensions

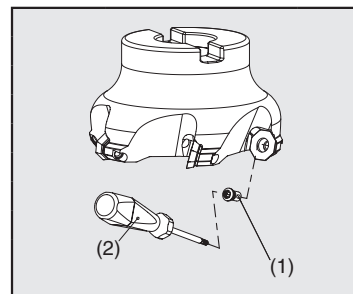
Description	Stock	No. of Inserts	Dimension (mm)											Drawing	Weight(kg)	Applicable Inserts ● M21	
			DC	DCX	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW	APMX					
Metric	MOF	45040R-05-3T-M	●	3	40	49	16	13.5	8.5	40	19	5.6	8.4	-	Fig. 1	0.3	OFMT05 type
		45050R-05-4T-M	●	4	50	59	22	17	11								
		45063R-05-5T-M	●	5	63	72											
		45080R-05-6T-M	●	6	80	89	27	20	13								
	45100R-05-7T-M	●	7	100	109	32	45	-	50	32	8	14.4	-	Fig. 2	1.8		
	MOF	45063R-07-4T-M	●	4	63	75	22	17	11	40	21	6.3	10.4	-	Fig. 1	0.6	OFMT07 type
		45080R-07-5T-M	●	5	80	92	27	20	13	50	24	7	12.4	-		1.2	
		45100R-07-6T-M	●	6	100	112	32	45	-	50	32	8	14.4	-	1.9		
45125R-07-8T-M		●	8	125	137	40	55	-	63	33	9	16.4	-	Fig. 2	3.7		
Bore Dia. Inch spec.	MOF	45080R-05-6T	●	6	80	89	25.4	20	13	50	26	6	9.5	-	Fig. 1	1.1	OFMT05 type
		45100R-05-7T	●	7	100	109	31.75	45	-						Fig. 2	1.8	
	MOF	45080R-07-5T	●	5	80	92	25.4	20	13	50	26	6	9.5	-	Fig. 1	1.2	OFMT07 type
		45100R-07-6T	●	6	100	112	31.75	45	-						Fig. 2	1.8	

### Spare Parts

Description	(1) Clamp Screw	(2) Wrench	Mounting bolt
MOF 45040R-05-3T-M	SB-4082TPR	DTP-15	HH8X25
45050R-05-4T-M			HH10X30
45063R-05-5T-M			HH12X35
45080R-05-6T-M			-
45100R-05-7T-M			-
MOF 45063R-07-4T-M	SB-50120TRS	DTP-15	HH10X30S
45080R-07-5T-M			HH12X35
45100R-07-6T-M			-
45125R-07-8T-M			-
MOF 45080R-05-6T	SB-4082TPR	DTP-15	HH12X35
45100R-05-7T			-
MOF 45080R-07-5T	SB-50120TRS	DTP-15	HH12X35
45100R-07-6T			-

### Max. ap and usable edges

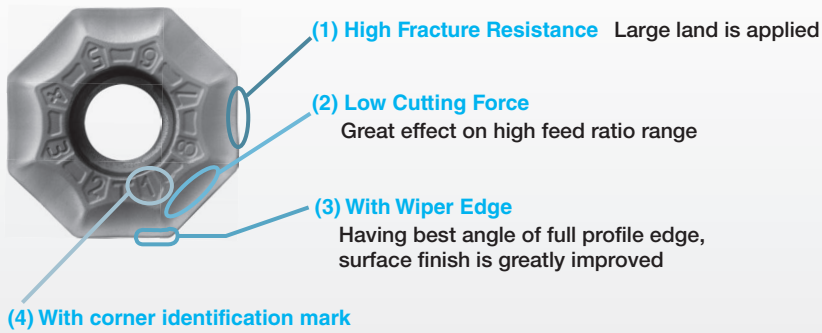
Usable edges	Max. ap	
	OFMT05 type	OFMT07 type
4 edges	7mm	10mm
8 edges	2.5mm	4mm



M  
Milling

- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

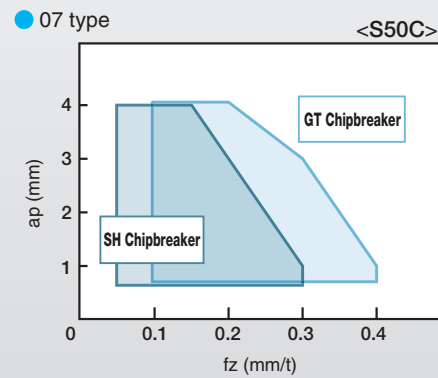
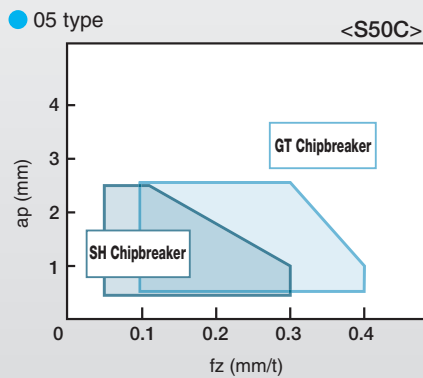
## General purpose “SH Chipbreaker”, Tough Edge type “GT Chipbreaker”



	OFMT05 type	OFMT07 type
GT Chipbreaker (Tough Edge)		
SH Chipbreaker (General purpose)		

Note 1) OFMT07 type inserts cannot be used for MOFX cutters

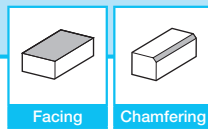
## Applicable Chipbreaker Range



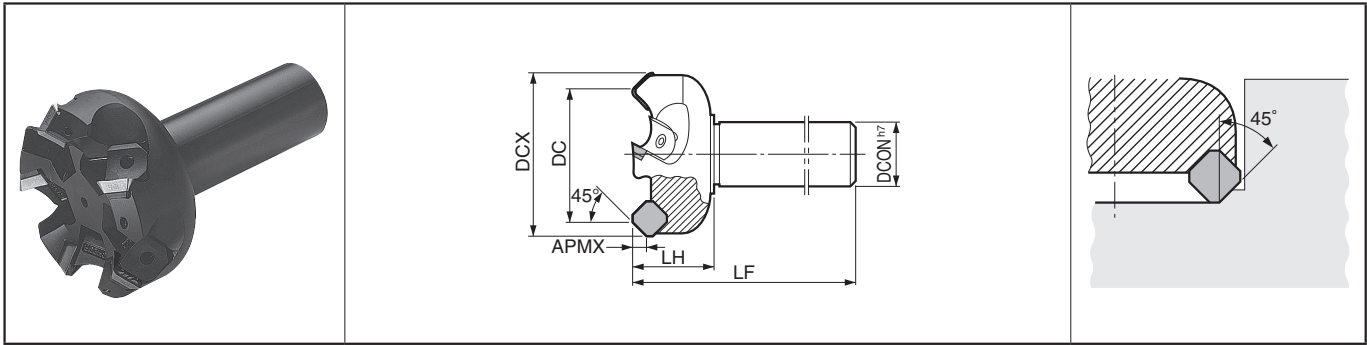
## ◆ Recommended Cutting Conditions (MOF)

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
	GT Chipbreaker (Tough Edge)	SH Chipbreaker (General purpose)	MEGACOAT		PVD Coated Carbide
			PR1225	PR1210	PR830
Carbon Steel	0.10~0.25~0.40	0.10~0.15~0.30	★ 120~180~250	-	☆ 120~150~200
Alloy Steel	0.10~0.25~0.35	0.10~0.15~0.30	★ 100~160~220	-	☆ 100~150~180
Mold Steel	0.10~0.20~0.35	0.08~0.12~0.25	★ 80~140~180	-	☆ 80~120~150
Stainless Steel	-	0.08~0.12~0.25	★ 120~160~220	-	-
Gray Cast Iron	0.10~0.25~0.40	0.10~0.15~0.30	-	★ 120~180~250	-
Nodular Cast Iron	0.10~0.20~0.35	0.08~0.12~0.25	-	★ 100~150~200	-

★ : 1st Recommendation ☆ : 2nd Recommendation



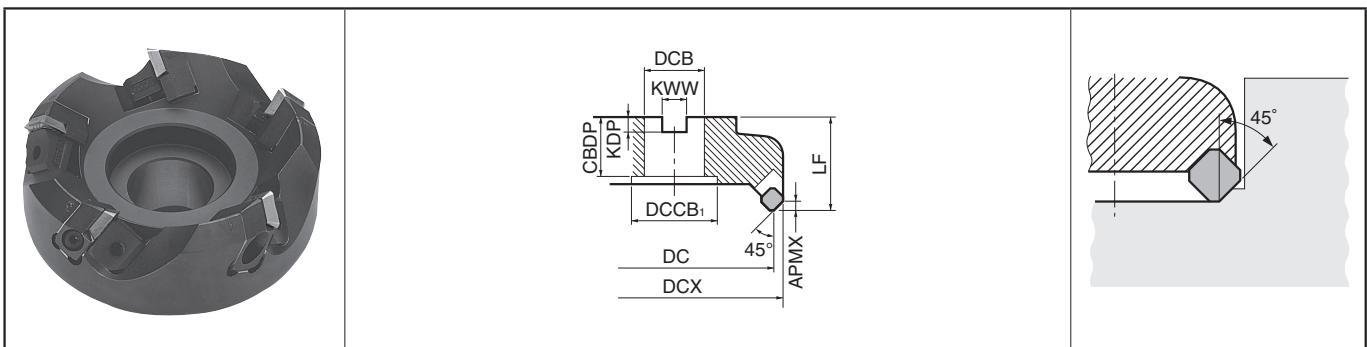
## MSO45-S with cylindrical shank (High Rake)



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Rake Angle		Spare Parts					
			DC	DCX	DCON	LF	LH	APMX	A.R.	R.R.	Shim	Shim Screw	Clamp	Clamp screw	Wrench	
<b>MSO 4550-S</b>	<input type="radio"/>	4	50	66												
<b>4563-S</b>	<input type="radio"/>	5	63	79	32	120	40	7.1	+27°	-8°	MSO-4T245	SP3X6	CH-20R	TH8X15	TH-4	
<b>4580-S</b>	<input type="radio"/>	5	80	96												

## MSO45 Face Mill (High Rake)

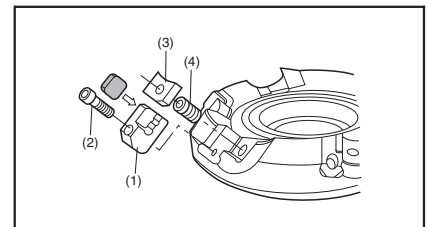


### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)									Rake Angle		Weight (kg)			
			DC	DCX	DCB	DCCB <sub>1</sub>	LF	CBDP	KDP	KWW	APMX	A.R.	R.R.				
<b>MSO 45100R</b>	<input type="checkbox"/>	5	100	114.8	31.75	48					32	8	12.7	7.1	+27°	-8°	2.5
<b>45125R</b>	<input type="checkbox"/>	6	125	140.0	38.10	58	60				38	10	15.9				3.7

### Spare Parts

Description	(1) Cartridge	(2) Cartridge Clamp Screw	(3) Clamp	(4) Clamp Screw	Wrench
<b>MSO 45...R</b>	LSO-445R	HH4X16	CH-20R	TH8X15	TH-4



### Applicable Inserts

Description	Applicable Inserts <b>M10</b>		Applicable Inserts <b>M25</b>	
	<b>MSO 45...</b>	SOKR	13T3AXEN-J	SOKN
			SOKN	13T3AXFN-NE (PCD)

Recommended Cutting Conditions

**M193**

○ : Check Availability  
□ : Deleted from the next catalog

# Face Mill for Heavy Milling MSRS15

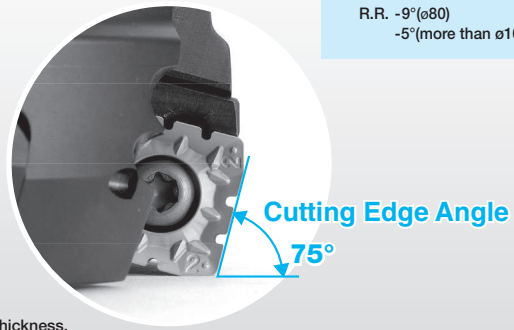
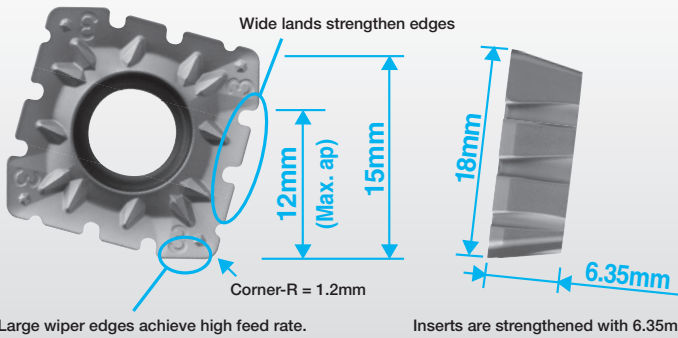


Facing

## Large depth of cut and high feed rate achieve high efficiency machining

- Recommended ap : 5 ~ 10mm

A.R. +9°  
R.R. -9°(ø80)  
-5°(more than ø100)



- Selection of chipbreaker

	Low Cutting Force	General purpose	Edge Strength Oriented
Insert Type	+	+	+
Applications	When using long arbor or for machining of thin-plate workpieces	General purpose type with good balance of strength and cutting force	For interrupted machining and high load machining When feed rate is increased or workpiece material is Cast Iron
Edge preparation	As many as four (or five) Notches help to alleviate the shock when biting into the workpiece	Strength, edge and chip control are all well balance	Strength is increased by the edge shape and moderate rake angle of the chamfer edge

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



- About insert no. of NB2P (4-Notched) and NB3P (5-Notched)  
In order to adjust applicable inserts on marked numbers on toolholders, "2+" is marked for NB2P (4-Notched) and "3+" is marked on NB3P (5-Notched).

## Features of Toolholder

### Coarse pitch

Design of large chip pocket  
Good Chip Evacuation

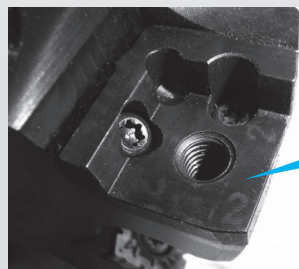
### Fine pitch

Higher productivity with fine pitch design

Adoption of cartridge (coarse pitch type)  
Damage prevention of base body

Display the applicable insert number (Notch number)

### Insert Replacement Identification



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

\* Depending on the cutting conditions, marks are not transcribed.

Insert Grades  
A  
Turnable  
B  
Indexable Inserts  
C  
CNX & PCD Tools  
D  
External  
E  
Small Parts  
F  
Boring  
G  
Grooving  
H  
Cut-off  
J  
Threading  
K  
Drilling  
L  
Solid Tools  
M  
Milling  
N  
Tools for Turning Mill  
P  
Spare Parts  
R  
Technical Information  
T  
Index

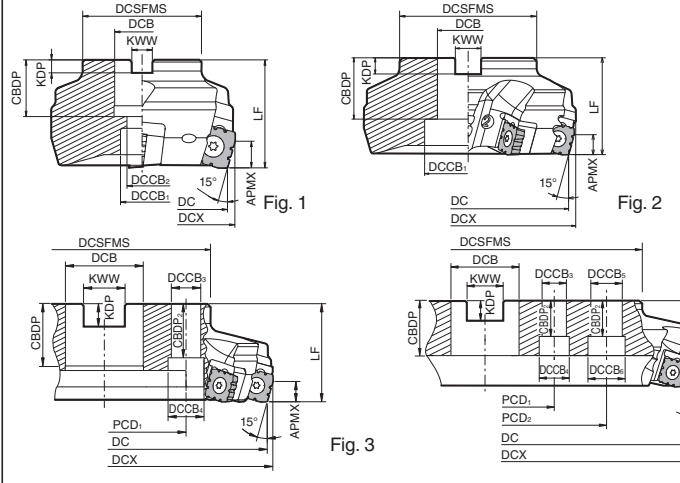




## MSRS15



(The photo shows the coarse pitch type)



Rake Angle		
Description	A.R.	R.R.
MSRS15080R-..	+9°	-9°
MSRS15100R-..	+9°	-5°
MSRS15315R-..	+9°	-5°

### Toolholder Dimensions (Metric)

Description	Stock	No. of Inserts	Dimension (mm)																	Drawing	Weight (kg)										
			DC	DCX	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	DCCB <sub>3</sub>	DCCB <sub>4</sub>	DCCB <sub>5</sub>	DCCB <sub>6</sub>	PCD <sub>1</sub>	PCD <sub>2</sub>			CBDP <sub>2</sub>									
Coarse pitch	MSRS 15080R-4T-M	●	4	80	87	70	27	20	13	50	24	7	12.4	12	14	20	-	-	66.7	-	28	Fig. 1	1.3								
	MSRS 15100R-4T-M	●	4	100	107	85	32	45	29		8	14.4	-									-	-	-	-	-	-	-	-	Fig. 2	2.0
	MSRS 15125R-6T-M	●	6	125	132		40	55	33		9	16.4	-									-	-	-	-	-	-	-	-	Fig. 3	3.6
	MSRS 15160R-8T-M	●	8	160	167	110	60	-	60	38	15	25.7	18									26	22	32	101.6	177.8	-	32	Fig. 4	5.0	
	MSRS 15200R-10T-M	●	10	200	207	60				-	60	38	15									25.7							18	26	22
	MSRS 15250R-12T-M	●	12	250	257	140	60	-	60	38	15	25.7	18									26	22	32	101.6	177.8	-	32	Fig. 4	12.0	
	MSRS 15315R-14T-M	●	14	315	322	230				-	60	38	15									25.7							18	26	22
Fine pitch	MSRS 15080R-6T-M	●	6	80	87	70	27	20	13	50	24	7	12.4	12	14	20	-	-	66.7	-	28	Fig. 1	1.3								
	MSRS 15100R-6T-M	●	6	100	107	85	32	45	29		8	14.4	-									-	-	-	-	-	-	-	-	Fig. 2	1.9
	MSRS 15125R-8T-M	●	8	125	132		40	55	33		9	16.4	-									-	-	-	-	-	-	-	-	Fig. 3	3.5
	MSRS 15160R-10T-M	●	10	160	167	110	60	-	60	38	15	25.7	18									26	22	32	101.6	177.8	-	32	Fig. 4	4.9	
	MSRS 15200R-12T-M	●	12	200	207	60				-	60	38	15									25.7							18	26	22
	MSRS 15250R-14T-M	●	14	250	257	140	60	-	60	38	15	25.7	18									26	22	32	101.6	177.8	-	32	Fig. 4	11.9	
	MSRS 15315R-16T-M	MTO	16	315	322	230				-	60	38	15									25.7							18	26	22

- Mounting bolt (HH12X35) is included for MSRS15080R-○T-M.
- Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.

### Toolholder Dimensions (Bore Dia. : Inch spec)

Description	Stock	No. of Inserts	Dimension (mm)																	Drawing	Weight (kg)										
			DC	DCX	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	DCCB <sub>3</sub>	DCCB <sub>4</sub>	DCCB <sub>5</sub>	DCCB <sub>6</sub>	PCD <sub>1</sub>	PCD <sub>2</sub>			CBDP <sub>2</sub>									
Coarse pitch	MSRS 15080R-4T	●	4	80	87	55	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	25	Fig. 1	1.3								
	MSRS 15100R-4T	●	4	100	107	70	31.75	42	32		8	12.7	-									-	-	-	-	-	-	-	-	Fig. 2	2.0
	MSRS 15125R-6T	●	6	125	132	85	38.1	54	38		10	15.9	-									-	-	-	-	-	-	-	-	Fig. 3	3.6
	MSRS 15160R-8T	●	8	160	167	100	50.8	68	60	38	14	25.4	18									26	22	32	101.6	177.8	-	32	Fig. 4	5.0	
	MSRS 15200R-10T	●	10	200	207	130	47.625	-																					60	38	14
	MSRS 15250R-12T	●	12	250	257	140	60	-	60	38	15	25.4	18									26	22	32	101.6	177.8	-	32	Fig. 4	12.0	
	MSRS 15315R-14T	●	14	315	322	220				-	60	38	15									25.4							18	26	22
Fine pitch	MSRS 15080R-6T	●	6	80	87	55	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	25	Fig. 1	1.3								
	MSRS 15100R-6T	●	6	100	107	70	31.75	42	32		8	12.7	-									-	-	-	-	-	-	-	-	Fig. 2	1.9
	MSRS 15125R-8T	●	8	125	132	85	38.1	54	38		10	15.9	-									-	-	-	-	-	-	-	-	Fig. 3	3.5
	MSRS 15160R-10T	●	10	160	167	100	50.8	68	60	38	11	19.0	18									26	22	32	101.6	177.8	-	32	Fig. 4	4.9	
	MSRS 15200R-12T	●	12	200	207	130	47.625	-																					60	38	11
	MSRS 15250R-14T	●	14	250	257	140	60	-	60	38	15	25.4	18									26	22	32	101.6	177.8	-	32	Fig. 4	11.9	
	MSRS 15315R-16T	MTO	16	315	322	220				-	60	38	15									25.4							18	26	22

- Mounting bolt (HH12X35) is included for MSRS15080R-○T.
- Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.





Facing

● Spare Parts

Description		Spare Parts						
		Clamp Screw	Wrench	Cartridge	Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
Coarse pitch	MSRS 15080R-○○ (M)	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	P-37	HH12X35
	MSRS 15100R-○○ (M)							-
	15315R-○○ (M)							-
Fine pitch	MSRS 15080R-○○ (M)	SB-60120TR	TT-25L	-	-	-	P-37	HH12X35
	MSRS 15100R-○○ (M)							-
	15315R-○○ (M)							-



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

● Applicable Inserts

Description	Applicable Inserts  M23 (Handed Insert shows Right-hand)			
		 2-Notched	 3-Notched	 2-Notched / Tough Edge
MSRS... MSRS...M	SPMT 1806EDER-NB2	SPMT 1806EDER-NB3	SPMT 1806EDSR-NB2T	SPMT 1806EDSR-NB3T
For custom-ordered cutter	-	-	SPMT 1806EDSL-NB2T	SPMT 1806EDSL-NB3T
Description	Applicable Inserts  M23			Selection of chipbreaker M43
		 4-Notched / Low cutting force	 5-Notched / Low cutting force	
MSRS... MSRS...M	SPMT 1806EDER-NB2P	SPMT 1806EDER-NB3P	SPMT 1806EDER-V	

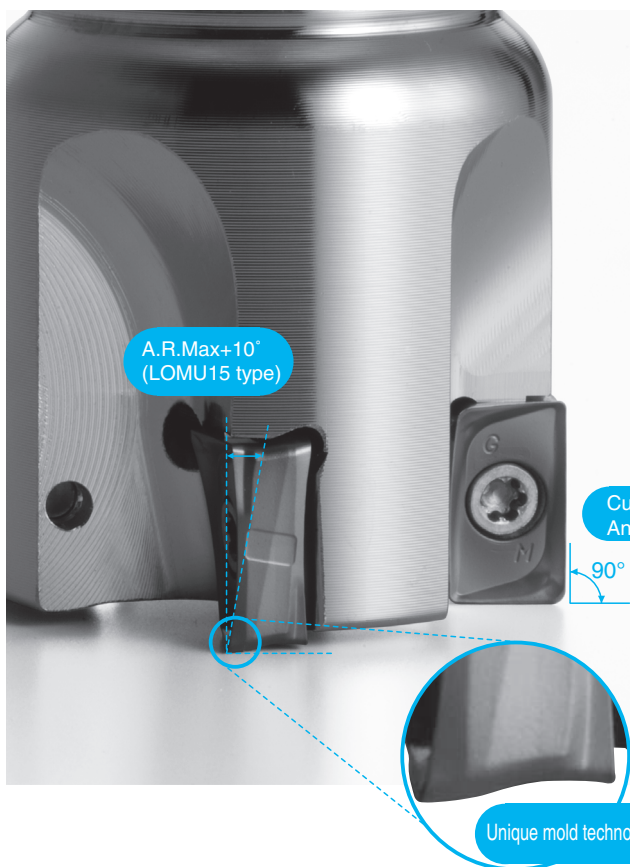
◆ Recommended Cutting Conditions

Workpiece Material	fz (mm / t)			Recommended Insert Grades (Cutting Speed Vc: m/min)			
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	MEGACOAT			PVD Coated Carbide
				PR1225	PR1230	PR1210	PR830
Carbon Steel	0.15	0.2	0.3	☆ 120~180~250	★ 120~180~220	-	☆ 120~170~220
Alloy Steel	0.15	0.2	0.3	☆ 120~180~250	★ 120~180~220	-	☆ 120~170~220
Mold Steel	0.1	0.15	0.2	☆ 100~160~220	★ 100~160~200	-	☆ 100~150~200
Gray Cast Iron	0.2	0.25	0.35	-	-	★ 120~180~250	-
Nodular Cast Iron	0.15	0.2	0.3	-	-	★ 100~160~220	-
Stainless Steel	Not recommended						
Aluminum / Copper	Not recommended						

★ : 1st Recommendation ☆ : 2nd Recommendation

Insert Grades  
Indexable Inserts  
Turning  
CNC & PCO Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

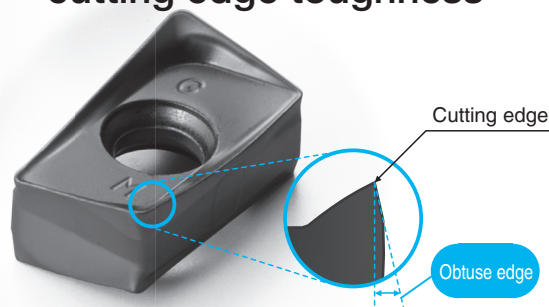
A  
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## MEW

Double-sided 4-edge insert,  
Newly Developed End Mill  
Kyocera's unique mold technology  
reduces cutting force equivalent to  
positive inserts

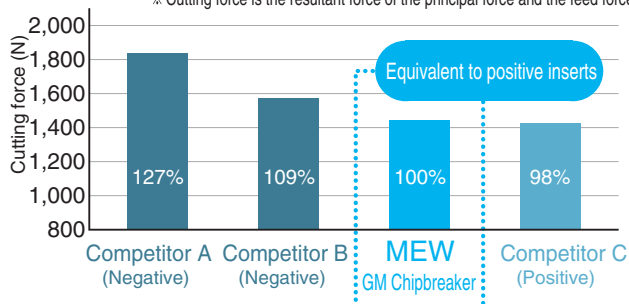
Obtuse edge increases  
cutting edge toughness



## Low cutting force equivalent to positive inserts

### ● Cutting Force Comparison (Internal evaluation)

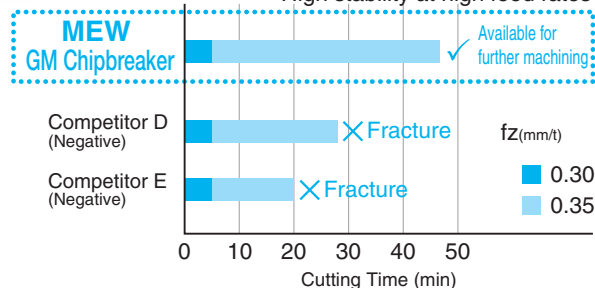
※ Cutting force is the resultant force of the principal force and the feed force.



<Cutting Conditions>  
Vc=150m/min apxae=3x15mm fz=0.15mm/t S50C Cutting Dia. ø20

### ● Fracture Resistance Comparison (Internal evaluation)

High stability at high feed rates

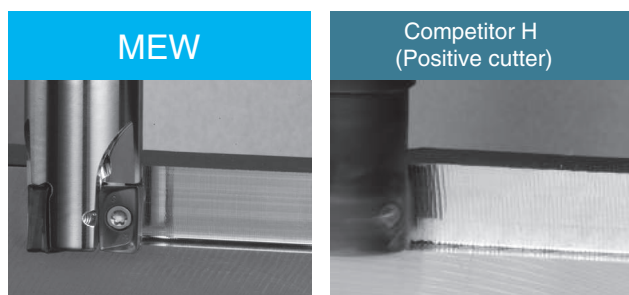


<Cutting Conditions>  
Vc=120m/min apxae=3x10mm fz=0.3-0.35mm/t  
SCM440H (37-39HS) Cutting Dia. ø20

## Improved surface finish, minimizing chattering

Sharp cutting and superior resistance to chattering and burrs  
with helical cutting edge and optimum axial rake design

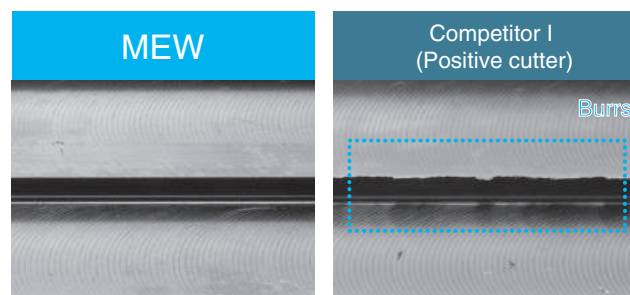
### Surface of shoulder wall (Internal evaluation)



Smooth surface of MEW without chattering

<Cutting Conditions>  
Vc=240m/min apxae=4 (3passes) x5mm fz=0.12mm/t Dry SS400 Cutting Dia. ø20

### Burr comparison with positive cutters (Internal evaluation)



Sharp cutting enables less burrs than positive cutters

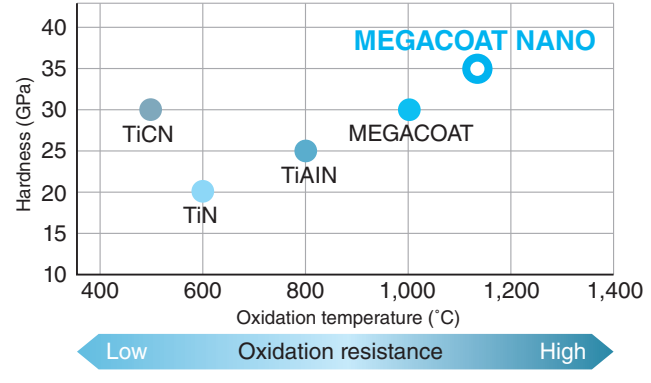
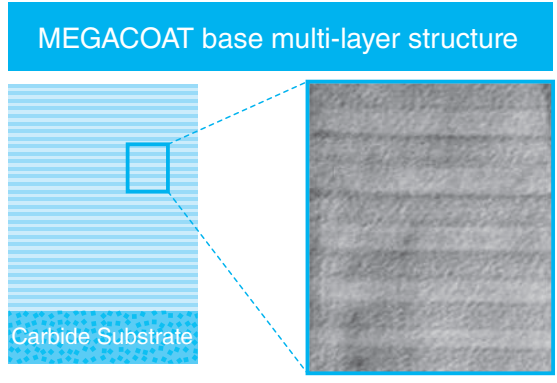
<Cutting Conditions>  
Vc=250m/min apxae=4x5mm fz=0.1mm/t Dry S50C Cutting Dia. ø20

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

Large actual rake angle lowers cutting force

# Extended Tool Life by New MEGACOAT NANO Technology

Stable and longer tool life by special nano coating layer "MEGACOAT NANO"  
**PR1525** for steel and stainless steel (austenitic related), **PR1510** for cast iron are available.  
**PR1535** for heat-resistant alloys, titanium and stainless steel (precipitation hardening) are available, too.  
**CA6535** (CVD coated) for heat-resistant alloys and stainless steel (martensitic) is available.  
**PDL025** (DLC coated) and **GW25** (Carbide) for non-ferrous metals are available, too.

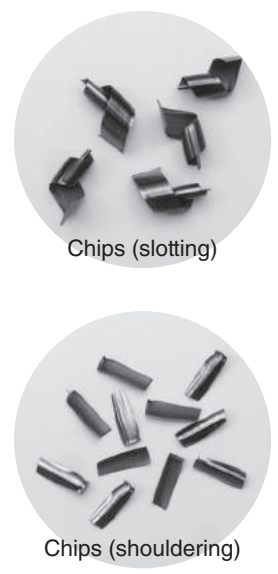
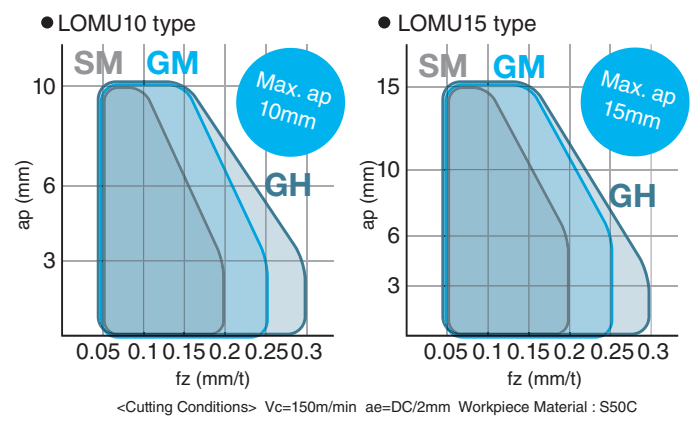


Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature : 1,150°C)

## Various chipbreaker lineup

Newly developed 3 chipbreakers for various applications  
 Applicable to a wide range of application

Chipbreaker	Applications	Insert
<b>GM</b>	General purpose	
<b>SM</b>	Low cutting force	
<b>GH</b>	For Heavy Milling	
<b>AM</b>	For Non-ferrous Metals	



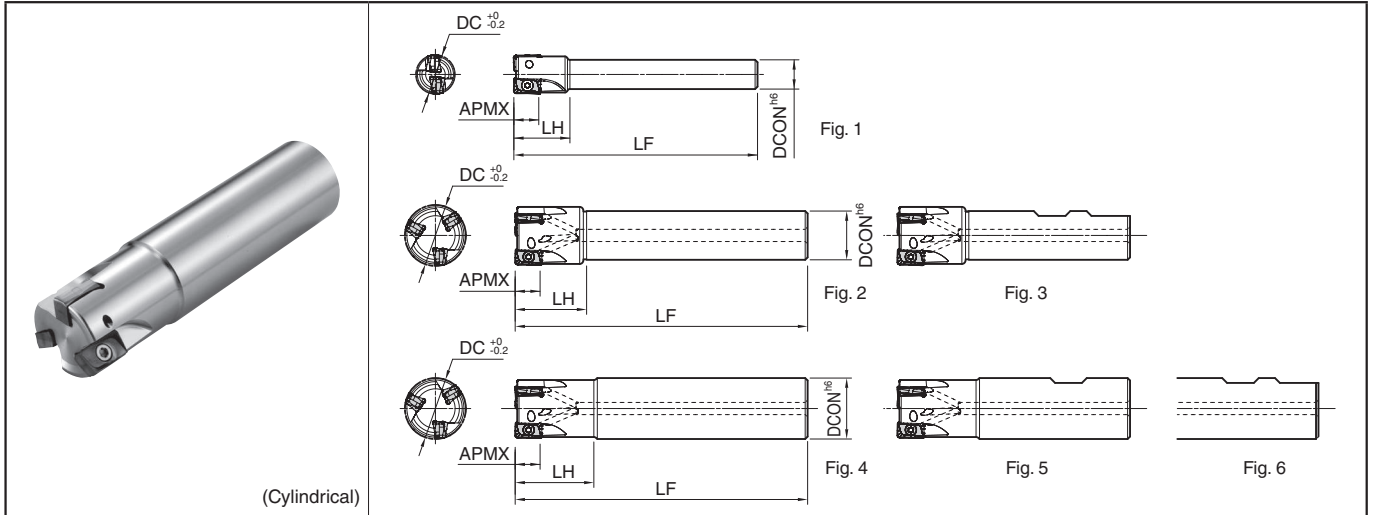
## Lineup of Corner-R (RE)

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



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

## MEW End Mill



(Cylindrical)

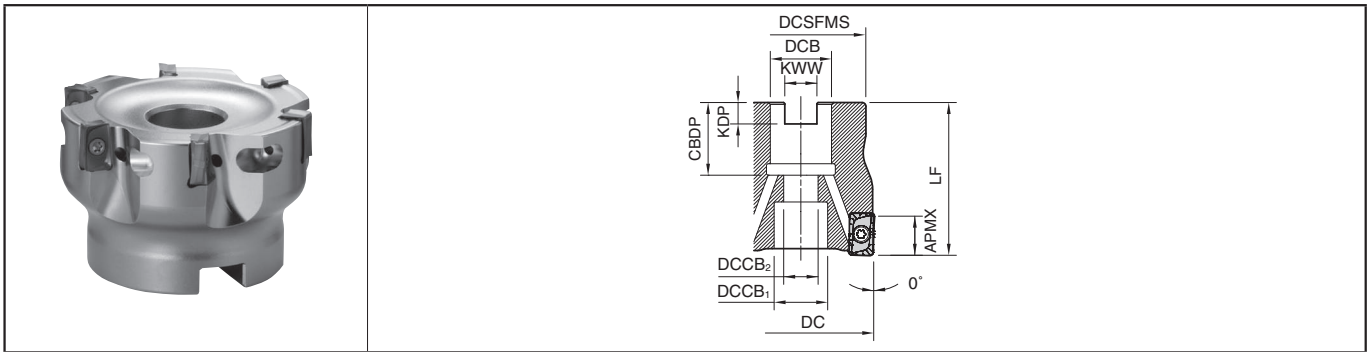
### Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Max. Revolution (min <sup>-1</sup> )						
				DC	DCON	LF	LH	APMX	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					
		MEW 18-S16-10-2T	●	2	18	16	100	25						43,000					
		MEW 20-S16-10-2T	●	2	20	16	110	26						41,000					
		MEW 22-S20-10-3T	●	3	22	20	120	29						39,600					
		MEW 25-S20-10-3T	●	3	25	20	120	29						37,500					
		MEW 28-S25-10-3T	●	3	28	25	130	32						35,800					
		MEW 30-S25-10-4T	●	4	30	25	130	32						34,800					
		MEW 32-S25-10-4T	●	4	32	25	130	32						33,900					
		MEW 40-S32-10-5T	●	5	40	32	150	50						30,000					
	MEW 50-S32-10-5T	●	5	50	32	120	40	22,500											
	Same Shank	MEW 16-S16-10-2T	●	2	16	16	100	26	10	+7°	-22°	Yes	Fig. 4	43,750					
		MEW 20-S20-10-2T	●	2	20	20	110	30						41,000					
		MEW 20-S20-10-3T	●	3	20	20	110	30						41,000					
		MEW 25-S25-10-2T	●	2	25	25	120	32						37,500					
		MEW 25-S25-10-3T	●	3	25	25	120	32						37,500					
		MEW 32-S32-10-3T	●	3	32	32	130	40						33,900					
		MEW 32-S32-10-4T	●	4	32	32	130	40						33,900					
	Long Shank	MEW 20-S20-10-150-2T	●	2	20	20	150	40	10	+7°	-20°	Yes	Fig. 4	41,000					
		MEW 25-S25-10-170-2T	●	2	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					
MEW 32-S25-15-2T		●	2	32	25	130	32	30,000											
MEW 40-S32-15-3T		●	3	40	32	150	50	25,000											
MEW 40-S32-15-4T		●	4	40	32	150	50	25,000											
MEW 50-S32-15-4T		●	4	50	32	120	40	17,000											
Same Shank	MEW 25-S25-15-2T	●	2	25	25	120	32	15	+10°	-22°	Yes	Fig. 4	35,000						
	MEW 32-S32-15-2T	●	2	32	32	130	40						30,000						
	MEW 32-S32-15-3T	●	3	32	32	130	40						30,000						
Weldon	Standard Shank	MEW 40-W32-10-5T	MTO	5	40	32	111	50	10	+7°	-19°	Yes	Fig. 3	30,000					
		MEW 40-W32-15-4T	MTO	4	40	32	111	50						15	+10°	-21°	25,000		
	Same Shank	MEW 16-W16-10-2T	MTO	2	16	16	75	10	+7°	-22°	Yes	Fig. 5	43,750						
		MEW 20-W20-10-2T	MTO	2	20	20	77						25	41,000					
		MEW 20-W20-10-3T	MTO	3	20	20	77						25	41,000					
		MEW 25-W25-10-2T	MTO	2	25	25	90						32	37,500					
		MEW 25-W25-10-3T	MTO	3	25	25	90						32	37,500					
		MEW 32-W32-10-4T	MTO	4	32	32	102						40	33,900					
		MEW 25-W25-15-2T	MTO	2	25	25	90						32	15	+10°	-22°	Yes	Fig. 6	35,000
		MEW 32-W32-15-3T	MTO	3	32	32	102						40						30,000

Max. Revolution

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

## MEW Face Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Weight (kg)	Max. Revolution (min <sup>-1</sup> )
			DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDB	KDP	KWW	APMX	A.R. (MAX.)	R.R.			
MEW 032R-10-4T-M	●	4	32	30	16	14	9	35	19	5.6	8.4	10	+7°	-20°	Yes	0.1	33,900
			40	34													
			50	45													
			63	47													
MEW 040R-10-5T-M	●	5	40	34	16	14	9	35	19	5.6	8.4	10	+7°	-19°	Yes	0.2	30,000
			50	45													
			63	47													
			63	47													
MEW 050R-10-5T-M	●	5	50	45	22	18	11	40	21	6.3	10.4	15	+10°	-21°	Yes	0.4	22,500
			63	47													
			63	47													
			63	47													
MEW 063R-10-6T-M	●	6	63	47	22	18	11	40	21	6.3	10.4	15	+10°	-21°	Yes	0.5	20,500
			63	47													
			63	47													
			63	47													
MEW 040R-15-4T-M	●	4	40	34	16	14	9	35	19	5.6	8.4	15	+10°	-21°	Yes	0.2	25,000
			50	45													
			63	47													
			63	47													
MEW 050R-15-4T-M	●	5	50	45	22	18	11	40	21	6.3	10.4	15	+10°	-21°	Yes	0.3	17,000
			63	47													
			63	47													
			63	47													
MEW 063R-15-5T-M	●	5	63	47	22	18	11	40	21	6.3	10.4	15	+10°	-21°	Yes	0.5	14,500
			63	47													
			63	47													
			63	47													
MEW 080R-15-6T-M	●	6	80	60	27	20	13	50	25	7	12.4	15	+10°	-20°	Yes	1.0	12,000
			80	60													
			80	60													
			80	60													
MEW 080R-15-6T	●	6	80	60	25.4	20	13	50	27	6	9.5	15	+10°	-20°	Yes	1.0	12,000
			80	60													

Max. Revolution

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

### Spare Parts and Applicable Inserts (end mill / face mill)

Description	Spare Parts				Applicable Inserts M13			
	Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt				
MEW ...-10- T								
MEW 032R-10- M	SB-3065TRP	DTPM-8	P-37	HH8X25	LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
MEW 040R-10- M								
MEW 050R-10- M								
MEW 063R-10- M								
MEW ...-15- T								
MEW 040R-15- M	SB-4090TRP	DTPM-15	P-37	HH8X25	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM
MEW 050R-15- M								
MEW 063R-15- M								
MEW 080R-15- (-M)								

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

Recommended Cutting Conditions M54

### About wrench specifications

Wrenches and clamp screws are "Torx Plus".

- 1) Ref. to Fig. 1 for "Torx Plus" Wrench. (Purple grip)
- 2) Ref. to Fig. 2 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.

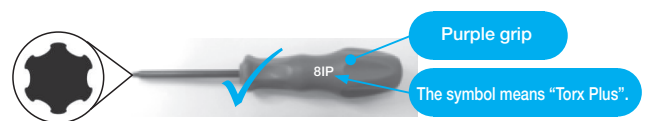


Fig. 1 "Torx Plus" Wrench (For MEW)

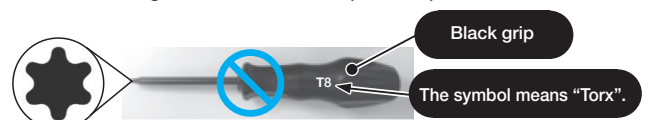
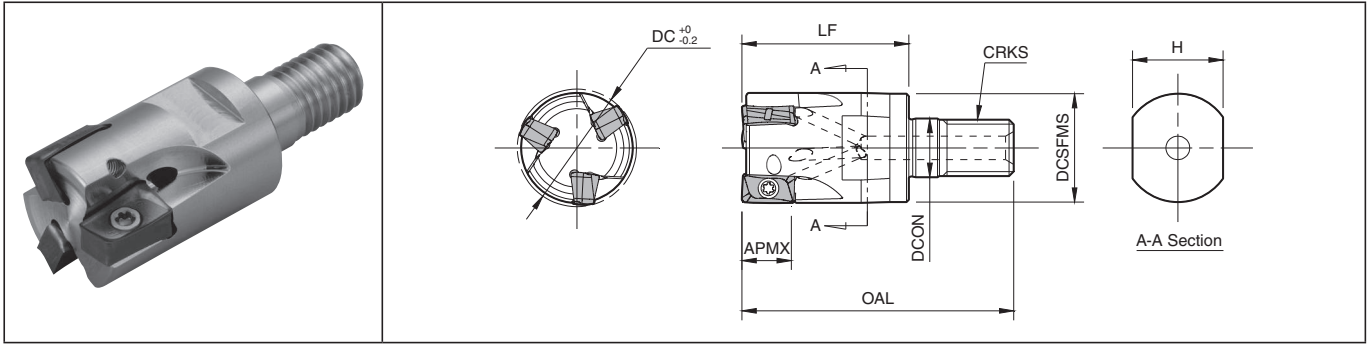


Fig. 2 "Torx" Wrench (Do NOT use it for MEW)



# MEW Modular type

## MEW Head



### Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Rake Angle		Coolant Hole	Applicable Inserts ➡ M13	Max. Revolution (min <sup>-1</sup> )	
			DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R. (MAX.)				R.R.
<b>MEW 16-M08-10-2T</b>	●	2	16	14.7	8.5	43	25	M8×P1.25	12	10	+7°	-22°	Yes	LOMU1004	43,750
<b>20-M10-10-2T</b>	●		20	18.7	10.5	49	30	M10×P1.5	15						41,000
<b>20-M10-10-3T</b>	●	3	25	23	12.5	57	35	M12×P1.75	19	15	+7°	-20°	Yes	LOMU1004	41,000
<b>25-M12-10-3T</b>	●														37,500
<b>32-M16-10-4T</b>	●	4	32	30	17	63	40	M16×P2.0	24	15	+10°	-22°	Yes	LOMU1505	33,900
<b>MEW 25-M12-15-2T</b>	●	2	25	23	12.5	57	35	M12×P1.75	19	15	+10°	-22°	Yes	LOMU1505	35,000
<b>32-M16-15-3T</b>	●	3	32	30	17	63	40	M16×P2.0	24						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.

➡ See Page M52 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

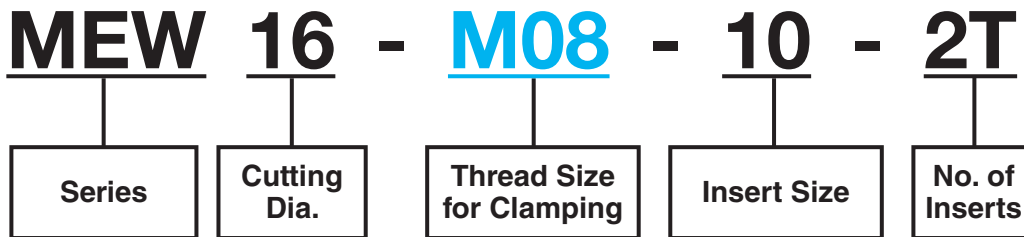
### Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts ➡ M13			
	Clamp Screw	Wrench	Anti-seize Compound				
<b>MEW 16-M08-10-2T</b>	SB-3065TRP Recommended tightening torque for Insert Clamp 1.2N·m	DTPM-8	P-37	General purpose	Low cutting force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
<b>20-M10-10-2T</b>				LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
<b>20-M10-10-3T</b>							
<b>25-M12-10-3T</b>							
<b>32-M16-10-4T</b>							
<b>MEW 25-M12-15-2T</b>	SB-4090TRP Recommended tightening torque for Insert Clamp 3.5N·m	DTPM-15	P-37	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM
<b>32-M16-15-3T</b>							

🔧 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M54

### Modular End Mill Head Identification System

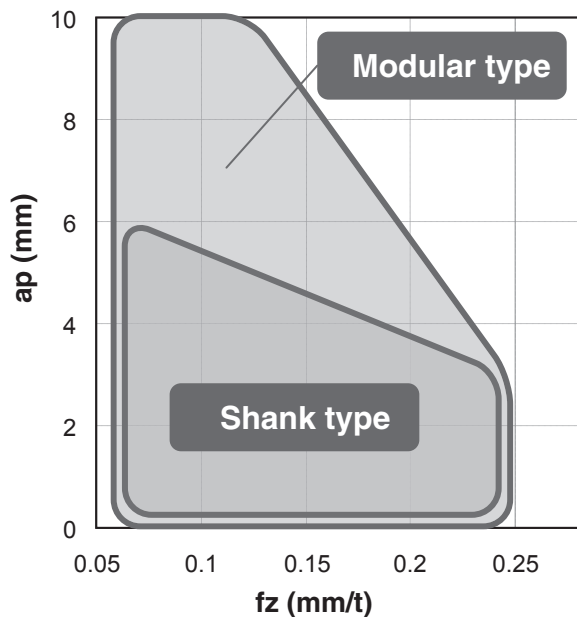


● : Std. Item



## Feature of Modular type

- Applicable to a wide range of applications



### <Cutting Conditions>

- Cutting Speed :  $V_c = 150 \text{ m/min}$  ( $n = 2,390 \text{ min}^{-1}$ )
- Width of Cut :  $a_e = 10 \text{ mm}$  (Shouldering)
- Workpiece Material : S55C, Dry

### · Machine : BT30 M/C

### <Cutting Tool>

- Modular type
  - Head : MEW20-M10-10-3T
  - Arbor : BT30K-M10-45
  - Insert : LOMU100408ER-GM (PR1525)
- Shank type
  - Toolholder : MEW20-S20-10-3T
  - Arbor : BT30 Milling Chuck (Double-face clamping)
  - Insert : LOMU100408ER-GM (PR1525)

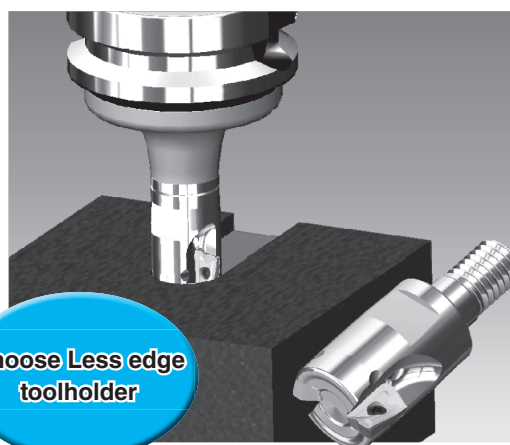
A wide range of applications even in BT30 M/C with the superior anti-chattering performance

- How to select Multi-edge or Less edge toolholder

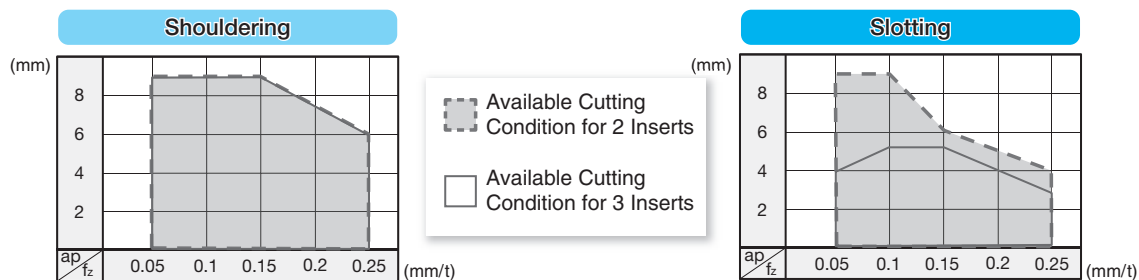
### Shouldering ( $a_e = 10 \text{ mm}$ )



### Slotting



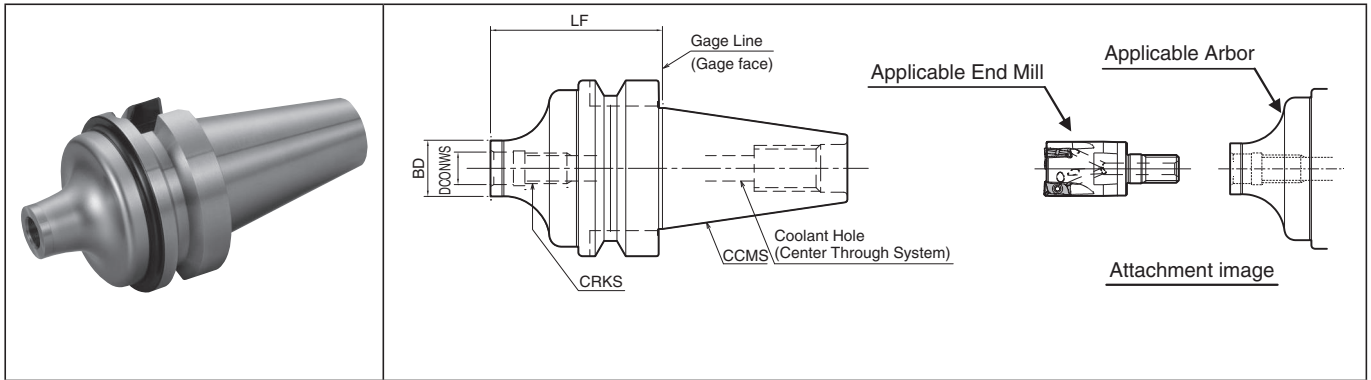
- Available Cutting Condition of Modular type



Choose Multi-edge toolholder for shouldering; higher efficiency in machining by higher feed rate.  
For grooving, choose less edge toolholder to lower cutting force.

# BT Arbor for Modular End Mill

## BT Arbor (for exchangeable head / double-face clamping spindle)

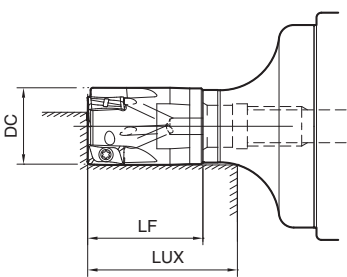


### Dimensions

Description	Stock	Dimension (mm)				Coolant Hole	Arbor (Double-face clamping)	Applicable End Mill (Head) ● M50(MEW), M59(MEC) M114(MFH Harrier) M119(MFH Mini) M125(MFH Micro) M171(MRX)
		LF	BD	DCONWS	CRKS			
<b>BT30K-</b> M08-45	●	45	14.7	8.5	M8×P1.25	Yes	BT30	(MEW/MEC/MFH/MRX)..-M08-..
	●		18.7	10.5	M10×P1.5			(MEW/MEC/MFH/MRX)..-M10-..
	●		23	12.5	M12×P1.75			(MEW/MEC/MFH/MRX)..-M12-..
<b>BT40K-</b> M08-55	●	55	14.7	8.5	M8×P1.25	Yes	BT40	(MEW/MEC/MFH/MRX)..-M08-..
	●	60	18.7	10.5	M10×P1.5			(MEW/MEC/MFH/MRX)..-M10-..
	●	55	23	12.5	M12×P1.75			(MEW/MEC/MFH/MRX)..-M12-..
	●	65	30	17	M16×P2.0			(MEW/MEC/MFH/MRX)..-M16-..

### Actual End Mill depth (See page M125 for MFH Micro)

Arbor Description	Applicable End Mill (Head)			Actual End Mill depth (mm)
	Description	Dimension (mm)		LUX
		Cutting Dia. (mm)	DC	
<b>BT30K-</b> M08-45	...16-M08-...	ø16	25	31.8
	...17-M08-...	ø17		33.2
	...18-M08-...	ø18		34.2
<b>M10-45</b>	...20-M10-...	ø20	30	36.8
	...22-M10-...	ø22		39.2
<b>M12-45</b>	...25-M12-...	ø25	35	42.8
	...28-M12-...	ø28		45.5
<b>BT40K-</b> M08-55	...16-M08-...	ø16	25	31.7
	...17-M08-...	ø17		33.2
	...18-M08-...	ø18		34.3
<b>M10-60</b>	...20-M10-...	ø20	30	38.7
	...22-M10-...	ø22		44.5
	...25-M12-...	ø25		44.6
<b>M12-55</b>	...28-M12-...	ø28	35	47.6
	...32-M16-...	ø32		51.2
<b>M16-65</b>	...35-M16-...	ø35	40	60.2
	...40-M16-...	ø40		64



M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

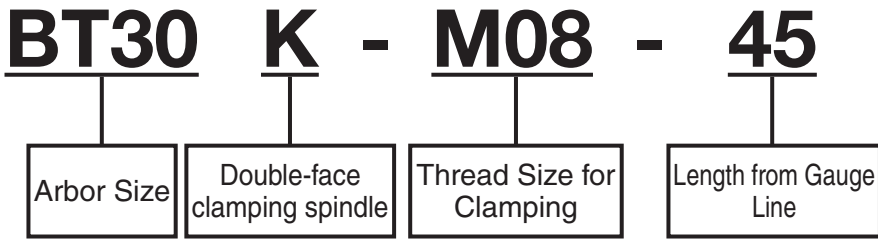
Slot Mill

Ball-nose  
Radius

Others

● : Std. Item

● Arbor Identification System



■ How to Attach Head

- (1) When clamping the head on the arbor, make sure there is no dust or chips inside (Fig. 1).  
Do NOT put lubricant on the clamping portion.

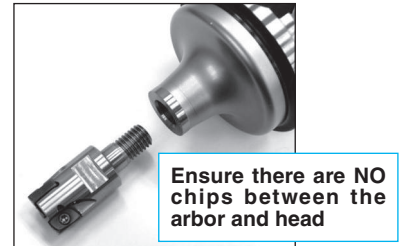


Fig. 1

- (2) Attach the head on the arbor and fix it using the wrench (Fig. 2).  
Ref. to the Table 1 for Recommended tightening torque.  
Note) The wrench is NOT included in the products.

Table 1 Recommended Head Tightening Torque

Thread Size for Clamping	Wrench Double width[mm]	Recommended tightening torque [N·m]
M8	12	23
M10	15	46
M12	19	80
M16	24	90



Fig. 2

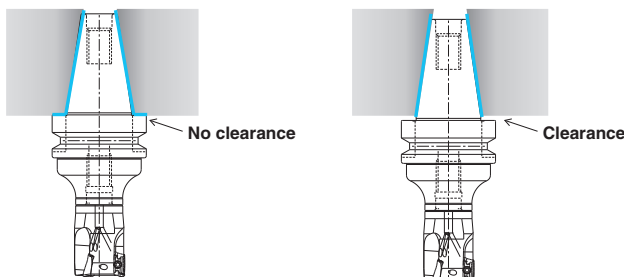
- (3) Confirm that the head is fixed firmly on the arbor. (Fig. 3)



Fig. 3

■ Frequently Asked Question

**Q :** Can the double-face clamping arbor be mounted on a general BT spindle?  
**A :** Yes. It can be used as a general BT arbor with a general BT spindle.



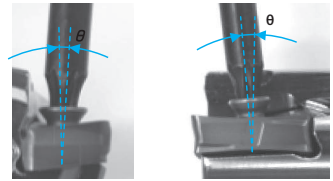
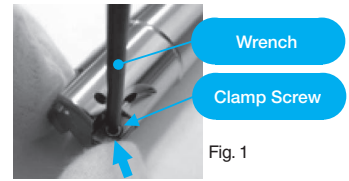
Double-face clamping arbor mounted on double-face clamping spindle

Double-face clamping arbor mounted on general spindle

It can be used as a general BT arbor, though the advantage of the double-face clamping will not be shown.

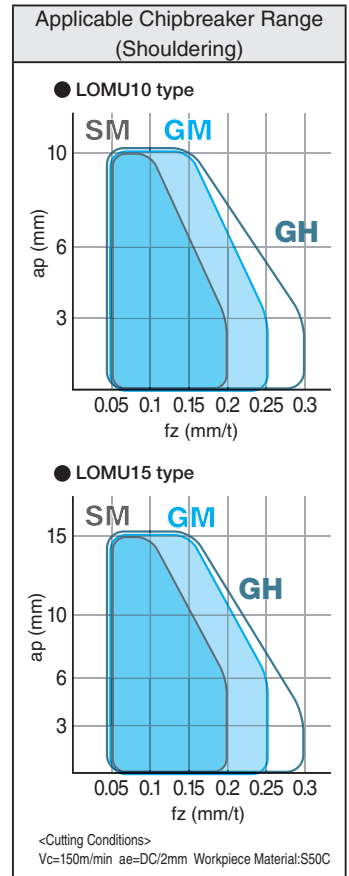
## How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp Screw
  - (1) Apply anti-seize compound on portion of taper and thread of clamp screw.
  - (2) Attach the screw (magnetic head) to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. When tightening the screw, make sure that the wrench is parallel to the screw. Tighten M3 screws (SB-3065TRP) slightly inclined from the insert surface. (Ref. to Fig. 2)
4. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.



### Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)			
		Toolholder Description		MEGACOAT NANO			CVD Coated Carbide
		MEW16-MEW18	MEW20-MEW40 MEW040R-MEW080R	PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel	0.06- <b>0.1</b> -0.2	0.08- <b>0.15</b> -0.25	120- <b>180</b> -250	120- <b>180</b> -250	-	-
	Alloy Steel	0.06- <b>0.1</b> -0.14	0.08- <b>0.15</b> -0.2	100- <b>160</b> -220	100- <b>160</b> -220	-	-
	Mold Steel	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.2	80- <b>140</b> -180	80- <b>140</b> -180	-	-
	Stainless Steel (Austenitic related)	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.15	100- <b>160</b> -200	100- <b>160</b> -200	-	-
	Stainless Steel (Martensitic related)	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.2	150- <b>200</b> -250	-	-	180- <b>240</b> -300
	Stainless Steel (Precipitation Hardening)	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.2	90- <b>120</b> -150	-	-	-
	Gray Cast Iron	0.06- <b>0.1</b> -0.17	0.08- <b>0.18</b> -0.25	-	-	120- <b>180</b> -250	-
	Nodular Cast Iron	0.06- <b>0.08</b> -0.12	0.08- <b>0.15</b> -0.2	-	-	100- <b>150</b> -200	-
	Ni-base heat-resistant alloys	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.15	20- <b>30</b> -50	-	-	20- <b>30</b> -50
	Titanium Alloys	0.06- <b>0.08</b> -0.12	0.08- <b>0.15</b> -0.2	40- <b>60</b> -80	-	30- <b>50</b> -70	-
SM	Carbon Steel	0.06- <b>0.1</b> -0.17	0.08- <b>0.15</b> -0.2	120- <b>180</b> -250	120- <b>180</b> -250	-	-
	Alloy Steel	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.18	100- <b>160</b> -220	100- <b>160</b> -220	-	-
	Mold Steel	0.06- <b>0.08</b> -0.12	0.08- <b>0.1</b> -0.15	80- <b>140</b> -180	80- <b>140</b> -180	-	-
	Stainless Steel (Austenitic related)	0.06- <b>0.08</b> -0.12	0.08- <b>0.1</b> -0.15	100- <b>160</b> -200	100- <b>160</b> -200	-	-
	Stainless Steel (Martensitic related)	0.06- <b>0.08</b> -0.12	0.08- <b>0.1</b> -0.15	150- <b>200</b> -250	-	-	180- <b>240</b> -300
	Stainless Steel (Precipitation Hardening)	0.06- <b>0.08</b> -0.12	0.08- <b>0.1</b> -0.15	90- <b>120</b> -150	-	-	-
	Ni-base heat-resistant alloys	0.06- <b>0.08</b> -0.1	0.08- <b>0.1</b> -0.12	20- <b>30</b> -50	-	-	20- <b>30</b> -50
	Titanium Alloys	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.15	40- <b>60</b> -80	-	30- <b>50</b> -70	-
GH	Carbon Steel	0.06- <b>0.1</b> -0.2	0.08- <b>0.2</b> -0.3	120- <b>180</b> -250	120- <b>180</b> -250	-	-
	Alloy Steel	0.06- <b>0.1</b> -0.14	0.08- <b>0.2</b> -0.25	100- <b>160</b> -220	100- <b>160</b> -220	-	-
	Mold Steel	0.06- <b>0.08</b> -0.12	0.08- <b>0.15</b> -0.22	80- <b>140</b> -180	80- <b>140</b> -180	-	-
	Stainless Steel (Austenitic related)	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.15	100- <b>160</b> -200	100- <b>160</b> -200	-	-
	Stainless Steel (Martensitic related)	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.2	150- <b>200</b> -250	-	-	180- <b>240</b> -300
	Stainless Steel (Precipitation Hardening)	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.2	90- <b>120</b> -150	-	-	-
	Gray Cast Iron	0.06- <b>0.1</b> -0.2	0.08- <b>0.22</b> -0.3	-	-	120- <b>180</b> -250	-
	Nodular Cast Iron	0.06- <b>0.08</b> -0.15	0.08- <b>0.18</b> -0.25	-	-	100- <b>150</b> -200	-
	Ni-base heat-resistant alloys	0.06- <b>0.08</b> -0.12	0.08- <b>0.12</b> -0.15	20- <b>30</b> -50	-	-	20- <b>30</b> -50
	Titanium Alloys	0.06- <b>0.08</b> -0.12	0.08- <b>0.15</b> -0.2	40- <b>60</b> -80	-	30- <b>50</b> -70	-
Chipbreaker	Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)			
		Toolholder Description		DLC Coated Carbide	Carbide		
		MEW16-MEW18	MEW20-MEW40 MEW040R-MEW080R	PDL025	GW25		
AM	Aluminum Alloys	0.06- <b>0.1</b> -0.2	0.08- <b>0.15</b> -0.25	200- <b>600</b> -900	200- <b>500</b> -800		

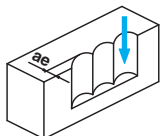


\* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

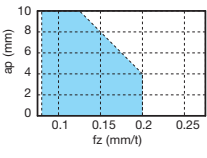
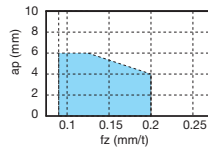
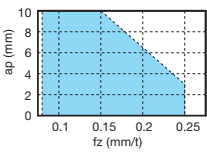
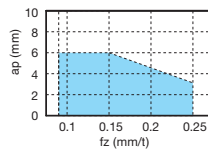
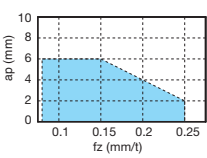
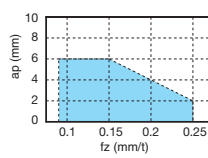
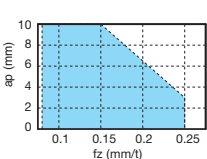
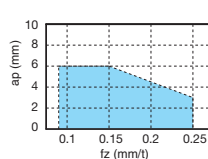
\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

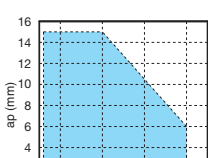
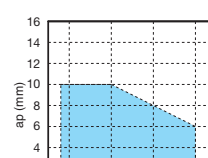
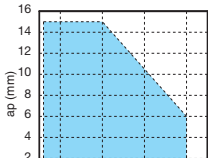
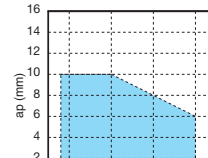
## Ramping, Helical milling and Vertical milling (Plunging)

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

Vertical Milling (Plunging)		
	Insert Description	Max. Width of Cut
	LOMU10 type	5mm
	LOMU15 type	7mm


## Cutting Performance

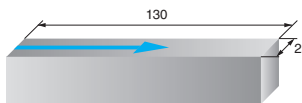
Description	Shouldering (Cutting width $ae = DC/2$ )	Slotting
MEW16...-10 MEW18...-10		
MEW20...-10 MEW50...-10		
MEW20-S20 -10-150-2T MEW25-S25 -10-170-2T (Long Shank)		
MEW032R... -10 MEW063R... -10		

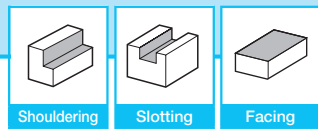
Description	Shouldering (Cutting width $ae = DC/2$ )	Slotting
MEW25...-15 MEW50...-15		
MEW040R... -15 MEW080R... -15		

<p>&lt;Cutting Conditions&gt;</p> <ul style="list-style-type: none"> <li>· <math>V_c=180\text{m/min}</math></li> <li>· GM Chipbreaker</li> <li>· Workpiece Material : S50C</li> <li>· Overhang Length               <ol style="list-style-type: none"> <li>1. End mill : Same length as LH of the dimension</li> <li>2. Face mill : LF of the dimension + minimum overhang length of the arbor</li> </ol> </li> </ul>
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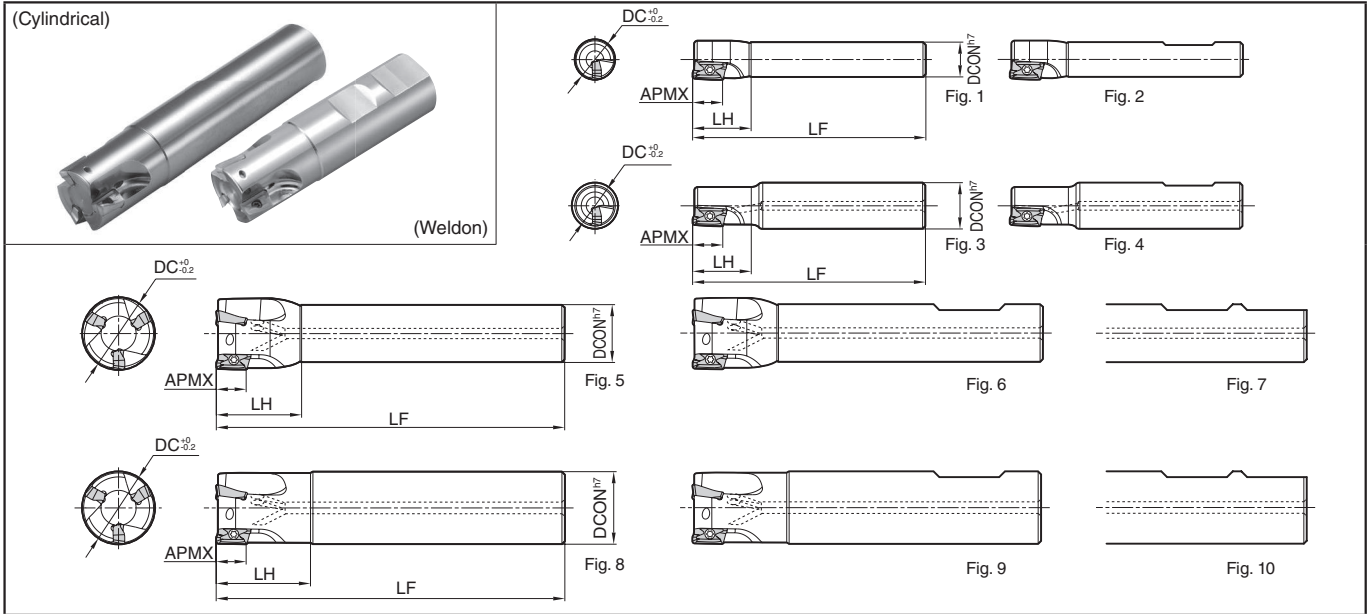
## Case Studies

SS400	
<ul style="list-style-type: none"> <li>· Construction machine part</li> <li>· <math>V_c=250\text{m/min}</math></li> <li>· <math>ap_{xae}=4 \times 20\text{mm}</math></li> <li>· <math>fz=0.14\text{mm/t}</math> (<math>V_f=1,350\text{mm/min}</math>)</li> <li>· Wet</li> <li>· MEW32-S32-10-4T(4 inserts)</li> <li>· LOMU100408ER-GM (PR1525)</li> </ul>	
<b>PR1525</b>	Chip Evacuation Rate = 108cc/min
Competitor A (Positive Cutter)	Chip Evacuation Rate = 72cc/min
<p>MEW showed stable milling without chattering at higher feed, improving the machining efficiency by 150%. Burr is prevented and excellent surface finish is achieved. (User Evaluation)</p>	

15-5PH(42HRC)	
<ul style="list-style-type: none"> <li>· Aircraft Part</li> <li>· <math>V_c=180\text{m/min}</math></li> <li>· <math>ap_{xae}=2 \times 25\text{mm}</math></li> <li>· <math>fz=0.1\text{mm/t}</math> (<math>V_f=716\text{mm/min}</math>)</li> <li>· Wet</li> <li>· MEW32-S32-10-4T(4 inserts)</li> <li>· LOMU100408ER-GM (PR1525)</li> </ul>	
<b>PR1525</b>	Chip Evacuation Rate = 35.8cc/min (Further Machining Possible)
Competitor B (Positive Cutter)	Chip Evacuation Rate = 26.8cc/min (Unable to continue machining)
<p>No chattering and more stable milling is possible with MEW. Despite the milling difficulty because of the properties of the material (42HRC), PR1525 kept good cutting edge form, minimizing wear and adhesion. (User Evaluation)</p>	



## MEC End Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min <sup>-1</sup> )									
			DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench										
Cylindrical	Standard Shank	MEC	10-S10-11	●	1	10	10	80	17	10	+10°	-24°	No	Fig. 1	SB-2545TR	DTM-8	54,800						
			10-S16-11	●		16	20		+12°		-21°	No	Fig. 1										
			12-S10-11	●		12								12				16	-19°	No	Fig. 1		
			12-S12-11	●		12																16	Yes
			12-S16-11	●		13								12				-19°	No	Fig. 1			
			13-S12-11	●		14															16	Yes	Fig. 3
			14-S12-11	●		14								16				No	Fig. 1				
		14-S16-11	●	16	2	16		100		23							+18°			-14°	No	Fig. 1	50,800
		MEC 16-S12-11T	●	17			110		26		+20°	-10°											
		MEC 17-S16-11T	●	18									16	-13°				Yes	Fig. 3				
		MEC 18-S16-11T	●	18																			
		MEC 19-S16-11T	●	19									16	-13°				Yes	Fig. 3				
		MEC 20-S16-11T	●	20																			
		MEC 21-S20-11T	●	21									20	-10°				Yes	Fig. 5				
	MEC 22-S20-11T	●	22	120	29	+21°		-10°															
	MEC 24-S20-11T	●	24				25		130	+23°	-9°												
	MEC 25-S20-11T	●	25	10	+21°	-10°		Yes				Fig. 5											
	MEC 25-S20-11T-4	●	4				25		120	29	+22°		-8°										
	MEC 28-S25-11T	●	3	28	130	32		+23°				-9°											
	MEC 30-S25-11T	●	4				30		150	50	+21°		-10°										
	MEC 32-S25-11T	●	4	32	130	40		+23°				-9°											
	MEC 32-S25-11T-5	●	5				40		32	150	50		+23°	-9°									
	MEC 40-S32-11T	●	5	50	32	150		50				+23°			-9°								
	MEC 50-S32-11T	●	5				32		130	40	+23°		-9°										
	Same Shank	MEC	16-S16-11T	●	2	16		16				100		30	10	+18°	-14°	Yes	Fig. 8	SB-2555TRG	DTM-8	37,500	
			20-S20-11T	●	3	20	20	110	30	+20°	-10°												
			25-S25-11T	●	4	25	25	120	32	+21°	-10°												
			25-S25-11T-4	●	4	25	25	120	32	+21°	-10°												
32-S32-11T			●	4	32	32	130	40	+23°	-9°													
32-S32-11T-5			●	5	32	32	130	40	+23°	-9°													
MEC			20-S18-170-11T	●	20	18	170	30	10	+20°	-10°	Yes	Fig. 5	SB-2555TRG		DTM-8	39,600						
		20-S20-140-11T	●	140		60	Fig. 8																
		20-S20-170-11T	●	20		170		30							Fig. 5								
		22-S20-170-11T	●	22		170	30	Fig. 5															
		25-S23-210-11T	●	25		23	210								32			+21°	-10°	Yes	Fig. 8	SB-2555TRG	DTM-8
		25-S25-160-11T	●			160	60																
		MEC 25-S25-210-11T	●	25		25	210	32							+22°			-9°	Yes	Fig. 8	SB-2555TRG	DTM-8	35,800
MEC 28-S25-210-11T		●	28		210	32																	
MEC 32-S30-250-11T	●	32	30	250	40	+23°	-9°	Yes	Fig. 5	SB-2555TRG	DTM-8	33,900											
MEC 32-S32-200-11T	●		32	200	65																		
MEC 32-S32-250-11T	●	32	32	250	65	+23°	-9°	Yes	Fig. 8	SB-2555TRG	DTM-8	32,600											
MEC 35-S32-250-11T	●		35	250	40																		
MEC 40-S32-240-11T	●	40	240	65	+23°	-8°	Yes	Fig. 5	SB-2555TRG	DTM-8	30,000												
MEC 40-S32-240-11T	●	40	240	65																			

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

### Max. Revolution

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force. For more details, "Warning" on page see [M61](#).

● : Std. Item

M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

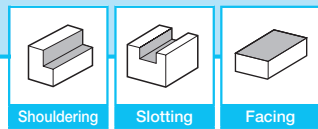
Multi-Function

Slot Mill

Ball-nose Radius

Others





● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min <sup>-1</sup> )																																						
			DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench																																							
			Cylindrical		Weldon		Standard Shank		Same Shank			Standard																																								
Cylindrical	Long Shank	MEC 20-S20-150-11T-3	●	3	20	20	150	60	10	+20°	-10°	Yes	Fig. 8	SB-2555TRG	DTM-8	41,000																																				
		25-S25-170-11T-3	●	3	25	25	170	60	10	+21°	-10°	Yes	Fig. 5			37,500																																				
		25-S25-170-11T-4	●	4	30	30	180	32	10	+23°	-9°	Yes	Fig. 8			34,800																																				
		30-S25-180-11T-3	●	3	32	32	200	65	10	+23°	-9°	Yes	Fig. 8			33,900																																				
		32-S32-200-11T-3	●	4	32	32	200	65	10	+23°	-9°	Yes	Fig. 8			33,900																																				
		32-S32-200-11T-4	●	4	32	32	200	65	10	+23°	-9°	Yes	Fig. 8			33,900																																				
	Cylindrical	Standard	MEC 25-S20-17	●	2	25	20	120	36	15.7	+16°	-11°	Yes	Fig. 5	SB-4070TRN	DTM-15	35,000																																			
			32-S25-17	●	3	32	25	130	40	15.7	+17°	-7°	Yes	Fig. 5			30,000																																			
			40-S32-17	●	4	40	32	150	50	15.7	+19°	-7°	Yes	Fig. 5			25,000																																			
			50-S32-17	●	4	50	32	150	50	15.7	+19°	-7°	Yes	Fig. 5			17,000																																			
			MEC 25-S25-17	●	2	25	25	120	36	15.7	+16°	-11°	Yes	Fig. 8			35,000																																			
		Cylindrical	Long Shank	MEC 32-S32-17	●	3	32	32	130	40	15.7	+17°	-7°	Yes	Fig. 8	SB-4070TRN	DTM-15	30,000																																		
				MEC 25-S25-160-17	●	2	25	160	60	15.7	+16°	-11°	Yes	Fig. 8	35,000																																					
				25-S25-210-17	●													210	36	15.7	+16°	-11°	Yes	Fig. 5	32,500																											
				28-S25-210-17	●																					28	36	15.7	+16°	-11°	Yes	Fig. 5	32,500																			
32-S32-200-17				●	32																													65	15.7	+17°	-7°	Yes	Fig. 8	30,000												
32-S32-250-17				●																																					32	250	40	15.7	+17°	-7°	Yes	Fig. 8	27,700			
35-S32-250-17				●																																														35	250	40
40-S32-240-17				●		40	240	65	15.7	+19°	-6°	Yes	Fig. 5	17,000																																						
MEC 32-S32-250-17-3				●											3			32	250	65	15.7	+19°	-7°	Yes	Fig. 8																											
40-S32-250-17-3				●																						40	250	65	15.7	+19°	-7°	Yes	Fig. 5																			
40-S32-250-17-4	●		50	42	64											15.7	+19°																	-6°	Yes	Fig. 5	17,000															
50-S42-250-17-4	●																																					50	42	64	15.7	+19°	-6°	Yes	Fig. 5	17,000						
Weldon	Standard Shank														MEC 10-W10-1103			MTO	1	10	10	60	17	10	+10°																						-24°	No	Fig. 2	SB-2545TR	DTM-8	54,800
						10-W16-1103-H	MTO	16	68	17	10	+10°	-24°	Yes	Fig. 4			50,800																																		
			12-W10-1103	MTO	12	10	60									10	+12°									-21°	No	Fig. 2	50,800																							
		12-W16-1103-H	MTO	16																										68	20	10	+12°	-21°	Yes	Fig. 4	47,700															
		14-W12-1103	MTO																																			14	12	68	20	+12°	-19°	No	Fig. 2	47,700						
		14-W16-1103-H	MTO																																																	
		MEC 16-W12-11T3	MTO																2	16	12	68	23	10	+18°																						-14°	No	Fig. 2	43,750		
		18-W16-11T3-H	MTO					18	16	68	25	10	+19°	-13°	Yes			Fig. 6																																	43,000	
		20-W16-11T3-H	MTO		20	20	81									26	10									+20°	-10°	Yes	Fig. 6																							41,000
		22-W20-11T3-H	MTO	22																										20	81	26	10	+21°	-10°	Yes	Fig. 6															
	25-W20-11T3-H	MTO	25																25	88	29	10	+22°	-9°	Yes													Fig. 7	37,500													
	28-W25-11T3-H	MTO						28	25	88	32	10	+23°	-8°	Yes			Fig. 7																						35,800												
	30-W25-11T3-H	MTO			30	25	88									32	10									+23°	-8°	Yes	Fig. 7												34,800											
	32-W25-11T3-H	MTO		32																										25	88	32	10	+23°	-8°	Yes	Fig. 7					33,900										
	40-W32-11T3-H	MTO	40																32	110	50	10	+23°	-8°	Yes													Fig. 7	30,000													
Same Shank	MEC 16-W16-11T3-H	MTO						2	16	16	68	25	10	+18°	-14°			Yes																						Fig. 9			SB-2555TRG	DTM-8	43,750							
	20-W20-11T3-H	MTO			20	20	81									30	10									+20°	-10°	Yes	Fig. 10												41,000											
	25-W25-11T3-H	MTO		25																										25	88	32	10	+21°	-10°	Yes	Fig. 10					37,500										
	32-W32-11T3-H	MTO	32																32	100	40	10	+23°	-9°	Yes													Fig. 10	33,900													
	Standard	MEC 25-W20-1704-H																																												MTO	2	25	20	86	36	15.7
32-W25-1704-H		MTO						3	32	25	92	36	15.7	+17°	-7°			Yes																						Fig. 7			30,000									
40-W32-1704-H		MTO			4	40	32									110	50									15.7	+19°	-7°	Yes												Fig. 7			25,000								
Same Shank		MEC 25-W25-1704-H		MTO																										2	25	25	92	36	15.7	+16°	-11°					Yes			Fig. 10	SB-4070TRN						
		32-W32-1704-H	MTO	3															32	32	100	40	15.7	+17°	-7°													Yes	Fig. 10													

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

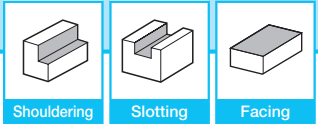
● Applicable Inserts

Description	Applicable Inserts M18, M19			Applicable Inserts M25	
MEC....-11	BDMT 1103 ○○ ER-JT	BDMT 1103 ○○ ER-JS	-	-	-
MEC....-1103	BDMT 1103 ○○ ER-JT	BDMT 1103 ○○ ER-JS	-	-	-
MEC....-11T	BDMT 11T3 ○○ ER-JT	BDMT 11T3 ○○ ER-JS	BDGT 11T3 ○○ FR-JA	BDGT 11T3 ○○ FR(-LE)	BDMT 11T3 ○○ FR
MEC....-11T03	BDMT 11T3 ○○ ER-JT	BDMT 11T3 ○○ ER-JS	BDGT 11T3 ○○ FR-JA	BDGT 11T3 ○○ FR(-LE)	BDMT 11T3 ○○ FR
MEC....-17	BDMT 1704 ○○ ER-JT	BDMT 1704 ○○ ER-JS	BDGT 1704 ○○ FR-JA	-	BDMT 1704 ○○ FR
MEC....-1704	BDMT 1704 ○○ ER-JT	BDMT 1704 ○○ ER-JS	BDGT 1704 ○○ FR-JA	-	BDMT 1704 ○○ FR

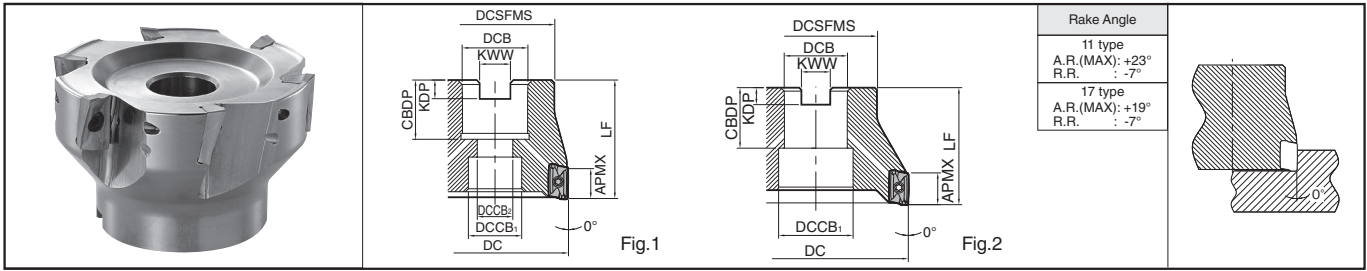
Recommended Cutting Conditions M60, M61

● : Std. Item  
MTO : Made to order

Insert Grades  
Turning  
Indexable Inserts  
CNC & PCO Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index



## MEC Face Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)									Coolant Hole	Drawing	Weight (kg)	Spare Parts		Max. Revolution (min <sup>-1</sup> )										
			DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW				APMX	Clamp Screw		Wrench									
Metric	Coarse pitch	MEC 040R-11-5T-M	5	40	34	16	14	8.5				20	5.5	8.5	10	Yes	Fig.1	SB-2555TRG	DTM-8	0.2	30,000						
		MEC 050R-11-5T-M	5	50																0.3	22,500						
		MEC 063R-11-6T-M	6	63	40	22	18	12				22	6.3	10.4						0.7	20,500						
		MEC 080R-11-7T-M	7	80	52.5	27	20	14	50			26	7	12.4						1.0	18,500						
		MEC 100R-11-9T-MN	9	100	65	32	26	17.6	55				8	14.4						1.6	17,000						
		MEC 125R-11-11T-M	11	125	85															3.1	15,000						
	MEC 160R-11-14T-M	14	160	110	40	68	-				63	33	9.5	16.4	No	Fig.2	4.5	13,900									
	Fine pitch	MEC 032R-11-5T-M	5	32	30		11.5									10	Yes	Fig.1	SB-2555TRG	DTM-8	0.1	33,900					
		MEC 040R-11-6T-M	6	40	34	16	14					20	5.6	8.4	0.2						30,000						
		MEC 080R-11-10T-M	10	80	52.5	27	20	14	50			26.5	7	12.4	0.9						18,500						
		MEC 100R-11-11T-M	11	100	65	32	26	17.6	55			34	8	14.4	1.7						17,000						
		Coarse pitch	MEC 040R-17-4T-M	4	40	34	16	14	8.5												15.7	Yes	Fig.1	SB-4070TRN	DTM-15	0.3	25,000
MEC 050R-17-4T-M			4	50											0.4											17,000	
MEC 063R-17-5T-M	5		63	40	22	18	12				22	6.3	10.4	0.6	14,500												
MEC 080R-17-6T-M	6		80	52.5	27	20	14	50			26	7	12.4	1.0	12,000												
MEC 100R-17-7T-MN	7	100	65	32	26	17.6	55				8	14.4	1.8	10,500													
MEC 125R-17-9T-M	9	125	85										3.1	8,900													
MEC 160R-17-12T-M	12	160	110	40	68	-				63	33	9.5	16.4	No	Fig.2	4.5	7,400										
Bore Dia. Inch spec	Coarse pitch	MEC 063R-11-6T	6	63	40										10	Yes	Fig.1	SB-2555TRG	DTM-8	0.8	20,500						
		MEC 080R-11-7T	7	80	52.5	25.4	20	14	50			26	6	9.5						1.0	18,500						
		MEC 100R-11-9TN	9	100	65	31.75	26	17.6				32	8	12.7						1.8	17,000						
		MEC 125R-11-11T	11	125	80	38.1	45	32	63			38	10	15.9						3.4	15,000						
		MEC 160R-11-14T	14	160	100	50.8	70	-				47	10	19.1						4.4	13,900						
		Fine pitch	MEC 063R-11-8T	8	63	40															10	Yes	Fig.1	SB-2555TRG	DTM-8	0.8	20,500
	MEC 080R-11-10T		10	80	52.5	25.4	20	14	50			26	6	9.5	1.0	18,500											
	Coarse pitch		MEC 063R-17-5T	5	63	40										15.7	Yes	Fig.1	SB-4070TRN	DTM-15						0.8	14,500
			MEC 080R-17-6T	6	80	52.5	25.4	20	14	50			26	6	9.5											1.0	12,000
			MEC 100R-17-7TN	7	100	65	31.75	26	17.6				32	8	12.7											1.8	10,500
			MEC 125R-17-9T	9	125	80	38.1	45	32	63			38	10	15.9											3.4	8,900
	MEC 160R-17-12T	12	160	100	50.8	70	-				47	10	19.1	4.5	7,400												
Fine pitch	MEC 063R-17-6T	6	63	40										15.7	Yes	Fig.1	SB-4070TRN	DTM-15	0.8	14,500							
	MEC 080R-17-8T	8	80	52.5	25.4	20	14	50			26	6	9.5						1.0	12,000							
	MEC 100R-17-9TN	9	100	65	31.75	26	17.6	63			32	8	12.7						1.8	10,500							

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread when insert is fixed.

### Recommended Cutting Conditions M60, M61

#### Max. Revolution

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force. For more details, "Warning" on page see M61.

#### When using Center-through Air / Coolant / Mist

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

#### For good shoulder finishes by MEC multistage ap.

In order to obtain smooth machining wall surface by multiple passes of MEC Milling Cutter, please keep ap 5.5mm or less for 11T3 type and also keep ap 9mm or less for 1704 type.

Table 1

Description	Mounting bolt (Attachment)	Wrench
MEC032R.....M	SP8X35	LW-5 (Double width 5mm)
MEC040R.....M	HH8X25H	LW-5 (Double width 5mm)
MEC050R.....M	HH10X30H	LW-6 (Double width 6mm)
MEC063R.....M	HH12X35H	LW-8 (Double width 8mm)
MEC100R....N/M	HH16X52H	LW-12 (Double width 12mm)
MEC125R....	HF20X53H	LW-14 (Double width 14mm)
MEC160R....	HF24X60H	LW-17 (Double width 17mm)

Wrench is not attached. Please purchase it separately.

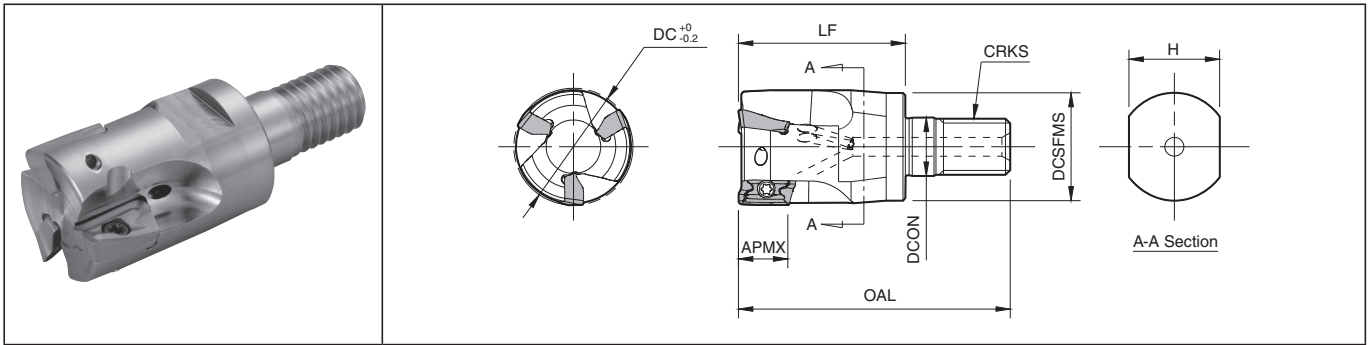
### Applicable Inserts

Description	Applicable Inserts M18, M19			Applicable Inserts M25	
MEC..R-11	BDMT 11T3 ○○ ER-JT	BDMT 11T3 ○○ ER-JS	BDGT 11T3 ○○ FR-JA	BDGT 11T3 ○○ FR(-LE)	BDMT 11T3 ○○ FR
MEC..R-17	BDMT 1704 ○○ ER-JT	BDMT 1704 ○○ ER-JS	BDGT 1704 ○○ FR-JA	-	BDMT 1704 ○○ FR

● : Std. Item

# MEC Modular type

## MEC Head



### Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Rake Angle		Coolant Hole	Applicable Inserts ➡ M18, M19 M25	Max. Revolution (min <sup>-1</sup> )	
			DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R. (MAX.)				R.R.
<b>MEC 16-M08-11T-2T</b>	●	2	16	14.7	8.5	43	25	M8×P1.25	12	10	+18°	-14°	Yes	BDMT11T3 BDGT11T3	43,750
<b>20-M10-11T-2T</b>	●	2	20	18.7	10.5	49	30	M10×P1.5	15		+20°	-10°			41,000
<b>20-M10-11T-3T</b>	●	3	20	18.7	10.5	49	30	M10×P1.5	15		+20°	-10°			41,000
<b>25-M12-11T-3T</b>	●	3	25	23	12.5	57	35	M12×P1.75	19		+21°	-10°			37,500
<b>32-M16-11T-4T</b>	●	4	32	30	17	63	40	M16×P2.0	24		+23°	-9°			33,900
<b>MEC 25-M12-17-2T</b>	●	2	25	23	12.5	57	35	M12×P1.75	19	15.7	+16°	-11°	Yes	BDMT1704 BDGT1704	35,000
<b>32-M16-17-3T</b>	●	3	32	30	17	63	40	M16×P2.0	24		+17°	-7°			30,000

### Max. Revolution

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

### Recommended Cutting Conditions ➡ M60, M61

➡ See Page M52 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

### Spare Parts

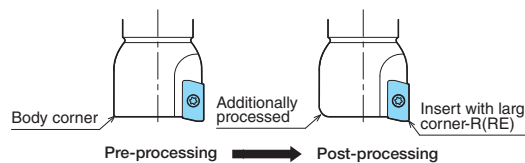
Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
<b>MEC 16-M08-11T-2T</b>	 SB-2555TRG Recommended tightening torque for Insert Clamp 1.2N·m	 DTM-8	 P-37
<b>20-M10-11T-2T</b>			
<b>20-M10-11T-3T</b>			
<b>25-M12-11T-3T</b>			
<b>32-M16-11T-4T</b>			
<b>MEC 25-M12-17-2T</b>	 SB-4070TRN Recommended tightening torque for Insert Clamp 3.5N·m	 DTM-15	 P-37
<b>32-M16-17-3T</b>			

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

■ When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary.  
 Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 1.2mm or less.)

Insert Corner-R(RE)(mm)	Additional Processing Dimension to Body Corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

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



## ◆ Recommended Cutting Conditions

· JT Chipbreaker

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)					
	Toolholder Description		Cermet	MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
	MEC10~MEC19	MEC20-MEC40 MEC040R-MEC160R	TN100M	PR1535	PR1225	PR1210	PR830	CA6535
Carbon Steel	0.06~ <b>0.1</b> ~0.15	0.08~ <b>0.15</b> ~0.25	☆ 120~ <b>160</b> ~200	☆ 120~ <b>180</b> ~250	★ 120~ <b>180</b> ~250	-	☆ 120~ <b>160</b> ~200	-
Alloy Steel	0.06~ <b>0.1</b> ~0.12	0.08~ <b>0.15</b> ~0.2	☆ 100~ <b>140</b> ~180	☆ 100~ <b>160</b> ~220	★ 100~ <b>160</b> ~220	-	☆ 100~ <b>140</b> ~180	-
Mold Steel	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.12</b> ~0.2	☆ 80~ <b>120</b> ~150	☆ 80~ <b>140</b> ~180	★ 80~ <b>140</b> ~180	-	☆ 80~ <b>120</b> ~150	-
Stainless Steel (Austenitic related)	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.12</b> ~0.15	-	☆ 100~ <b>160</b> ~200	☆ 100~ <b>160</b> ~200	-	☆ 100~ <b>140</b> ~180	-
Stainless Steel (Martensitic related)	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.12</b> ~0.2	-	☆ 150~ <b>200</b> ~250	-	-	-	★ 180~ <b>240</b> ~300
Stainless Steel (Precipitation Hardening)	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.12</b> ~0.2	-	★ 90~ <b>120</b> ~150	-	-	-	-
Gray Cast Iron	0.06~ <b>0.1</b> ~0.15	0.08~ <b>0.18</b> ~0.25	-	-	-	★ 120~ <b>180</b> ~250	-	-
Nodular Cast Iron	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.15</b> ~0.2	-	-	-	★ 100~ <b>150</b> ~200	-	-
Ni-base heat-resistant alloys	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.12</b> ~0.15	-	☆ 20~ <b>30</b> ~50	-	-	-	★ 20~ <b>30</b> ~50
Titanium Alloys	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.15</b> ~0.2	-	☆ 40~ <b>60</b> ~80	-	☆ 30~ <b>50</b> ~70	-	-

\* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★ : 1st Recommendation ☆ : 2nd Recommendation

\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others

· JS Chipbreaker

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)				
	Toolholder Description		MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
	MEC10~MEC19	MEC20~MEC40 MEC040R~MEC160R	PR1535	PR1225	PR1210	PR830	CA6535
Carbon Steel	0.06~ <b>0.1</b> ~0.12	0.08~ <b>0.15</b> ~0.18	☆ 120~ <b>180</b> ~250	★ 120~ <b>180</b> ~250	-	☆ 120~ <b>160</b> ~200	-
Alloy Steel	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.12</b> ~0.15	☆ 100~ <b>160</b> ~220	★ 100~ <b>160</b> ~220	-	☆ 100~ <b>140</b> ~180	-
Mold Steel	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.1</b> ~0.12	☆ 80~ <b>140</b> ~180	★ 80~ <b>140</b> ~180	-	☆ 80~ <b>120</b> ~150	-
Stainless Steel (Austenitic related)	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.1</b> ~0.12	★ 100~ <b>160</b> ~200	☆ 100~ <b>160</b> ~200	-	☆ 100~ <b>140</b> ~180	-
Stainless Steel (Martensitic related)	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.1</b> ~0.12	☆ 150~ <b>200</b> ~250	-	-	-	★ 180~ <b>240</b> ~300
Stainless Steel (Precipitation Hardening)	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.1</b> ~0.12	☆ 90~ <b>120</b> ~150	-	-	-	-
Ni-base heat-resistant alloys	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.1</b> ~0.12	☆ 20~ <b>30</b> ~50	-	-	-	★ 20~ <b>30</b> ~50
Titanium Alloys	0.06~ <b>0.08</b> ~0.1	0.08~ <b>0.1</b> ~0.12	★ 40~ <b>60</b> ~80	-	-	-	-

\* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. ★ : 1st Recommendation  
 \* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ☆ : 2nd Recommendation

· JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)	
		DLC Coated Carbide	Carbide
		PDL025	GW25
Aluminum Alloys (Si 13% or less)	0.05~0.3	200~1,000	200~800
Aluminum Alloys (Si 13% and over)	0.05~0.2	200~300	200~300

· PCD

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
		PCD
		KPD230 (KPD001)
Aluminum Alloys (Si 13% or less)	0.05~0.2	500~1,500
Aluminum Alloys (Si 13% and over)	0.05~0.15	300~1,000

**Warning**

Please observe below precautions fully. Failure to observe the precautions may cause serious damage to human body.

**Warning about Max. Revolution indicated on main body**

- 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.
- For actual practical revolution, please set within recommended cutting condition.
- When using at a higher revolution (over 10,000min<sup>-1</sup>), refer to the table to adjust the balance of MEC and suitable arbor.

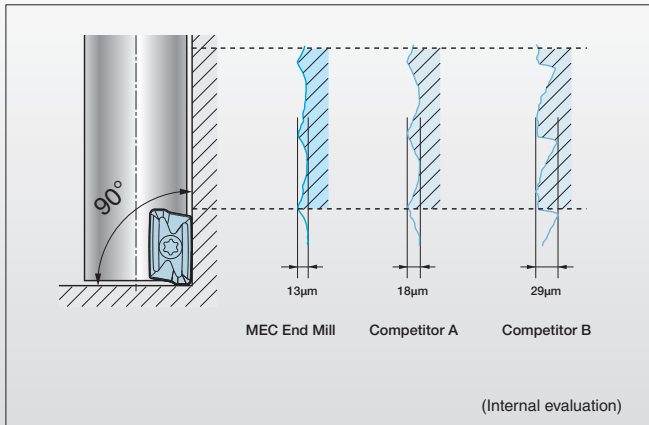
Revolution (min <sup>-1</sup> )	Balance quality grade G ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

Insert Grades  
 Turnable  
 Indexable Inserts  
 CNM & PCD Tools  
 External  
 Small Parts  
 Machining  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Tools for  
 Turning Mill  
 Spare Parts  
 Technical  
 Information  
 Index

## Features of MEC

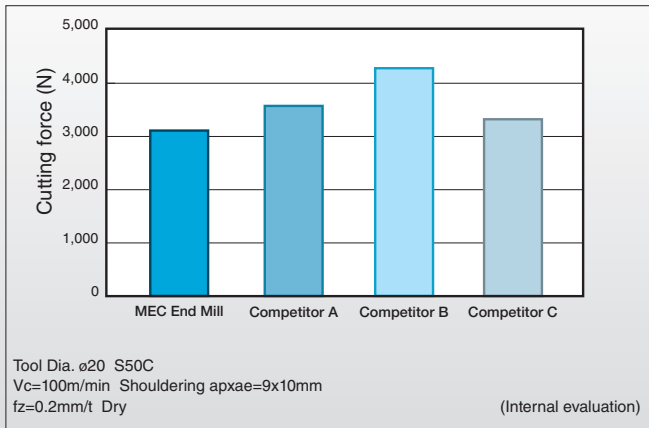
- Good squareness

<Cutting Surface Comparison>



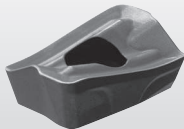
- Low cutting force

<Cutting Force Comparison>

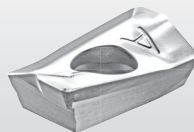


## Chipbreaker

- JT Chipbreaker (General purpose)

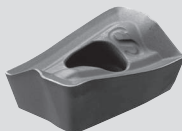


- JA Chipbreaker (For Aluminum)



- JS chipbreaker (Low cutting force)

Cutting force 20% lower



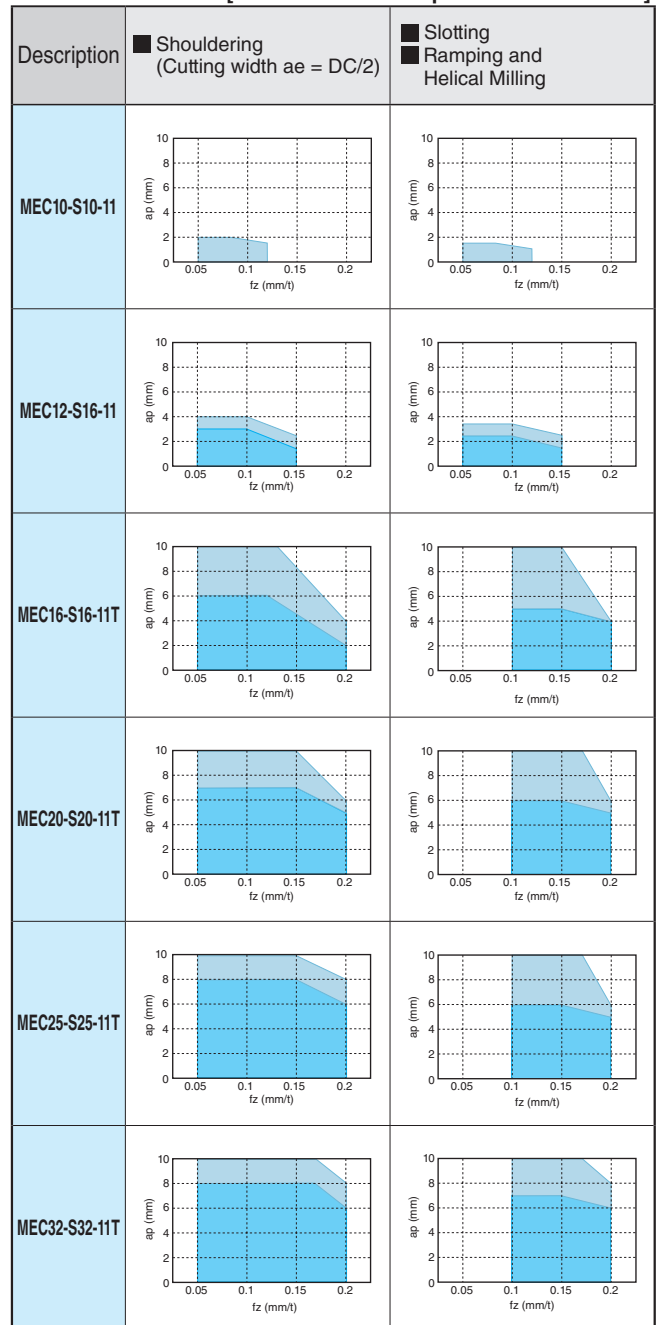
## Cutting Performance of MEC End Mill

(1) Cutting edge length 10mm type

(Standard / Same Shank with JT Chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (mm)		Shape
ø10	MEC10-S10-11	17	-	
ø12	MEC12-S16-11	20	30	
ø16	MEC16-S16-11T	30	45	
ø20	MEC20-S20-11T	30	45	
ø25	MEC25-S25-11T	32	48	
ø32	MEC32-S32-11T	40	60	

[Vc=120m/min Workpiece Material : S50C]



M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

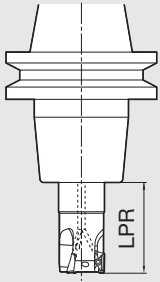
Slot Mill

Ball-nose Radius

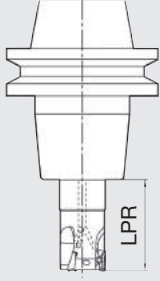
Others



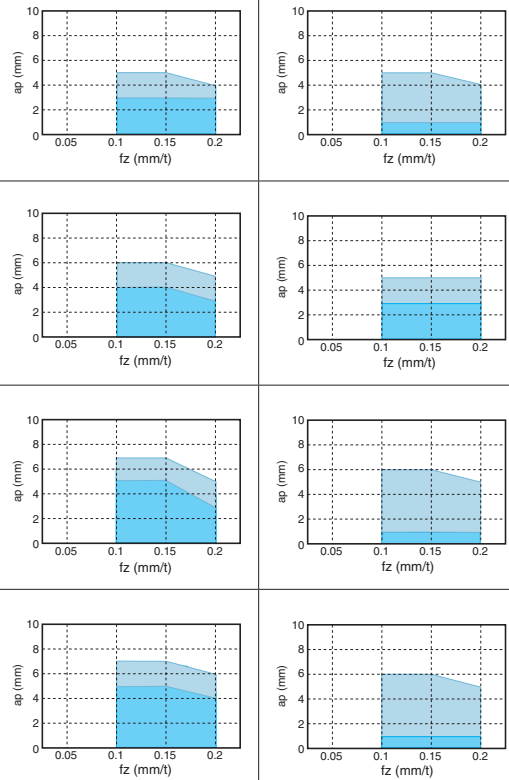
(2) Cutting edge length 10mm type  
(Long Shank with JT Chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (mm)		Shape
ø20 Long Shank	MEC20-S20-140-11T	60	90	
ø25 Long Shank	MEC25-S25-160-11T	60	100	
ø32 Long Shank	MEC32-S32-200-11T	100	130	
ø40 Long Shank	MEC40-S32-240-11T	100	130	

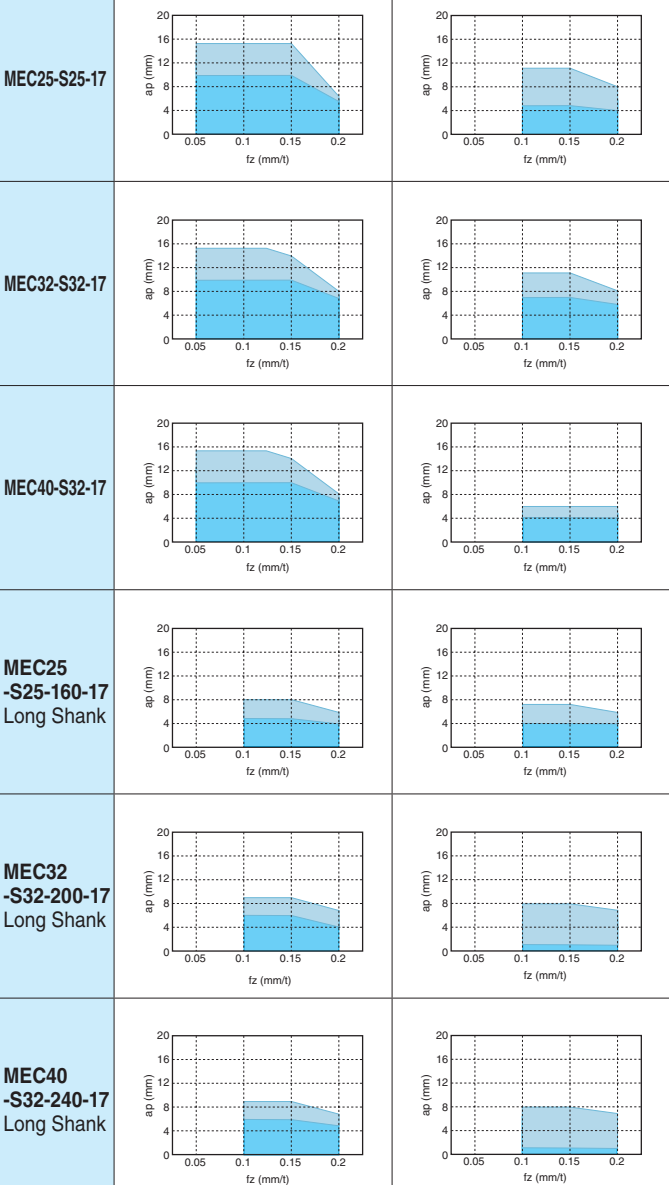
(3) Cutting edge length 15.7mm type  
(JT Chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (mm)		Shape
ø25	MEC25-S25-17	36	54	
ø32	MEC32-S32-17	40	60	
ø40	MEC40-S32-17	50	75	
ø25 Long Shank	MEC25-S25-160-17	60	100	
ø32 Long Shank	MEC32-S32-200-17	100	130	
ø40 Long Shank	MEC40-S32-240-17	100	130	

[Vc=120m/min Workpiece Material : S50C]

Description	<input type="checkbox"/> Shouldering (Cutting width ae = DC/2)		<input type="checkbox"/> Slotting <input type="checkbox"/> Ramping and Helical Milling	
				
MEC20-S20-140-11T Long Shank	[Graphs for MEC20-S20-140-11T]			
MEC25-S25-160-11T Long Shank	[Graphs for MEC25-S25-160-11T]			
MEC32-S32-200-11T Long Shank	[Graphs for MEC32-S32-200-11T]			
MEC40-S32-240-11T Long Shank	[Graphs for MEC40-S32-240-11T]			

[Vc=120m/min Workpiece Material : S50C]

Description	<input type="checkbox"/> Shouldering (Cutting width ae = DC/2)		<input type="checkbox"/> Slotting <input type="checkbox"/> Ramping and Helical Milling	
				
MEC25-S25-17	[Graphs for MEC25-S25-17]			
MEC32-S32-17	[Graphs for MEC32-S32-17]			
MEC40-S32-17	[Graphs for MEC40-S32-17]			
MEC25-S25-160-17 Long Shank	[Graphs for MEC25-S25-160-17]			
MEC32-S32-200-17 Long Shank	[Graphs for MEC32-S32-200-17]			
MEC40-S32-240-17 Long Shank	[Graphs for MEC40-S32-240-17]			

Insert Grades  
Turnable  
Indexable Inserts  
CNC & PCO Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

## Cutting Performance of MEC Face Mill

Cutting edge length 10 mm type (JT Chipbreaker)

[Vc=120m/min Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)
φ40	MEC040R-11-5T-M	115
φ50	MEC050R-11-○T-M	100
φ63	MEC063R-11-○T	95
	MEC063R-11-○T-M	
φ80	MEC080R-11-○T(-M)	95
φ100	MEC100R-11-9T(-M)N	108
φ125	MEC125R-11-11T(-M)	
φ160	MEC160R-11-14T(-M)	

Shape

Description	Shouldering (Cutting width ae = DC/2)	Slotting
MEC040R-11-5T-M		
MEC050R-11-○T-M MEC100R-11-9TN		
MEC125R-11-11T(-M) MEC160R-11-14T(-M)		

Cutting edge length 15.7mm type (JT Chipbreaker)

[Vc=120m/min Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)
φ40	MEC040R-17-4T-M	115
φ50	MEC050R-17-○T-M	100
φ63	MEC063R-17-○T	95
	MEC063R-17-○T-M	
φ80	MEC080R-17-○T(-M)	95
φ100	MEC100R-17-○T(-M)N	108
φ125	MEC125R-17-9T(-M)	
φ160	MEC160R-17-12T(-M)	

Shape

Description	Shouldering (Cutting width ae = DC/2)	Slotting
MEC040R-17-4T-M		
MEC050R-17-○T-M		
MEC063R-17-○T(-M) MEC100R-17-○TN		
MEC125R-17-9T(-M) MEC160R-17-12T(-M)		

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

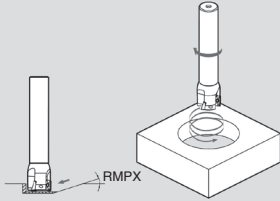
Ball-nose  
Radius

Others

# Ramping, Helical milling and Vertical milling (Plunging)

## Ramping / Helical Milling

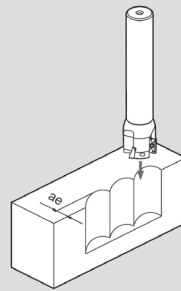
- Ramping angle is recommended under RMPX.
- Refer to each tool's cutting performance list for sinking depth per revolution when helical milling. Use compressed air when during machining.



Cutting Dia.	Applicable Inserts	Max. ramping angle (RMPX)
ø16~ø18	BDMT11T3 type BDGT11T3 type	3°
ø19~ø21		5°
ø22~ø25		2.5°
ø28~ø32		1.5°
ø40		0.7°
ø50 and over		Not recommended
ø25	BDMT1704 type BDGT1704 type	8°
ø32		5°
ø40		2.5°
ø50 and over		Not recommended

BDMT1103 type is not recommended for ramping and helical milling.

## Vertical Milling (Plunging)



Cutting Dia.	Applicable Inserts	Max. Width of Cut (ae)
ø16 s ø19	BDMT11T3 type BDGT11T3 type	1.5mm
ø20 s ø160	BDMT11T3 type BDGT11T3 type	5mm
ø25 s ø160	BDMT1704 type BDGT1704 type	8mm

BDMT1103 type is not recommended for vertical milling (plunging).

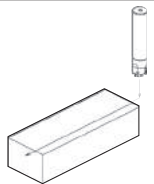
## Guidance of minimum cutting dia. by helical milling

MEC	Cutting Dia.	ø16	ø18	ø20	ø22	ø25	ø28	ø30	ø32	ø40	ø50
BD_T11T3 type	Guidance of minimum cutting dia. by helical milling	ø21	ø25	ø29	ø33	ø39	ø45	ø49	ø53	ø69	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flattening bottom after helical milling.	ø28	ø32	ø36	ø40	ø46	ø52	ø56	ø60	ø76	
BD_T1704 type	Guidance of minimum cutting dia. by helical milling	ø34	ø48	ø64	Helical milling is not recommended.						
	Guidance of minimum cutting dia. in case of flattening bottom after helical milling.	ø46	ø60	ø76							

## Case Studies

### RC55 (Pre-hardened Tool Steel)

- Test piece (54~56HRC)
- Vc=50m/min (n=800min<sup>-1</sup>)
- ap x ae=2 x 14mm
- fz=0.125mm/t (Vf=300mm/min)
- Dry
- MEC20-S20-11T
- 3 inserts
- BDMT11T308ER-JT (PR830)



#### MEC

Chip Removal Amount = 71.3cm<sup>3</sup> (Further Machining Possible)

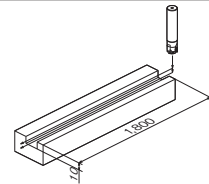
#### Competitor's End Mill A

Chip Removal Amount = 2.9cm<sup>3</sup> (Chipping occurred)

Competitor's End Mill A [ø25 (2 inserts) Vc=40m/min fz=0.075mm/t apxae=2x3mm] had chipping occurred in 10 minutes and had loud machining sound. MEC could increase the feed rate, and the cutting edge remained in extremely good condition and is still sustainable for further machining. (User Evaluation)

### SS400

- Plate
- Vc=88m/min (n=1,400min<sup>-1</sup>)
- ap=5mm x 2 passes
- fz=0.12mm/t (Vf=500mm/min)
- Dry
- MEC20-S20-11T
- 3 inserts
- BDMT11T308ER-JT (PR830)



#### MEC

23pcs/edge

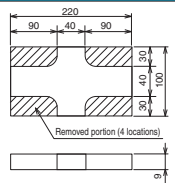
#### Competitor's End Mill B

10~11pcs/edge

MEC extended the tool life for more than twice. (User Evaluation)

### SUS304

- Plate
- Vc=125m/min (n=1,600min<sup>-1</sup>)
- ap=9.0mm
- fz=0.1mm/t (Vf=320mm/min)
- Dry
- MEC25-S25-17
- 2 inserts
- BDMT170408ER-JT (PR830)



#### MEC

4pcs/edge or more

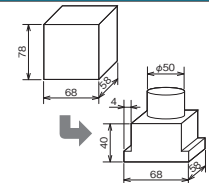
#### Competitor's End Mill C

1pc/edge or less

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

### DAC10 (Hot Work Tool Steel)

- Mold
- Vc=130m/min (n=1,040min<sup>-1</sup>)
- ap x ae = (~3)x(~5)  
(Varies depending on machining point)
- fz=0.18mm/t (Vf=936mm/min)
- Dry (Air blow)
- MEC40-S32-11T: 5 inserts
- BDMT11T308ER-JT (PR830)



#### MEC

2 hours (Small Wear : Extendible)

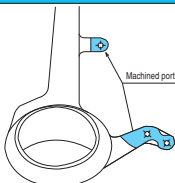
#### Competitor's End Mill D

2 hours (halted due to insert breakage)

MEC had better cutting performance / insert life comparing to Competitor's End Mill D, and the insert had only small wear and was usable for further machining after used for machining of the same duration as Competitor's End Mill D. Competitor's End Mill D (6 inserts type) was used with Vf=936mm/min (fz=0.15mm/t). (User Evaluation)

### SCM420

- Knuckle Steering
- Vc=150m/min (n=1,200min<sup>-1</sup>)
- ap=0.5~5mm (Shouldering)
- fz=0.1mm/t (Vf=478mm/min)
- Dry
- MEC40-S32-17
- 4 inserts
- BDMT170408ER-JT (PR830)



#### MEC

150 pcs/edge

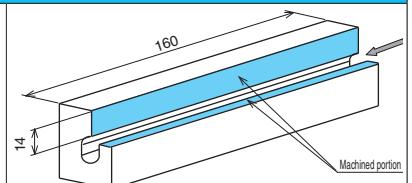
#### Competitor's End Mill E

40pcs/edge

MEC had a better finished surface comparing to Competitor's End mill E and also improved the tool life by more than 3 times. (User Evaluation)

### Ni-base heat-resistant alloys

- Turbine parts
- Vc=15m/min (n=120min<sup>-1</sup>)
- ap=0.5mm
- fz=0.08mm/t (Vf=38mm/min)
- Wet
- MEC40R-17-4T-M
- 4 inserts
- BDMT170408ER-JS (PR1025)



#### MEC

9pcs/edge

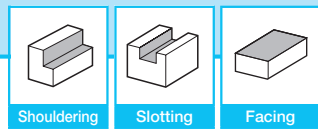
#### Competitor's End Mill F

1pc/edge or less

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

Insert Grades  
Indexable Inserts  
Turning  
CNC & CDD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

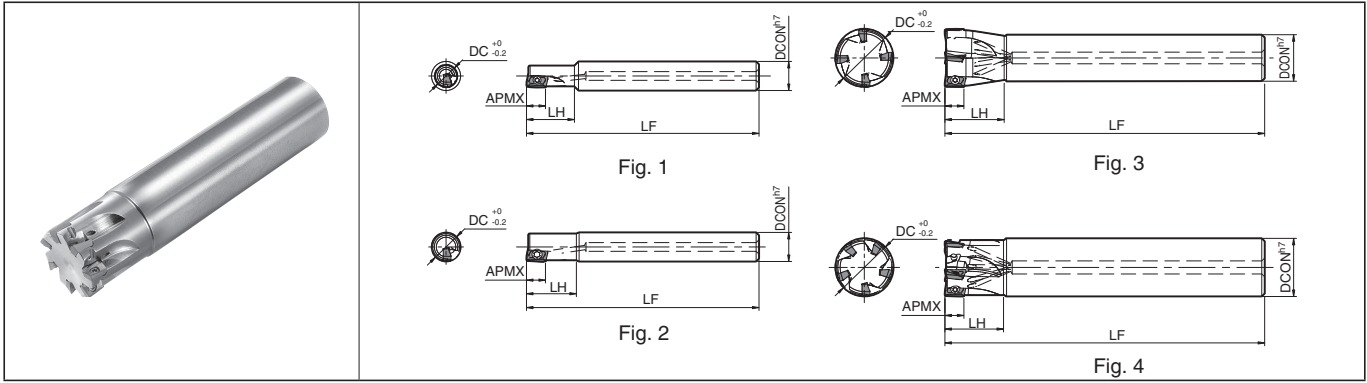


Shouldering

Slotting

Facing

## MECX End Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min <sup>-1</sup> )					
			DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench						
															SB-2035TRG	DTM-6			
Standard Shank	Standard	MECX 08-S10-07-1T	●	1	8	10	80	16	6	16.3°	Yes	Fig. 1	SB-2035TRG	DTM-6	48,100				
		MECX 14-S12-07-2T	●	2	14	12	80	18							11.7°	-24.0°	44,800		
		MECX 17-S16-07-3T	●	3	17	16	100	20							-12.1°	-11.0°	42,400		
		MECX 18-S16-07-3T	●		18		-10.9°								41,600				
		MECX 20-S16-07-4T	●	4	20	20	110	25							-10.4°	-10.1°	40,200		
		MECX 21-S20-07-4T	●		21		-9.7°								39,500				
		MECX 25-S20-07-5T	●	5	25	25	120	30							-9.5°	-8.8°	37,000		
		MECX 26-S25-07-5T	●		26		-9.5°								36,500				
		MECX 33-S32-07-6T	●	6	33	32	130	30							-8.8°	-8.8°	33,100		
		Standard	Fine pitch	MECX 20-S16-07-5T	●	5	20	16							110	20	6	16.3°	-10.4°
MECX 25-S20-07-7T	●			7	25	20	120	25	6	16.3°	-9.7°	Yes	Fig. 3	SB-2042TRG	DTM-6	37,000			
Same Shank	Standard	MECX 10-S10-07-1T	●	1	10	10	80	17	6	16.3°	Yes	Fig. 2	SB-2035TRG	DTM-6	47,100				
		MECX 12-S12-07-2T	●	2	12	12	80	18							12.8°	-18.7°	46,200		
		MECX 16-S16-07-3T	●	3	16	16	100	20							-14.3°	-13.7°	43,200		
		MECX 20-S20-07-4T	●	4	20	20	110								-11.3°	-10.4°	40,200		
		MECX 25-S25-07-5T	●	5	25	25	120	25							-9.7°	-9.7°	37,000		
		MECX 32-S32-07-6T	●	6	32	32	130	30							-8.9°	-8.9°	33,600		
	Standard	Fine pitch	MECX 16-S16-07-4T	●	4	16	16	100	20	6	16.3°	Yes	Fig. 4	SB-2042TRG	DTM-6	43,200			
			MECX 20-S20-07-5T	●	5	20	20	110								-11.3°	-10.4°	40,200	
			MECX 25-S25-07-7T	●	7	25	25	120								25	-9.7°	-9.7°	37,000
			MECX 32-S32-07-8T	●	8	32	32	130								30	-8.9°	-8.9°	33,600
Long Shank	Standard	MECX 17-S16-130-07-3T	●	3	17	16	130	20	6	16.3°	Yes	Fig. 3	SB-2042TRG	DTM-6	42,400				
		MECX 21-S20-140-07-4T	●	4	21	20	140								-11.0°	-10.1°	39,500		
		MECX 26-S25-160-07-5T	●	5	26	25	160								25	-10.1°	-9.5°	36,500	

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions **M68**

### Max. Revolution

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force. For more details, "Warning" in the next page.

### For good shoulder finishes by MECX multistage ap.

In order to obtain smooth machining wall surface by MECX multistage ap set up within 5mm for each cut.

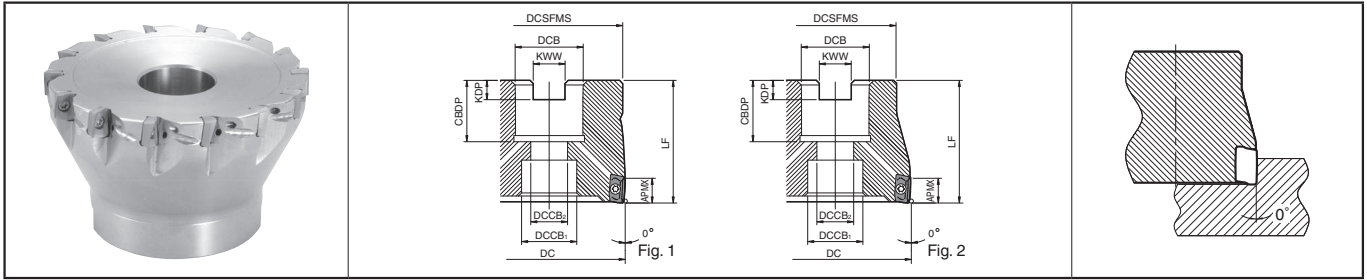
M

Milling

Insert
Lead Angle 45°~20°
Lead Angle 15°
Lead Angle 0°/2°
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

● : Std. Item

# MECX Face Mill



## Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Drawing	Weight (kg)	Spare Parts		Max. Revolution (min <sup>-1</sup> )							
			DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	A.R. (MAX.)	R.R.				Clamp Screw	Wrench								
<b>MECX 032R-07-8T-M</b>	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+7°	-8.9°	Yes	Fig. 1	0.15	SB-2042TRG	DTM-6	33,600							
<b>040R-07-10T-M</b>	●	10	40	38	22	18	12		22	6.3	10.4										-8.4°	Fig. 2	0.25	27,700			
<b>050R-07-12T-M</b>	●	12	50	40																					-8.3°	0.35	24,900
<b>063R-07-14T-M</b>	●	14	63																								

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions **M68**

### Max. Revolution

When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force. For more details, see "Warning" below.

### For good shoulder finishes by MECX multistage ap

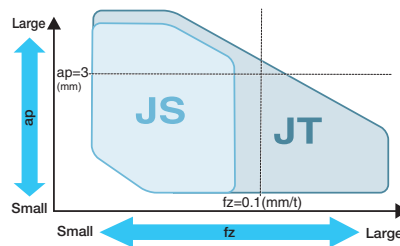
In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.

### MECX032R comes with mounting bolt (HH8X25H) and MECX040R/050R/063R comes with mounting bolt (HH10X30H).

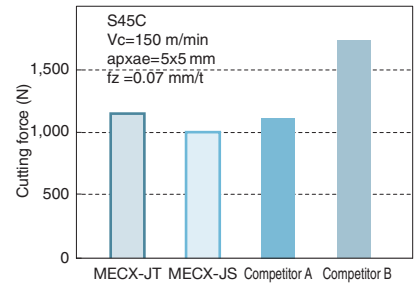
## Applicable Inserts

Description	Applicable Inserts <b>M18</b>	
<b>MECX...-07..</b>	BDMT 0703○○ ER-JT	BDMT 0703○○ ER-JS

### Chipbreaker selection



### Cutting Force Comparison (Internal evaluation)



### 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

- 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.
- For actual practical revolution, please set within recommended cutting condition.
- When using at a higher revolution (over 10,000min<sup>-1</sup>), refer to the table to adjust the balance of MECX and suitable arbor.

Revolution (min <sup>-1</sup> )	Balance quality grade G ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

## ◆ Recommended Cutting Conditions

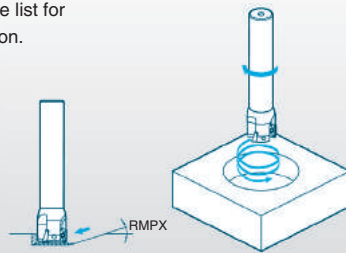
Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)				
	JS Chipbreaker	JT Chipbreaker	MEGACOAT NANO	MEGACOAT		PVD Coated Carbide	CVD Coated Carbide
			PR1535	PR1225	PR1210	PR830	CA6535
Carbon Steel	0.04~0.08~0.1	0.06~0.1~0.12	☆ 120~180~250	★ 120~180~250	-	☆ 120~150~180	-
Alloy Steel	0.04~0.06~0.08	0.06~0.08~0.1	☆ 100~160~220	★ 100~160~220	-	☆ 100~140~180	-
Mold Steel	0.04~0.06~0.08	0.06~0.08~0.1	☆ 80~140~180	★ 80~140~180	-	☆ 80~120~150	-
Stainless Steel (Austenitic related)	0.03~0.04~0.05	0.05~0.06~0.07	★ 100~160~200	☆ 100~160~200	-	-	-
Stainless Steel (Martensitic related)	0.03~0.04~0.05	0.05~0.06~0.1	☆ 150~200~250	-	-	-	★ 180~240~300
Stainless Steel (Precipitation Hardening)	0.03~0.04~0.05	0.05~0.06~0.1	★ 90~120~150	-	-	-	-
Gray Cast Iron	0.04~0.08~0.1	0.08~0.1~0.15	-	-	★ 120~180~250	-	-
Nodular Cast Iron	0.04~0.06~0.08	0.08~0.1~0.12	-	-	★ 100~150~200	-	-
Ni-base heat-resistant alloys	0.03~0.04~0.05	0.05~0.06~0.07	☆ 20~30~50	-	-	-	★ 20~30~50
Titanium Alloys	0.04~0.06~0.08	0.08~0.1~0.12	★ 40~60~80	-	☆ 30~50~70	-	-

\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation ☆ : 2nd Recommendation

## Ramping / Helical Milling

- Ramping angle is recommended under RMPX.
- Refer to each tool's cutting performance list for depth of helical milling per one revolution. Use compressed air during machining.



Cutting Dia.	Applicable Inserts	Max. ramping angle (RMPX)
ø8	BDMT0703 type	Not recommended
ø10		1.5°
ø12,ø14		2°
ø16		3°
ø17,ø18		1.5°
ø20		2°
ø21		1.8°
ø25		1.3°
ø26		1.2°
ø32		0.8°
ø33		0.5°

## Guidance of minimum cutting dia. by helical milling

MECX	Cutting Dia.	ø8	ø10	ø12	ø14	ø16	ø17	ø18	ø20
BDMT0703 type	Guidance of minimum cutting dia. by helical milling	Helical milling is not recommended	ø14	ø18	ø22	ø26	ø28	ø30	ø34
	Guidance of minimum cutting dia. in case of flattening bottom after helical milling		ø17	ø21	ø25	ø29	ø31	ø33	ø37

MECX	Cutting Dia.	ø21	ø25	ø26	ø32	ø33
BDMT0703 type	Guidance of minimum cutting dia. by helical milling	ø36	ø44	ø46	ø58	ø60
	Guidance of minimum cutting dia. in case of flattening bottom after helical milling	ø39	ø47	ø49	ø61	ø63

M

Milling

Insert

Lead Angle 45°~20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others



## Cutting Performance of MECX End Mill

[Vc=150m/min Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)	
ø8	MECX08-S10-07-1T	16	-
ø10	MECX10-S10-07-1T	17	-
ø12	MECX12-S12-07-2T	18	30
ø16	MECX16-S16-07-3T	20	40
ø20	MECX20-S20-07-4T	20	40
ø25	MECX25-S25-07-5T	25	50
ø32	MECX32-S32-07-6T	30	50

Shape

\* Machining with extended overhang length is not recommended for ø8 and ø10.

\* The cutting performance list shows applicable range of JT Chipbreaker (PR830) with Standard flute-number type.

For Multi-Edge type, use with 70% or less of ap.

### \* Cutting conditions of JS Chipbreaker

- (1) For MECX08-MECX12  
Decrease the feed rate by 25% according to cutting capability list.
- (2) For MECX16 and over  
Decrease the feed rate and ap by 30% according to cutting capability list.

Description	Shouldering (Cutting width ae = DC/2)	Slotting Ramping and Helical Milling
	MECX08-S10-07-1T	
MECX10-S10-07-1T		
MECX12-S12-07-2T		
MECX16-S16-07-3T		
MECX20-S20-07-4T		
MECX25-S25-07-5T		
MECX32-S32-07-6T		

## Cutting Performance of MECX Face Mill

[Vc=150m/min Workpiece Material : S50C]

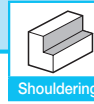
Cutting Dia.	Description	Overhang Length LPR (mm)
ø32	MECX032R-07-8T-M	100
ø40	MECX040R-07-10T-M	
ø50	MECX050R-07-12T-M	
ø63	MECX063R-07-14T-M	

Shape

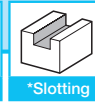
Description	Shouldering (Cutting width ae = DC/2)
MECX032R-07-8T-M MECX040R-07-10T-M	
MECX050R-07-12T-M MECX063R-07-14T-M	

- \* Use JT Chipbreaker
- \* Slotting is not recommended.

Insert Grades  
Turnable  
Indexable Inserts  
CNC & PCD Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index



Shouldering



\*Slotting



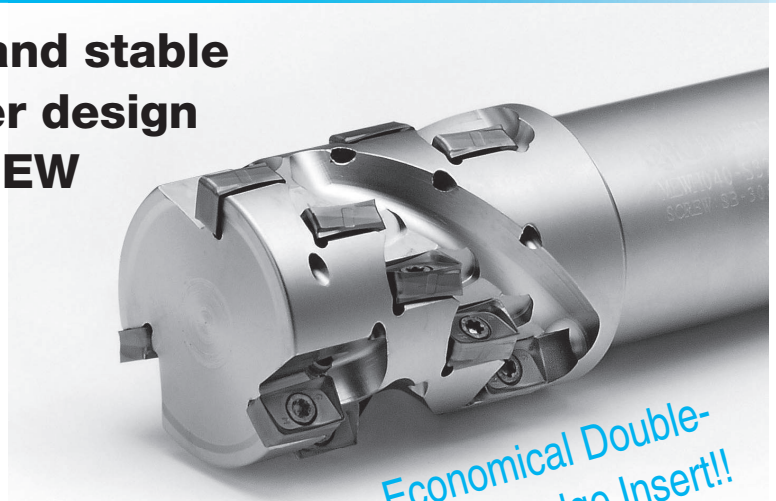
Facing

\* Only for 2 flute type

High quality and stable machining with heavy milling

# Helical End Mill MEWH

Excellent surface finish and stable machining with toolholder design utilizing advantages of MEW



Economical Double-sided 4-edge Insert!!

### Chip Evacuation

	Chipbreaker	Workpiece Material	fz=0.15mm/t	fz=0.2mm/t
	GM	SCM435		
	GM	SS400		
	SM			

Vc=120m/min  
apxae=20x15mm  
Dry

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

### Surface Finish Comparison (Internal evaluation)

MEWH	Competitor A

Better surface quality than competitor A

SCM435  
Vc=120m/min  
apxae=45x5mm  
fz=0.1mm/t  
Dry



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



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

M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

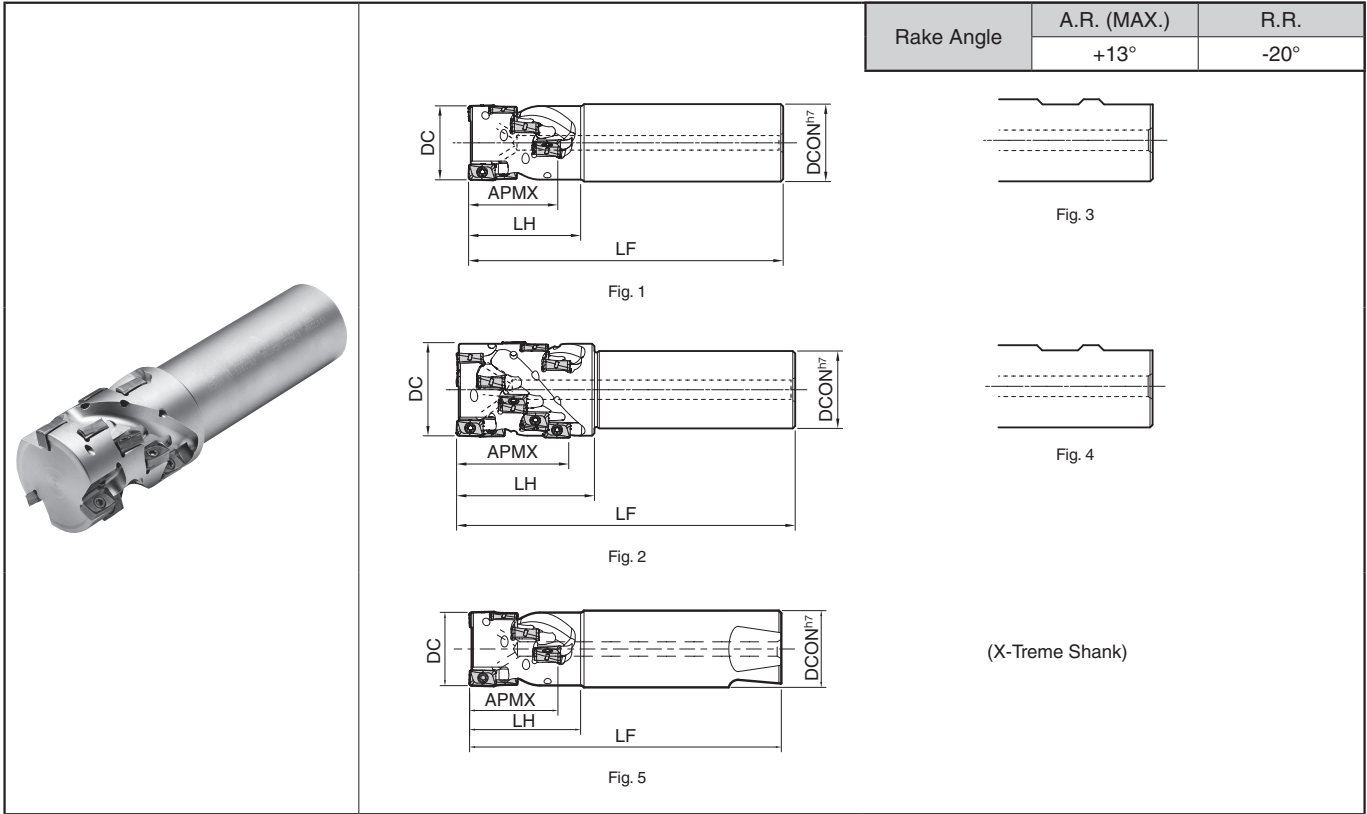
Multi-Function

Slot Mill

Ball-nose Radius

Others

# MEWH End Mill (with coolant hole for bottom insert)



Insert Grades  
A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

Turnable Indexable Inserts  
CNC & PCO Tools  
External  
Small Parts Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

## Toolholder Dimensions

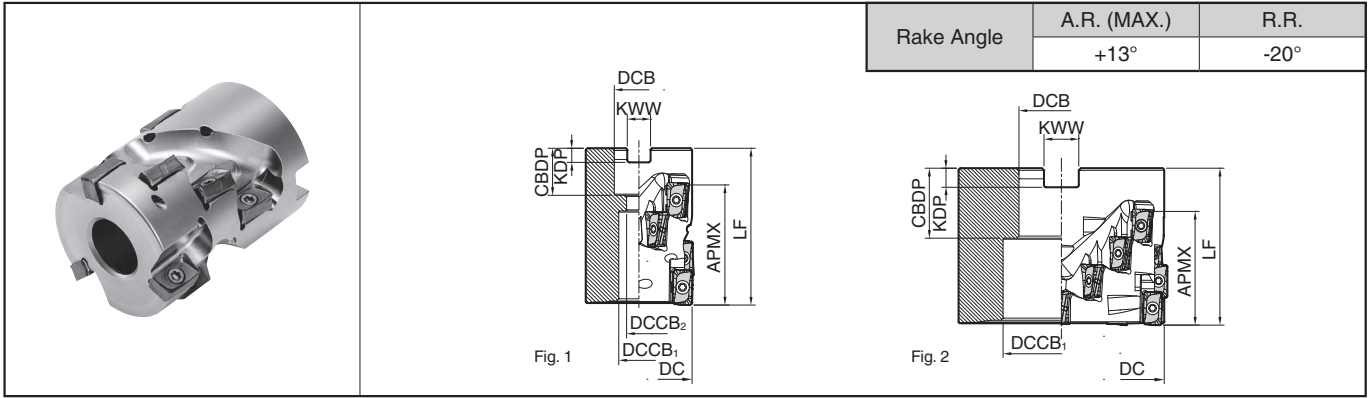
Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)					Coolant Hole	Drawing	Spare Parts			Applicable Inserts M13
					DC	DCON	LF	LH	APMX			Clamp Screw	Wrench	Anti-seize Compound	
MEWH 025-S25-10-3-2T	●	2	3	6	25	25	120	37	28	Yes	Fig. 1	SB-3065TRP	DTPM-8	P-37	LOMU1004..
032-S32-10-4-2T	●			8	32	130	46	37							
040-S32-10-5-2T	●		5	10	40	140	57	46							
040-S32-10-5-3T	●			15											
MEWH 040-S32-15-4-2T	●	2	4	8	40	32	160	63	53	Yes	Fig. 2	SB-4090TRP	DTPM-15	P-37	LOMU1505..
050-S42-15-4-2T	●			50	42										
050-S42-15-4-3T	●		3	12											
MEWH 025-W25-10-3-2T	●	2	3	6	25	25	95	37	28	Yes	Fig. 3	SB-3065TRP	DTPM-8	P-37	LOMU1004..
032-W32-10-4-2T	●			8	32	108	46	37							
040-W32-10-5-2T	●		5	10	40	119	57	46							
040-W32-10-5-3T	●			15											
MEWH 040-W32-15-4-2T	●	2	4	8	40	32	125	63	53	Yes	Fig. 4	SB-4090TRP	DTPM-15	P-37	LOMU1505..
050-W40-15-4-2T	●			50	40	135									
050-W40-15-4-3T	●		3	12											
MEWH 025S25-10-3-2TXT	●	2	3	6	25	25	118	37	28	Yes	Fig. 5	SB-3065TRP	DTPM-8	P-37	LOMU1004..
032S32-10-4-2TXT	●			4	8	32	32	133	46						

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

MEWH...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck

Recommended Cutting Conditions **M73**  
Applicable chuck for MEWH...XT **M74**

## MEWH Shell Mill (without coolant hole)



### Toolholder Dimensions

Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)									Drawing	Spare Parts				Applicable Inserts M13
					DC	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDB	KDP	KWW	APMX		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt	
<b>MEWH 040R-10-4-3T-M</b>	●	3	4	12	40	16	15	9	53	19	5.6	8.4	37	Fig. 1	SB-3065TRP <small>Recommended tightening torque for Insert Clamp 1.2N·m</small>	DTPM-8	P-37	HH8X25	LOMU1004..
<b>050R-10-5-3T-M</b>	●		5	15	50	22	18	11	64	21	6.3	10.4	46					HH10X30	
<b>MEWH 050R-15-4-3T-M</b>	●	3	4	12	50	22	18	11	70	21	6.3	10.4	53	Fig. 1	SB-4090TRP <small>Recommended tightening torque for Insert Clamp 3.5N·m</small>	DTPM-15	P-37	HH10X30	LOMU1505..
<b>063R-15-3-3T-M</b>	●		3	9	63	27	20	13	58	24	7	12.4	41					HH12X35	
<b>080R-15-4-4T-M</b>	●	4	4	16	80	32	26	18	70	28	8	14.4	53	Fig. 2				HH16X45	
<b>100R-15-4-5T-M</b>	●	5	20	100	40	55	-	74	33	9	16.4		-						

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

Recommended Cutting Conditions **M73**

### Applicable Inserts

Description	Applicable Inserts <b>M13</b>			
<b>MEWH...-10-...</b>	LOMU1004..ER-GM	LOMU100408ER-SM	LOMU100408ER-GH	LOGT100408FR-AM
<b>MEWH...-15-...</b>	LOMU1505..ER-GM	LOMU150508ER-SM	LOMU150508ER-GH	LOGT150508FR-AM

Recommended Cutting Conditions **M73**

### Guidance of applicable inserts for MEWH

Insert Location Indication	Toolholder Description										
	MEWH...10...					MEWH...15...					
	Corner-R (RE) (mm)					Corner-R (RE) (mm)					
Bottom inserts	0.4	0.8	1.2	1.6	2.0	0.4	0.8	1.0	1.2	1.6	2.0
*Middle inserts	0.4/0.8	0.4/0.8	0.4/0.8	0.4	0.4	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6

\* For Middle inserts, it is not recommended to use the insert with larger corner-R (RE) than shown in the table, because it will make finished surface uneven.

● : Std. Item

# Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)						
			Toolholder Description	MEGACOAT NANO			CVD Coated Carbide	DLC Coated Carbide	Carbide
				MEWH025-MEWH050 (Helical End Mill)	PR1535	PR1525	PR1510	CA6535	PDL025
GM	Carbon Steel	0.06- <b>0.1</b> -0.2	120- <b>180</b> -250	120- <b>180</b> -250	-	-	-	-	
	Alloy Steel	0.06- <b>0.1</b> -0.14	100- <b>160</b> -220	100- <b>160</b> -220	-	-	-	-	
	Mold Steel	0.06- <b>0.08</b> -0.12	80- <b>140</b> -180	80- <b>140</b> -180	-	-	-	-	
	Stainless Steel (Austenitic related)	0.06- <b>0.08</b> -0.12	100- <b>160</b> -200	100- <b>160</b> -200	-	-	-	-	
	Stainless Steel (Martensitic related)	0.06- <b>0.08</b> -0.1	150- <b>200</b> -250	-	-	180- <b>240</b> -300	-	-	
	Stainless Steel (Precipitation Hardening)	0.06- <b>0.08</b> -0.1	90- <b>120</b> -150	-	-	-	-	-	
	Gray Cast Iron	0.06- <b>0.1</b> -0.17	-	-	120- <b>180</b> -250	-	-	-	
	Nodular Cast Iron	0.06- <b>0.08</b> -0.12	-	-	100- <b>150</b> -200	-	-	-	
	Ni-base heat-resistant alloys	0.06- <b>0.08</b> -0.1	20- <b>30</b> -50	-	-	20- <b>30</b> -50	-	-	
	Titanium Alloys	0.06- <b>0.08</b> -0.12	40- <b>60</b> -80	-	30- <b>50</b> -70	-	-	-	
SM	Carbon Steel	0.06- <b>0.1</b> -0.17	120- <b>180</b> -250	120- <b>180</b> -250	-	-	-	-	
	Alloy Steel	0.06- <b>0.08</b> -0.12	100- <b>160</b> -220	100- <b>160</b> -220	-	-	-	-	
	Mold Steel	0.06- <b>0.08</b> -0.12	80- <b>140</b> -180	80- <b>140</b> -180	-	-	-	-	
	Stainless Steel (Austenitic related)	0.06- <b>0.08</b> -0.12	100- <b>160</b> -200	100- <b>160</b> -200	-	-	-	-	
	Stainless Steel (Martensitic related)	0.06- <b>0.08</b> -0.1	150- <b>200</b> -250	-	-	180- <b>240</b> -300	-	-	
	Stainless Steel (Precipitation Hardening)	0.06- <b>0.08</b> -0.1	90- <b>120</b> -150	-	-	-	-	-	
	Ni-base heat-resistant alloys	0.06- <b>0.08</b> -0.1	20- <b>30</b> -50	-	-	20- <b>30</b> -50	-	-	
	Titanium Alloys	0.06- <b>0.08</b> -0.12	40- <b>60</b> -80	-	30- <b>50</b> -70	-	-	-	
	GH	Carbon Steel	0.06- <b>0.1</b> -0.2	120- <b>180</b> -250	120- <b>180</b> -250	-	-	-	-
		Alloy Steel	0.06- <b>0.1</b> -0.14	100- <b>160</b> -220	100- <b>160</b> -220	-	-	-	-
Mold Steel		0.06- <b>0.08</b> -0.12	80- <b>140</b> -180	80- <b>140</b> -180	-	-	-	-	
Stainless Steel (Austenitic related)		0.06- <b>0.08</b> -0.12	100- <b>160</b> -200	100- <b>160</b> -200	-	-	-	-	
Stainless Steel (Martensitic related)		0.06- <b>0.08</b> -0.1	150- <b>200</b> -250	-	-	180- <b>240</b> -300	-	-	
Stainless Steel (Precipitation Hardening)		0.06- <b>0.08</b> -0.1	90- <b>120</b> -150	-	-	-	-	-	
Gray Cast Iron		0.06- <b>0.1</b> -0.2	-	-	120- <b>180</b> -250	-	-	-	
Nodular Cast Iron		0.06- <b>0.08</b> -0.15	-	-	100- <b>150</b> -200	-	-	-	
Ni-base heat-resistant alloys		0.06- <b>0.08</b> -0.1	20- <b>30</b> -50	-	-	20- <b>30</b> -50	-	-	
Titanium Alloys		0.06- <b>0.08</b> -0.12	40- <b>60</b> -80	-	30- <b>50</b> -70	-	-	-	
AM	Aluminum Alloys	0.06- <b>0.1</b> -0.2	-	-	-	-	200- <b>600</b> -900	200- <b>500</b> -800	

\* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. ★ : 1st Recommendation ☆ : 2nd Recommendation  
 \* Machining with coolant is recommended for Stainless Steel, Ni-base heat-resistant alloys and titanium alloys with MEWH.

## Cutting Performance

### ● LOMU1004 type

Cutting Dia.	Description	2 Flute		Description	3 Flute	
		ap x ae			ap x ae	
ø25	MEWH025 -S25-10-3-2T			-	-	
ø32	MEWH032 -S32-10-4-2T			-	-	
ø40	MEWH040 -S32-10-5-2T			MEWH040 -S32-10-5-3T		

### ● LOMU1505 type

Cutting Dia.	Description	2 Flute		Description	3 Flute	
		ap x ae			ap x ae	
ø40	MEWH040 -S32-15-4-2T			-	-	
ø50	MEWH050 -S42-15-4-2T			MEWH050 -S42-15-4-3T		
<p>&lt;Cutting Conditions&gt;</p> <ul style="list-style-type: none"> <li>Vc=120m/min</li> <li>fz=0.08-0.12mm/t</li> <li>GM Chipbreaker</li> <li>Workpiece Material : SCM435</li> <li>Overhang Length</li> <li>End mill : Overhang length is "LH" of the dimension list</li> </ul>						

Insert Grades  
Turnable  
Indexable Inserts  
CNV & PCD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Mill  
Spare Parts  
Technical Information  
Index

A

B

C

D

E

F

G

H

J

K

L

M

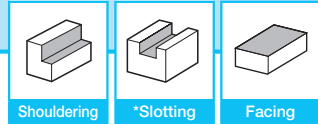
N

P

R

T





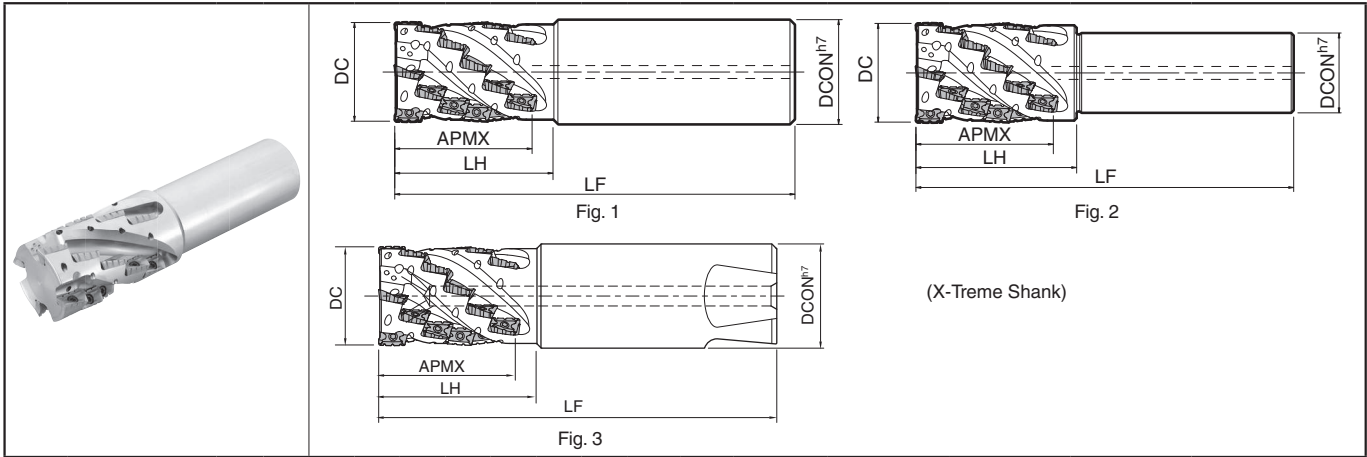
Shouldering

\*Slotting

Facing

\* Only for 2 flute type

## MECH End Mill (with coolant hole for bottom insert)



### Toolholder Dimensions

Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)					Rake Angle		Drawing	Spare Parts			Applicable Inserts ● M19
					DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.		Clamp Screw	Wrench	Anti-seize Compound	
MECH 025-S25-11-4-2T	●	2	4	8	25	25	120	46	37	+21°	-10°	Fig. 1	SB-2555TRG	DTM-8	P-37	BDMT11T308ER-N2 BDMT11T308ER-N3
032-S32-11-5-2T	●				10	32	140	55	46	-9°						
032-S32-11-5-4T	●	20	32	140	55	46	-9°									
040-S32-11-6-4T	●	4	6	24	40	150	64	55	+23°	-8°	Fig. 2					
040-S42-11-6-4T	●					160	64	55	-8°	Fig. 1						
050-S42-11-7-4T	●	7	28	50	42	172	75	64	-7°	Fig. 2						
050-S42-11-7-6T	●										42					
MECH 040-S32-17-4-2T	●	2	4	8	40	32	160	73	59	+19°	-7°	Fig. 2	SB-4070TRN	DTM-15	P-37	BDMT170408ER-N3 BDMT170408ER-N4
040-S42-17-4-2T	●					42	170	73	59	-7°	Fig. 1					
050-S42-17-5-4T	●	4	5	20	50	185	88	74	-6°	Fig. 2						
MECH 025S25-11-4-2TXT	●	2	4	8	25	25	127	46	37	+21°	-10°	Fig. 3	SB-2555TRG	DTM-8	P-37	BDMT11T308ER-N2 BDMT11T308ER-N3
032S32-11-5-2TXT	●	2	5	10	32	32	142	55	46	+23°	-9°					
032S32-11-5-4TXT	●	4	5	20	32	32	142	55	46							

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.  
MECH...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck.

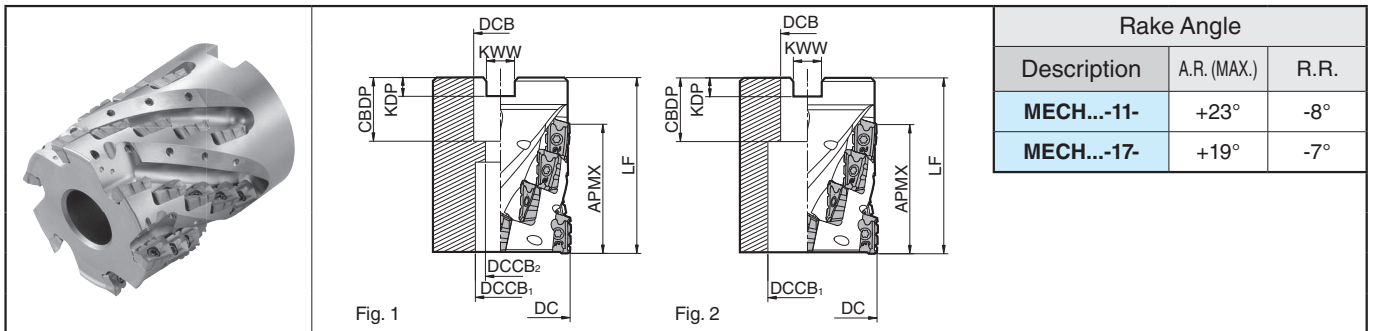
## X-Treme Chuck [NIKKEN]

Description	See Page	Shank Dia. (DCON)	X-Treme Chuck			
			BT		HSK	
			BT40	BT50	HSK63A	HSK100A
4TFR 120-260-R○○-XT	L21	12.0	NBT40-C12EX-86	NBT50-C12EX-96	HSK63A-C12EX-96	HSK100A-C12EX-96
160-350-R○○-XT		16.0	NBT40-C16EX-96	NBT50-C16EX-106	HSK63A-C16EX-101	HSK100A-C16EX-106
200-450-R○○-XT		20.0	NBT40-C20EX-96	NBT50-C20EX-116	HSK63A-C20EX-106	HSK100A-C20EX-116
4JER 120-260-R○○-XT	L36	12.0	NBT40-C12EX-86	NBT50-C12EX-96	HSK63A-C12EX-96	HSK100A-C12EX-96
160-350-R○○-XT		16.0	NBT40-C16EX-96	NBT50-C16EX-106	HSK63A-C16EX-101	HSK100A-C16EX-106
200-450-R○○-XT		20.0	NBT40-C20EX-96	NBT50-C20EX-116	HSK63A-C20EX-106	HSK100A-C20EX-116
MEWH 025S25-10-3-2TXT	M71	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
032S32-10-4-2TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121
MECH 025S25-11-4-2TXT	M74	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
032S32-11-5-○TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121

● : Std. Item



## MECH Shell Mill (without coolant hole)

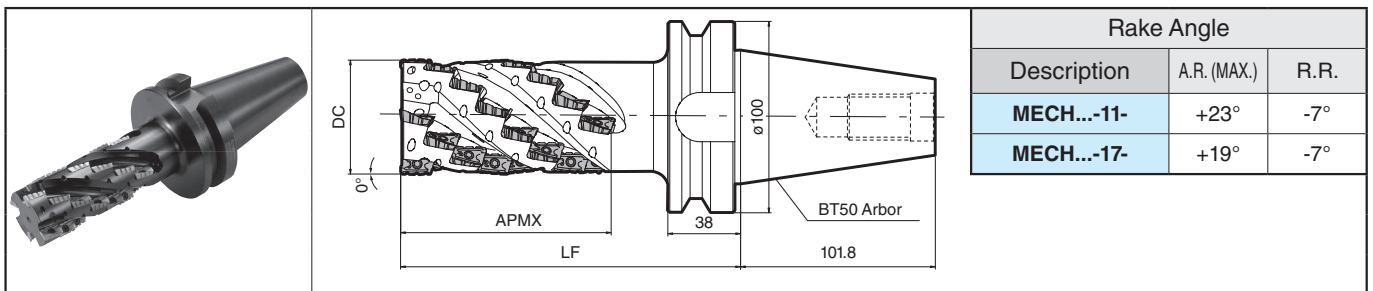


### Toolholder Dimensions

Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)								Drawing	Spare Parts				Applicable Inserts ➔ M19	
					DC	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW		APMX	Clamp Screw	Wrench	Anti-seize Compound		Mounting bolt
MECH 040R-11-4-4T-M	●	4	4	16	40	16	15	9	50	19	5.6	8.4	37	Fig. 1	SB-2555TRG	DTM-8	P-37	HH8X25	BDMT11T308ER-N2 BDMT11T308ER-N3
050R-11-5-6T-M	●	6	5	30	50	22	18	11	63	21	6.3	10.4	46					HH10X30	
MECH 050R-17-2-4T-M	●	4	2	8	50	22	18	11	52	21	6.3	10.4	30	Fig. 1	SB-4070TRN	DTM-15	P-37	HH10X30	BDMT170408ER-N3 BDMT170408ER-N4
050R-17-4-4T-M	●		4	16					78				59					HH10X40	
063R-17-3-4T-M	●	4	3	12	63	27	20	14	70	24	7	12.4	45	Fig. 2	SB-4070TRN	DTM-15	P-37	HH12X35	BDMT170408ER-N3 BDMT170408ER-N4
080R-17-4-6T-M	●	6	4	24	80	32	26	18	85	28	8	14.4	59					HH16X45	
100R-17-4-6T-M	●	6	4	24	100	40	56	-	85	30	9	16.4	59	Fig. 2	SB-4070TRN	DTM-15	P-37	-	
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	P-37	HH12X35	
080R-17-4-6T	●	6	4	24	80	31.75	26	18	85	32	8	12.7	59	Fig. 1	SB-4070TRN	DTM-15	P-37	HH16X45	
100R-17-4-6T	●	6	4	24	100	38.1	56	-	85	38	10	15.9	59	Fig. 2	SB-4070TRN	DTM-15	P-37	-	

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

## MECH-BT50 (Integral Arbor type, without coolant hole)



### Toolholder Dimensions

Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)			Weight (kg)	Spare Parts			Applicable Inserts ➔ M19
					DC	LF	APMX		Clamp Screw	Wrench	Anti-seize Compound	
MECH 050R11-8-4T-BT50	●	4	8	32	50	143	73	4.8	SB-2555TRG	DTM-8	P-37	BDMT11T308ER-N2 BDMT11T308ER-N3
MECH 050R17-7-4T-BT50	●	4	7	28	50	173	104	4.9				
063R17-7-4T-BT50	●				63			5.9				
080R17-7-4T-BT50	●				80			7.8				
100R17-7-6T-BT50	●				6			42	100	10.2	SB-4070TRN	DTM-15

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

### Applicable Inserts

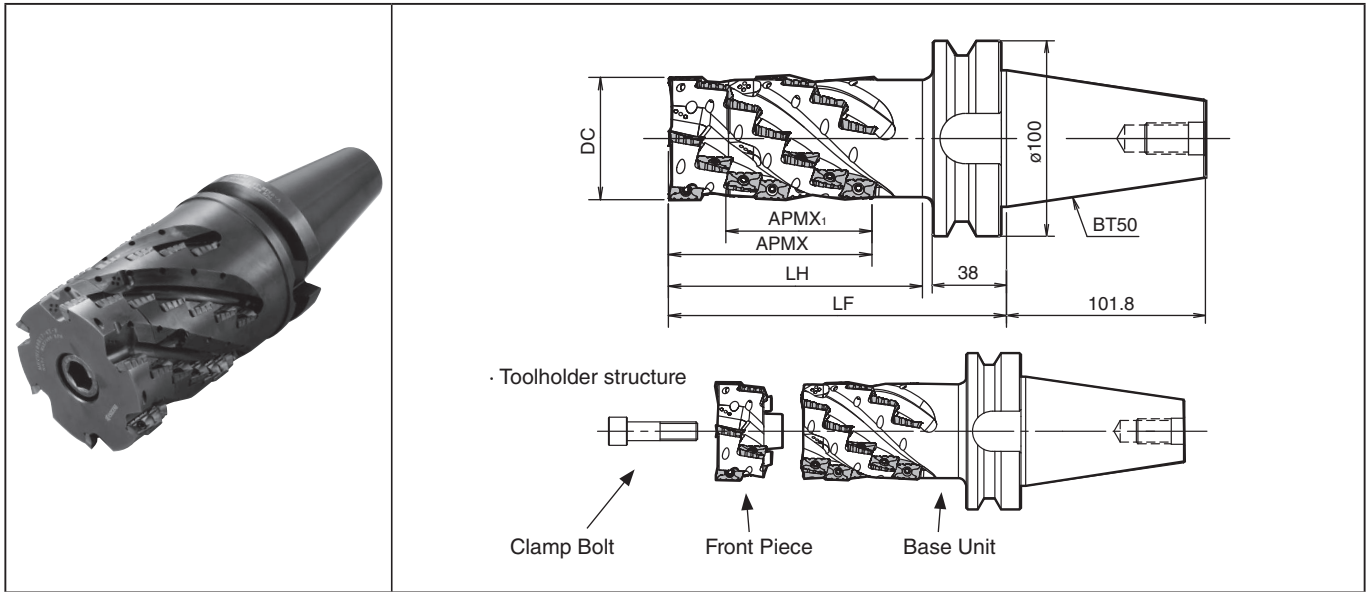
Description	Applicable Inserts ➔ M19			
	2-Notched	3-Notched	3-Notched	4-Notched
MECH...-11-	BDMT 11T308ER-N2	BDMT 11T308ER-N3	-	-
MECH...-17-	-	-	BDMT 170408ER-N3	BDMT 170408ER-N4

● : Std. Item

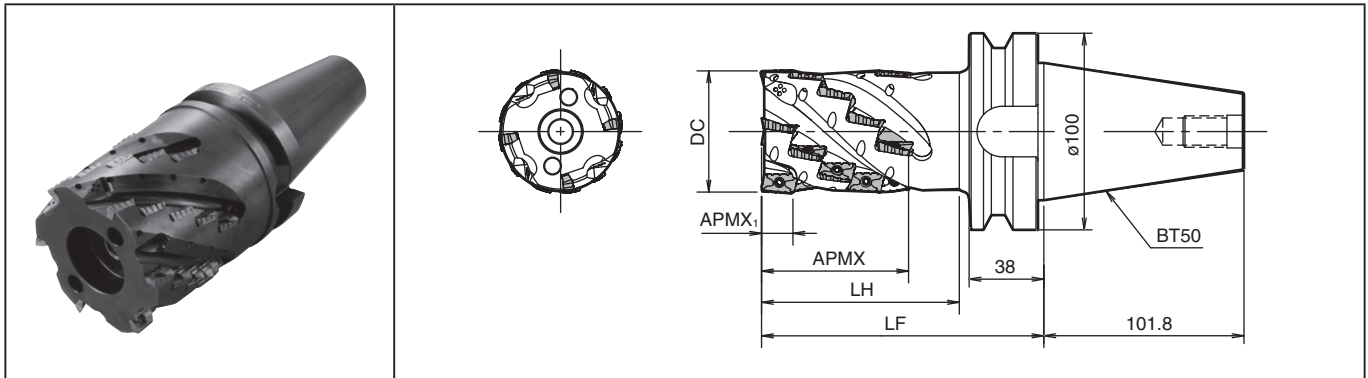
Recommended Cutting Conditions ➔ M79

# Head exchangeable type MECH Helical End Mill

## MECH-BT50SA (without coolant hole) Arbor Integral Type (Base Unit + 1 Front Piece + Clamp Bolt)



## MECH-BT50-A (without coolant hole) Base Unit



### Toolholder Dimensions

Description		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)					Rake Angle		Weight (kg)
						DC	LF	LH	APMX	APMX <sub>1</sub>	A.R.	R.R.	
Arbor Integral Type	MECH 050R11-4T-BT50SA	MTO	4	8	32	50	143	99	73	55	+23°	-7°	4.8
	063R17-4T-BT50SA	MTO		7	28	63	173	130	104	75	+19°	-7°	5.8
	080R17-4T-BT50SA	MTO		6	7	80							7.6
	100R17-6T-BT50SA	MTO				42							100
Base Unit	MECH 050R11-4T-BT50-A	MTO	4	6	24	50	125	81	55	10	+23°	-7°	4.6
	063R17-4T-BT50-A	MTO		5	20	63	143	100	75	16	+19°	-7°	5.4
	080R17-4T-BT50-A	MTO				80							6.8
	100R17-6T-BT50-A	MTO				6							5

Recommended Cutting Conditions ➔ M79

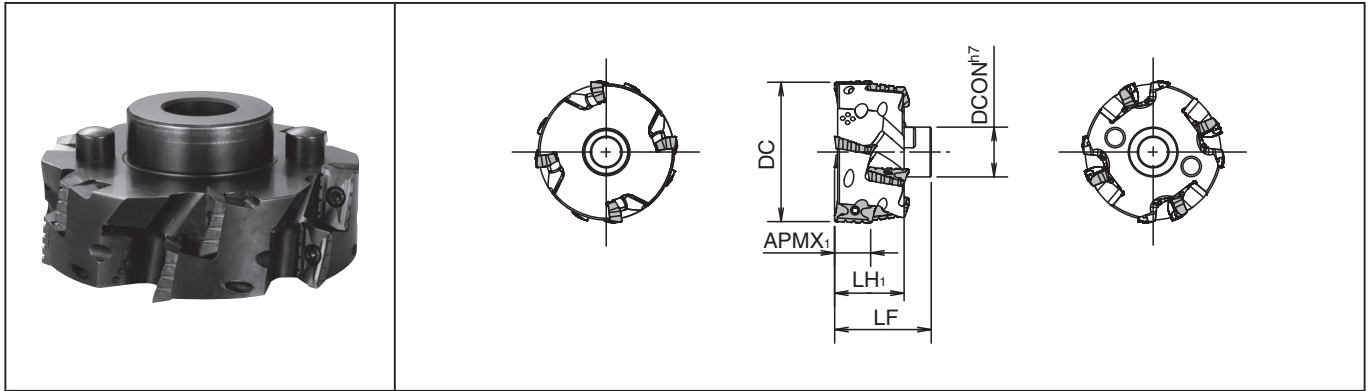
### Toolholder structure

End Mill		=	Base Unit ➔ M76		+	Front Piece (1pc) ➔ M77		+	Clamp Bolt	
MECH 050R11-4T-BT50SA			MECH050R11-4T-BT50-A			MECH050R11-4T-F			HH12X35	
063R17-4T-BT50SA			MECH063R17-4T-BT50-A			MECH063R17-4T-F			HH12X40	
080R17-4T-BT50SA			MECH080R17-4T-BT50-A			MECH080R17-4T-F			HH16X40	
100R17-6T-BT50SA			MECH100R17-6T-BT50-A			MECH100R17-6T-F			HH20X40	

MTO : Made to order

M  
Milling  
Insert  
Lead Angle 45°~20°  
Lead Angle 15°  
Lead Angle 0°/2°  
High Feed Cutter  
Multi-Function  
Slot Mill  
Ball-nose Radius  
Others

## MECH-F (without coolant hole) Front Piece



### Toolholder Dimensions

Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)					Rake Angle		Weight (kg)
					DC	DCON	LF	LH <sub>1</sub>	APMX <sub>1</sub>	A.R.	R.R.	
<b>MECH 050R11-4T-F</b>	●	4	2	8	50	22	32	18	10	+23°	-7°	0.2
<b>063R17-4T-F</b>	●				63	22						
<b>080R17-4T-F</b>	●				80	32	44	30	16			
<b>100R17-6T-F</b>	●	6	2	12	100	45						1.3

### Applicable Inserts

End Mill	Base Unit <a href="#">M76</a>	Front Piece <a href="#">M77</a>	Applicable Inserts <a href="#">M19</a>
<b>MECH 050R11-4T-BT50SA</b>	<b>MECH050R11-4T-BT50-A</b>	<b>MECH050R11-4T-F</b>	<b>BDMT11T308ER-N2</b> <b>BDMT11T308ER-N3</b>
<b>063R17-4T-BT50SA</b>	<b>MECH063R17-4T-BT50-A</b>	<b>MECH063R17-4T-F</b>	<b>BDMT170408ER-N3</b> <b>BDMT170408ER-N4</b>
<b>080R17-4T-BT50SA</b>	<b>MECH080R17-4T-BT50-A</b>	<b>MECH080R17-4T-F</b>	
<b>100R17-6T-BT50SA</b>	<b>MECH100R17-6T-BT50-A</b>	<b>MECH100R17-6T-F</b>	

· For installation of notched insert, see page [M79](#).

### Spare Parts

Description		Spare Parts				
		Clamp Screw	Wrench (for Clamp Screw)	Clamp Bolt	Wrench (for Clamp Bolt)	Anti-seize Compound
Arbor Integral Type (Set)	<b>MECH 050R11-4T-BT50SA</b>	SB-2555TRG	DTM-8	HH12X35	LW-10	P-37
	<b>063R17-4T-BT50SA</b>	SB-4070TRN	DTM-15	HH12X40	LW-10	
	<b>080R17-4T-BT50SA</b>			HH16X40	LW-14	
	<b>100R17-6T-BT50SA</b>			HH20X40	LW-17	
Base Unit	<b>MECH 050R11-4T-BT50-A</b>	SB-2555TRG	DTM-8	HH12X35	LW-10	
	<b>063R17-4T-BT50-A</b>	SB-4070TRN	DTM-15	HH12X40	LW-10	
	<b>080R17-4T-BT50-A</b>			HH16X40	LW-14	
	<b>100R17-6T-BT50-A</b>			HH20X40	LW-17	
Front Piece	<b>MECH 050R11-4T-F</b>	SB-2555TRG				
	<b>063R17-4T-F</b>	SB-4070TRN				
	<b>080R17-4T-F</b>					
	<b>100R17-6T-F</b>					

· If you purchased the front piece only, wrench (for clamp screw) / clamp bolt and wrench (for clamp bolt) is not included.

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

● : Std. Item

Insert Grades  
Turnable Inserts  
CNV & PCD Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

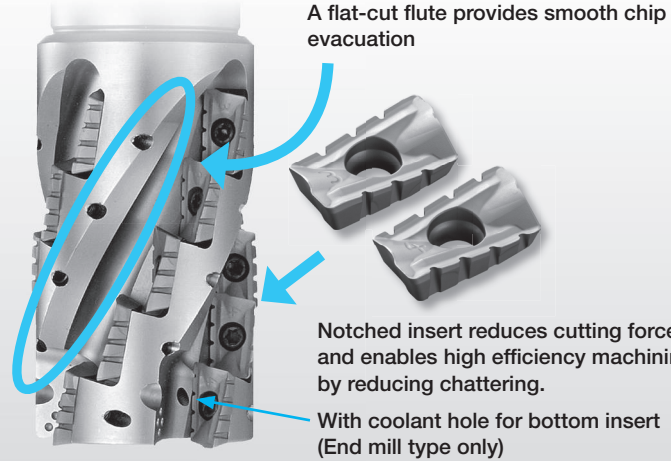
## Smooth Chip Evacuation

### Smooth Chip Evacuation

Notched insert breaks chips into small pieces

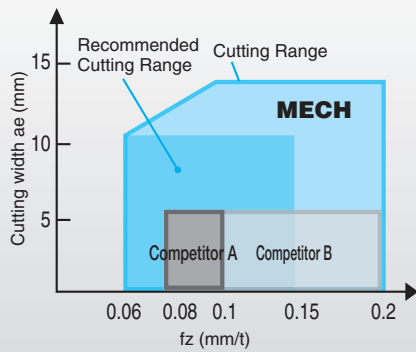


Workpiece Material : SS400  
Vc = 120m/min  
apxae = 40mmx10mm  
fz = 0.12mm/t  
MECH032-S32-11-5-4T



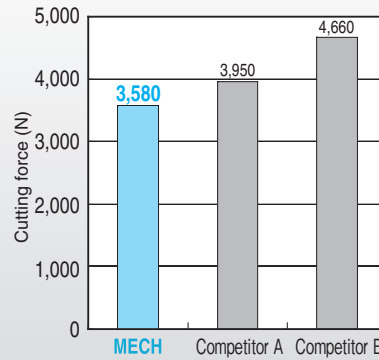
## Low Cutting Force

### Low Cutting Force due to Notched Inserts



Workpiece Material : S50C  
Vc = 120m/min  
apxae = 40 mmx5-13mm  
fz = 0.06 ~ 0.2mm/t  
MECH032-S32-11-5-4T

Cutting Force Comparison (principal force)



Workpiece Material : S50C  
Vc = 120m/min  
apxae = 40mmx10mm  
fz = 0.1mm/t  
MECH032-S32-11-5-4T

(Internal evaluation)

## Number of Inserts Installed

Description	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
<b>MECH</b> 025-S25-11-4-2T	2	8	4	4		
032-S32-11-5-2T		10	5	5		
032-S32-11-5-4T	4	20	10	10		
040-S32-11-6-4T		24	12	12	-	-
040-S42-11-6-4T		24	12	12		
050-S42-11-7-4T		28	14	14		
050-S42-11-7-6T	6	42	21	21		
<b>MECH</b> 040-S32-17-4-2T	2	8			4	4
040-S42-17-4-2T						
050-S42-17-5-4T	4	20			10	10
<b>MECH</b> 040R-11-4-4T-M	4	16	8	8		
050R-11-5-6T-M	6	30	15	15		
<b>MECH</b> 050R-17-2-4T-M	4	8			4	4
050R-17-4-4T-M		16			8	8
063R-17-3-4T-M		12			6	6
080R-17-4-6T-M		24			12	12
100R-17-4-6T-M	6	24			12	12
<b>MECH</b> 063R-17-3-4T	4	12			6	6
080R-17-4-6T	6	24			12	12
100R-17-4-6T						

Description	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
<b>MECH</b> 050R11-8-4T-BT50	4	32	16	16	-	-
050R17-7-4T-BT50		28			14	14
063R17-7-4T-BT50		28				
080R17-7-4T-BT50		28				
100R17-7-6T-BT50		6	42			21
<b>MECH</b> 050R11-4T-BT50SA	4	32	16	16	-	-
063R17-4T-BT50SA	4	28			14	14
080R17-4T-BT50SA	4	28			14	14
100R17-6T-BT50SA	6	42			21	21
<b>MECH</b> 050R11-4T-BT50-A	4	24	12	12	-	-
063R17-4T-BT50-A	4	20			10	10
080R17-4T-BT50-A	4	20			10	10
100R17-6T-BT50-A	6	30			15	15
<b>MECH</b> 050R11-4T-F	4	8	4	4	-	-
063R17-4T-F	4	8			4	4
080R17-4T-F	4	8			4	4
100R17-6T-F	6	12			6	6

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others

## Caution when installing Notched Insert

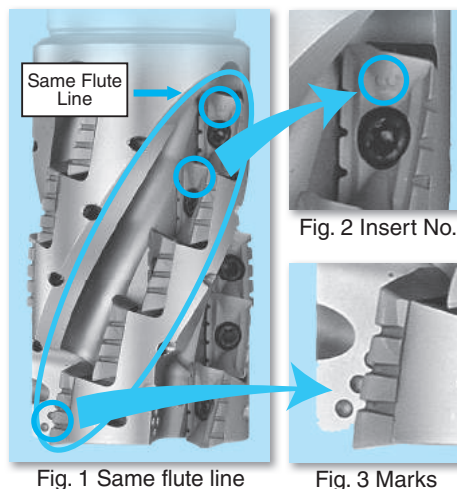
1. Install notched inserts by cutting the insert with the number of marks on the toolholder body.

<Insert Number and Toolholder Marks>

Insert Size	11 type		17 type	
Insert No.	2	3	3	4
Marks				

\* Using the cutter with the inserts installed incorrectly will damage the toolholder.

2. When installing notched inserts in flute line, ensure that the number on the insert is the same as the insert in first stage. (Ref. to Fig. 1, 2 and 3)



## Recommended Cutting Conditions (When using a notched insert)

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)				
		MEGACOAT NANO	MEGACOAT			PVD Coated Carbide
		PR1535	PR1225	PR1230	PR1210	PR830
Carbon Steel	0.08~0.1~0.15	☆ 120~180~250	☆ 120~180~250	★ 120~180~220	-	☆ 100~140~180
Alloy Steel	0.08~0.1~0.15	☆ 100~160~220	☆ 100~160~220	★ 100~160~200	-	☆ 100~140~180
Mold Steel	0.08~0.1~0.15	☆ 80~140~180	☆ 80~140~180	★ 80~140~160	-	☆ 100~120~150
Gray Cast Iron	0.08~0.15~0.18	-	-	-	★ 120~180~250	-
Nodular Cast Iron	0.08~0.15~0.18	-	-	-	★ 100~150~220	-
*Titanium Alloys	0.08~0.1~0.15	★ 40~60~80	-	-	☆ 30~50~70	-

\* Machining with coolant is recommended for titanium alloys.

★ : 1st Recommendation ☆ : 2nd Recommendation

1. The recommended cutting conditions above are for notched inserts.

2. If using an insert without notch, the cutting depth (ap) and width (ae) should be 60% or less of those of a notched insert.

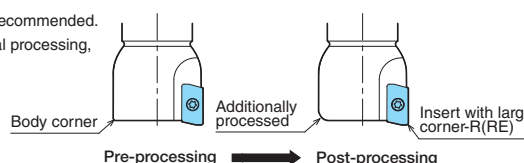
### JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
		Carbide <b>GW25</b>
Aluminum Alloys (Si 13% or less)	0.05~0.3	200~800
Aluminum Alloys (Si 13% and over)	0.05~0.2	200~300

When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary. Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 1.2mm or less.)

Insert Corner-R(RE) (mm)	Additional Processing Dimension to Body Corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

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

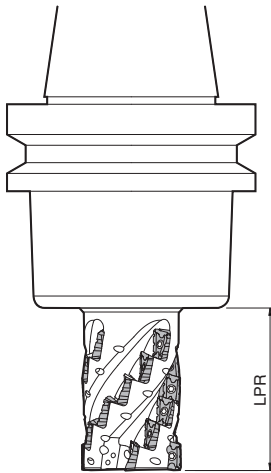


## Cutting Performance (Used Machine: Machining center equivalent to AC15 / 18.5kW)

### MECH End Mill

Cutting Dia.	Description	Overhang Length LPR(mm)
φ25	MECH025-S25-11-4-2T	48
φ32	MECH032-S32-11-5-2T	57
	MECH032-S32-11-5-4T	
φ40	MECH040-S32-11-6-4T	65
	MECH040-S42-11-6-4T	
φ50	MECH050-S42-11-7-4T	76
	MECH050-S42-11-7-6T	
φ40	MECH040-S32-17-4-2T	74
	MECH040-S42-17-4-2T	
φ50	MECH050-S42-17-5-4T	89

Shape



### 2 Flute Type

(Workpiece Material:S50C)

Description	Shouldering	Slotting
	 Cutting Speed : $V_c=100\sim 180\text{m/min}$ Feed : $f_z=0.08\sim 0.15\text{mm/t}$	 Cutting Speed : $V_c=100\sim 120\text{m/min}$ Feed : $f_z=0.08\sim 0.12\text{mm/t}$
MECH025-S25-11-4-2T		
MECH032-S32-11-5-2T		
MECH040-S32-17-4-2T MECH040-S42-17-4-2T		

### 4 Flute / 6 Flute Type

MECH032-S32-11-5-4T	
MECH040-S32-11-6-4T MECH040-S42-11-6-4T	
MECH050-S42-11-7-4T	
MECH050-S42-11-7-6T	
MECH050-S42-17-5-4T	

4 Flute / 6 Flute Type are not recommended for Slotting.

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others



(Workpiece Material: S50C)

MECH Shell Mill

Cutting Dia.	Description	Overhang Length LPR(mm)
ø40	MECH040R-11-4-4T-M	125
ø50	MECH050R-11-5-6T-M	123
	MECH050R-17-2-4T-M	112
ø50	MECH050R-17-4-4T-M	138
	MECH063R-17-3-4T-□	115
ø80	MECH080R-17-4-6T-□	130
ø100	MECH100R-17-4-6T-□	130

Shape

Shouldering			
Cutting Speed : Vc=100~180m/min Feed : fz=0.08~0.15mm/t			
MECH040R-11-4-4T-M		MECH063R-17-3-4T-□	
MECH050R-11-5-6T-M		MECH080R-17-4-6T-□	
MECH050R-17-2-4T-M		MECH100R-17-4-6T-□	
MECH050R-17-4-4T-M		Slotting is not recommended.	

MECH-BT50 (Integral Arbor Type)

MECH-BT50SA (Head exchangeable type / Integral Arbor type)

(Workpiece Material : S50C)

Cutting Dia.	Description	Overhang Length LPR (mm)
ø50	MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA	143
	MECH050R17-7-4T-BT50	173
ø63	MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA	
	ø80	
ø100		

Shape

Shouldering			
Cutting Speed : Vc=100~180m/min Feed : fz=0.08~0.15mm/t			
MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA		MECH080R17-7-4T-BT50 MECH080R17-4T-BT50SA	
MECH050R17-7-4T-BT50		MECH100R17-7-6T-BT50 MECH100R17-6T-BT50SA	
MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA		Slotting is not recommended.	

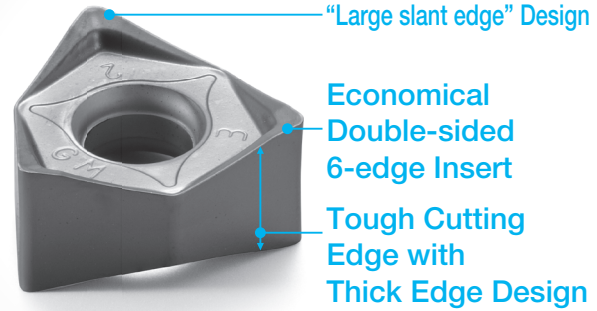
Insert Grades  
Turnings  
Indexable Inserts  
CNC & PC Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

## MFWN

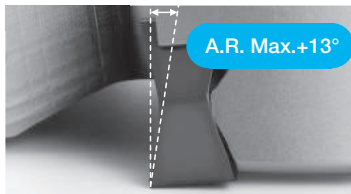
Double-Sided, 6-edge insert, 90° Cutters  
Low cutting force and reduced chattering

6 Advantages

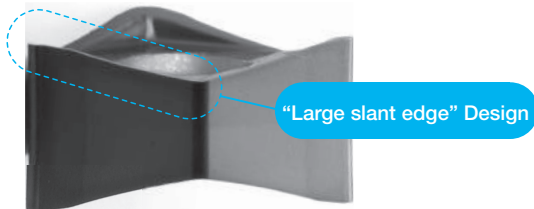


### Advantage 1 Sharp cutting with low cutting force

- Sharp cutting by large rake angle

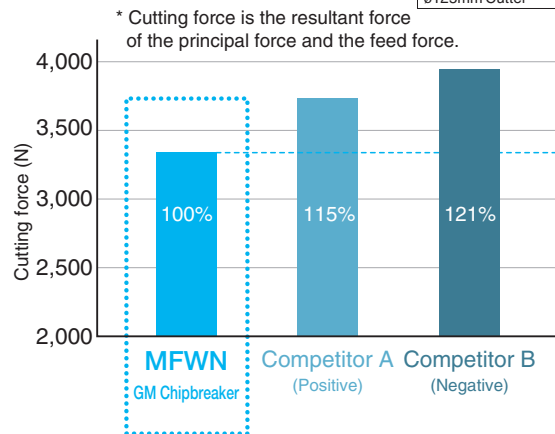


- "Large slant edge" Design reduces shock when cutting edge enters the workpiece



#### Cutting Force Comparison (Internal evaluation)

<Cutting Conditions>  
Vc = 180m/min  
apxae = 7x110mm  
fz = 0.2mm/t  
Workpiece Material: S50C  
ø125mm Cutter



### Advantage 2 Reduced chattering

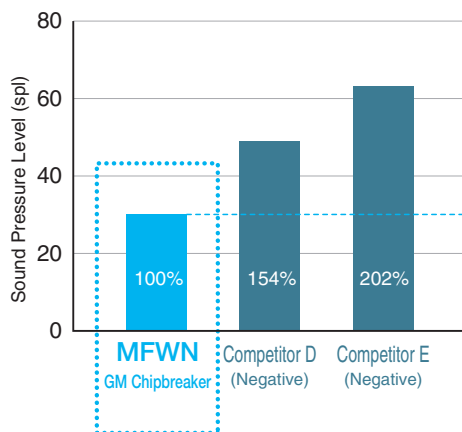
Applicable to long overhang

- Surface Finish Comparison (Internal evaluation)



- Machining Noise Comparison (Internal evaluation)

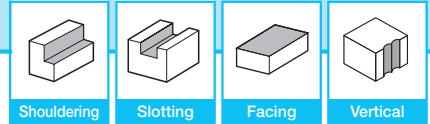
<Cutting Conditions>  
Vc = 200m/min  
apxae = 3x15mm  
fz = 0.1mm/t  
Workpiece Material: S50C  
ø80mm Cutter (7 inserts)



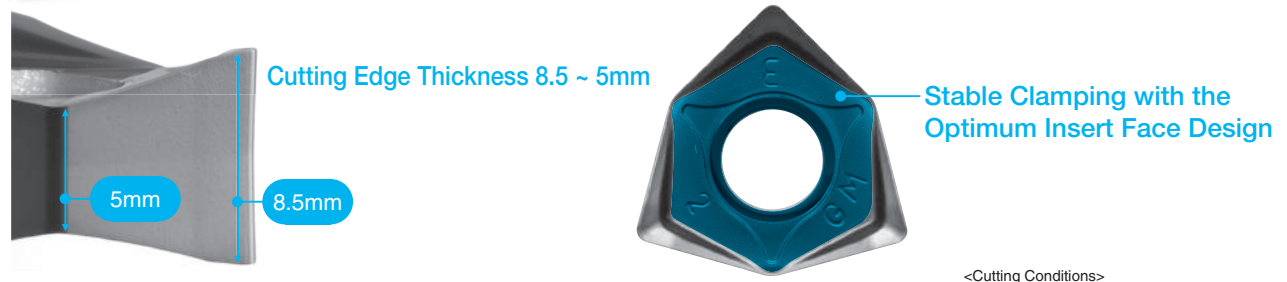
M

Milling

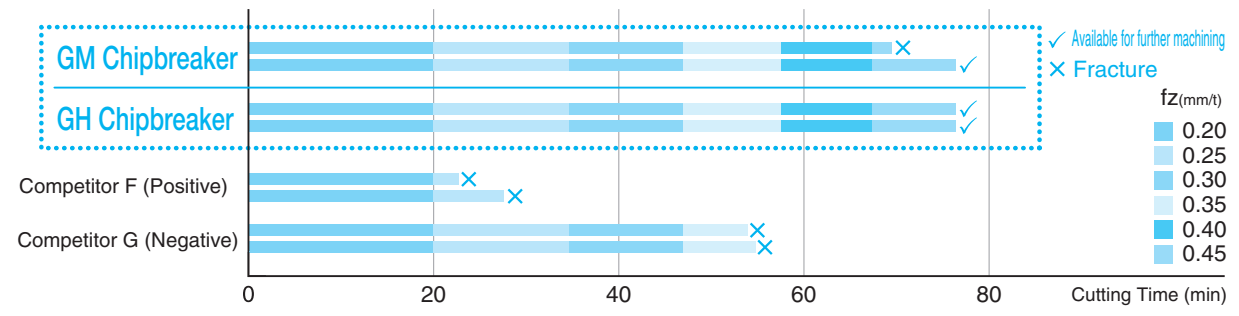
- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others



## Advantage 3 Superior Fracture Resistance with Thick Edge Design

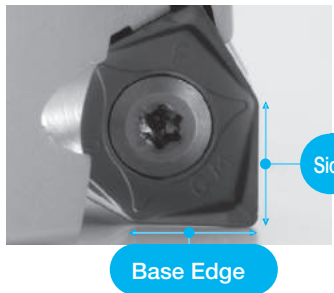


### ● Fracture Resistance Comparison (Internal evaluation)



## Advantage 4 Neutral

For Vertical Machining as well as Facing Neutral Inserts are applicable to left-hand cutters (custom order).

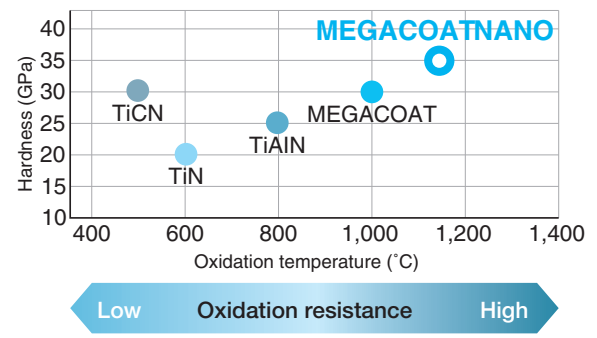


Applicable to a wide range of application

## Advantage 5

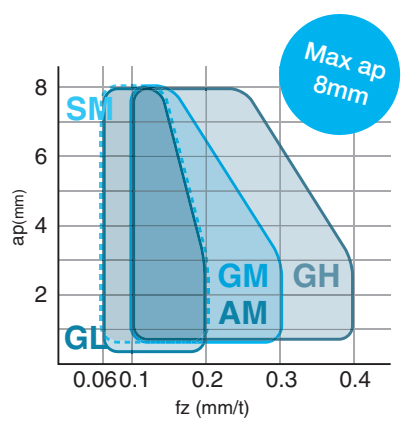
### Extended Tool Life by New MEGACOAT NANO Technology

PR1525 for steel and stainless steel (austenitic), PR1535 for titanium alloys and stainless steel (precipitation hardening) and PR1510 for cast iron are available. Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature : 1,150°C) CA6535 (CVD coated) for heat-resistant alloys and stainless steel (martensitic) is available, too.

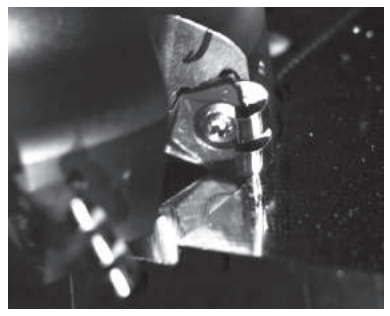


## Advantage 6 5 chipbreakers for various applications

Chipbreaker	Applications	Insert
GM	General purpose	
SM	Low cutting force	
GH	For Heavy Milling	
GL	Surface-Finish Oriented	
AM	Non-ferrous Metals	



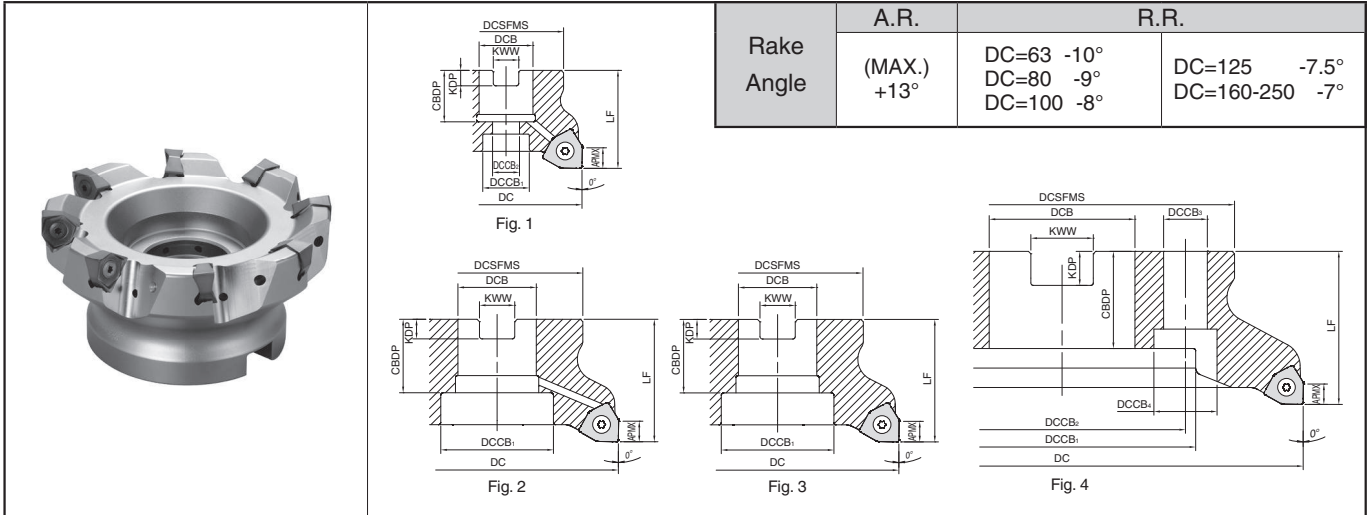
### Smooth chip evacuation



Properly curled chips  
 (The photo was taken by a high speed camera.)

Insert Grades  
 Turning  
 Indexable Inserts  
 CN & PCD Tools  
 External  
 Small Parts  
 Machining  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Tools for Turning Mill  
 Spare Parts  
 Technical Information  
 Index

## MFWN Face Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)											Drawing	Weight (kg)	Shim	Max. Revolution (min <sup>-1</sup> )	Coolant Hole			
			DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDDP	KDP	KWW	DCCB <sub>3</sub>	DCCB <sub>4</sub>								
Metric	Coarse pitch	MFWN 90063R-3T-M	●	3	63	47	22	19	11	40	21	6.3	10.4	-	-	Fig. 1	0.5	-	14,000	Yes	
		MFWN 90080R-4T-M	●	4	80	60	27	20	13	50	24	7	12.4	-	-	Fig. 1	1.0	-	12,000		
		MFWN 90100R-5T-M	●	5	100	70	32	46	-	-	50	30	8	14.4	-	-	Fig. 2	1.3	-		10,500
		MFWN 90125R-6T-M	●	6	125	87	40	55	-	-	50	33	9	16.4	-	-	Fig. 2	2.5	Yes		9,500
		MFWN 90160R-8T-M	●	8	160	102	40	68	66.7	-	63	32	9	16.4	14	20	Fig. 4	3.8	-		8,000
		MFWN 90200R-10T-M	●	10	200	142	60	110	101.6	-	63	40	14	25.7	18	26	Fig. 4	6.0	-		7,500
	MFWN 90250R-12T-M	●	12	250	142	60	110	101.6	-	63	40	14	25.7	18	26	Fig. 4	8.4	-	6,500		
	Fine pitch	MFWN 90063R-4T-M	●	4	63	47	22	19	11	40	21	6.3	10.4	-	-	Fig. 1	0.5	-	16,000	Yes	
		MFWN 90080R-5T-M	●	5	80	60	27	20	13	50	24	7	12.4	-	-	Fig. 1	1.0	-	13,500		
		MFWN 90100R-7T-M	●	7	100	70	32	46	-	-	50	30	8	14.4	-	-	Fig. 2	1.3	-		12,000
		MFWN 90125R-8T-M	●	8	125	87	40	55	-	-	50	33	9	16.4	-	-	Fig. 2	2.6	No		10,500
		MFWN 90160R-10T-M	●	10	160	102	40	68	66.7	-	63	32	9	16.4	14	20	Fig. 4	3.9	-		9,000
		MFWN 90200R-12T-M	●	12	200	142	60	110	101.6	-	63	40	14	25.7	18	26	Fig. 4	6.3	-		8,000
	MFWN 90250R-14T-M	●	14	250	142	60	110	101.6	-	63	40	14	25.7	18	26	Fig. 4	8.7	-	7,000		
Extra fine pitch	MFWN 90063R-5T-M	●	5	63	47	22	19	11	40	21	6.3	10.4	-	-	Fig. 1	0.5	-	16,000	Yes		
	MFWN 90080R-7T-M	●	7	80	60	27	20	13	50	24	7	12.4	-	-	Fig. 1	1.1	-	10,500			
	MFWN 90100R-9T-M	●	9	100	70	32	46	-	-	50	30	8	14.4	-	-	Fig. 2	1.3	-		9,500	
	MFWN 90125R-12T-M	●	12	125	87	40	55	-	-	50	33	9	16.4	-	-	Fig. 2	2.6	No		8,000	
	MFWN 90160R-14T-M	●	14	160	102	40	68	66.7	-	63	32	9	16.4	14	20	Fig. 4	3.9	-		7,000	
	MFWN 90200R-16T-M	●	16	200	142	60	110	101.6	-	63	40	14	25.7	18	26	Fig. 4	6.4	-		6,500	
MFWN 90250R-18T-M	●	18	250	142	60	110	101.6	-	63	40	14	25.7	18	26	Fig. 4	8.8	-	5,500			
Bore Dia. Inch spec	Coarse pitch	MFWN 90080R-4T	●	4	80	60	25.4	20	13	50	27	6	9.5	-	-	Fig. 1	1.0	-	12,000	Yes	
		MFWN 90100R-5T	●	5	100	70	31.75	46	-	-	50	34	8	12.7	-	-	Fig. 2	1.3	-		10,500
		MFWN 90125R-6T	●	6	125	87	38.1	55	-	-	50	38	10	15.9	-	-	Fig. 2	2.6	-		9,500
		MFWN 90160R-8T	●	8	160	102	50.8	72	-	-	63	38	11	19.1	-	-	Fig. 3	3.9	-		8,000
		MFWN 90200R-10T	●	10	200	142	47.625	110	101.6	-	63	40	14	25.4	18	26	Fig. 4	6.3	-		7,500
		MFWN 90250R-12T	●	12	250	142	47.625	110	101.6	-	63	40	14	25.4	18	26	Fig. 4	8.7	-		6,500
	Fine pitch	MFWN 90080R-5T	●	5	80	60	25.4	20	13	50	27	6	9.5	-	-	Fig. 1	1.0	-	13,500	No	
		MFWN 90100R-7T	●	7	100	70	31.75	46	-	-	50	34	8	12.7	-	-	Fig. 1	1.4	-		12,000
		MFWN 90125R-8T	●	8	125	87	38.1	55	-	-	50	38	10	15.9	-	-	Fig. 2	2.7	-		10,500
		MFWN 90160R-10T	●	10	160	102	50.8	72	-	-	63	38	11	19.1	-	-	Fig. 3	4.0	-		9,000
		MFWN 90200R-12T	●	12	200	142	47.625	110	101.6	-	63	40	14	25.4	18	26	Fig. 4	6.6	-		8,000
		MFWN 90250R-14T	●	14	250	142	47.625	110	101.6	-	63	40	14	25.4	18	26	Fig. 4	8.9	-		7,000
	Extra fine pitch	MFWN 90080R-7T	●	7	80	60	25.4	20	13	50	27	6	9.5	-	-	Fig. 1	1.1	-	10,500	No	
		MFWN 90100R-9T	●	9	100	70	31.75	46	-	-	50	34	8	12.7	-	-	Fig. 1	1.3	-		9,500
		MFWN 90125R-12T	●	12	125	87	38.1	55	-	-	50	38	10	15.9	-	-	Fig. 2	2.7	-		8,000
		MFWN 90160R-14T	●	14	160	102	50.8	72	-	-	63	38	11	19.1	-	-	Fig. 3	4.1	-		7,000
		MFWN 90200R-16T	●	16	200	142	47.625	110	101.6	-	63	40	14	25.4	18	26	Fig. 4	6.7	-		6,500
		MFWN 90250R-18T	●	18	250	142	47.625	110	101.6	-	63	40	14	25.4	18	26	Fig. 4	9.1	-		5,500

\*APMX : 8mm

Applicable Inserts **M17**

● Max. Revolution

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

● : Std. Item

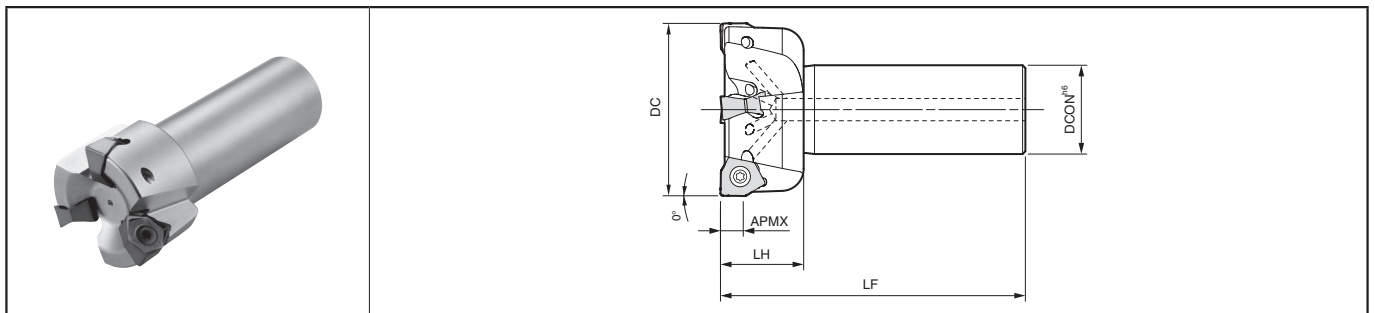
● Spare Parts

Description		Spare Parts							
		Clamp Screw	Wrench		Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt
			TTW	DTM					
Coarse pitch	<b>MFWN 90063R-3T-M</b>	SB-50140TR	TTW-15	-	MFWN-90	SPW-7050	LW-5	P-37	HH10X30
	<b>MFWN 90080R-4T(-M)</b>								HH12X35
	<b>MFWN 90100R-5T(-M)</b>								-
	<b>90250R-12T(-M)</b>								-
Fine pitch	<b>MFWN 90063R-4T-M</b>	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	<b>MFWN 90080R-5T(-M)</b>								HH12X35
	<b>MFWN 90100R-7T(-M)</b>								-
	<b>90250R-14T(-M)</b>								-
Extra fine pitch	<b>MFWN 90063R-5T-M</b>	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	<b>MFWN 90080R-7T(-M)</b>	SB-40140TRN	-	DTM-15	-	-	-		HH12X35
	<b>MFWN 90100R-9T(-M)</b>	Recommended tightening torque for Insert Clamp 3.5N·m		-	-	-	-		-
	<b>90250R-18T(-M)</b>	Recommended tightening torque for Insert Clamp 4.2N·m		-	-	-	-		-

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

Recommended Cutting Conditions ● M86

■ MFWN with cylindrical shank (with Coolant Hole)



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Max. Revolution (min <sup>-1</sup> )	Coolant Hole	Spare Parts		
			DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	Anti-seize Compound
<b>MFWN 90050R-S32-3T</b>	●	3	50	32	110	30	8	+13°	-12°	18,500	有	SB-50140TR	TTW-15	P-37
<b>90063R-S32-4T</b>	●	4	63						-10°	16,000				
<b>90080R-S32-5T</b>	●	5	80						-9°	13,500				

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

Applicable Inserts ● M17

■ 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

Description	Applicable Inserts ● M17				
MFWN90...	WNEU 080608EN-GL	WNMU 0806..EN-GM	WNMU 080608EN-SM	WNMU 080608EN-GH	WNGT 080608FN-AM

● : Std. Item

Insert Grades  
Turnable Inserts  
CNC & PC Tools  
External  
Small Parts  
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Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T



## How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. When tightening the screw, make sure that the wrench is parallel to the screw.  
Remember that the screw hole of the toolholder for Extra fine pitch is inclined to the bearing surface. (Ref. to Fig. 2 and Fig. 3)
4. Be careful not to tighten the screw with excessive torque.  
Recommended tightening torque is 4.2N·m for M5 screw (SB-50140TR) and 3.5N·m for M4 screw (SB-40140TRN).
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.
6. To change the cutting edge of the insert, turn the insert counterclockwise (Ref. to Fig. 4). The insert corner identification number is stamped on the top surface of the insert.



Fig. 1

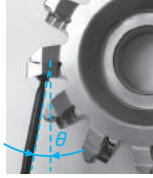


Fig. 2

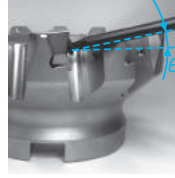


Fig. 3

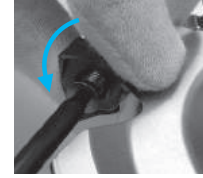


Fig. 4

## How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (Ref. to Fig. 1) and lightly pressing the shim toward the constraint surface (Ref. to Fig. 2), insert the screw into the hole of the shim and tighten (Ref. to Fig. 3). When tightening the screw, make sure that the screw is vertical to the bearing surface (Recommended tightening torque is 6.0N·m).
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.

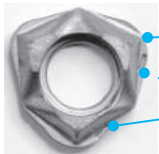


Fig. 1

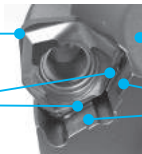


Fig. 2

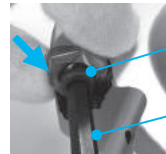


Fig. 3

Shim

Identifying mark

Cutter body

Constraint surface

Shim Screw

Wrench

## Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t) ( ):TN620M	Recommended Insert Grades (Cutting Speed Vc: m/min)						
			Cermet TN620M	MEGACOAT NANO			CVD Coated Carbide CA6535	DLC Coated Carbide PDL025	Carbide GW25
GM	Carbon Steel	0.1-0.2~0.3 (0.06-0.10~0.15)	★ 200-250~300	☆ 120-180~250	★ 120-180~250	-	-	-	-
	Alloy Steel	0.1-0.2~0.3 (0.06-0.10~0.15)	★ 180-220~250	☆ 100-160~220	★ 100-160~220	-	-	-	-
	Mold Steel	0.1-0.15~0.25 (0.06-0.10~0.13)	★ 150-180~220	☆ 80-140~180	★ 80-140~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.1-0.15~0.25	-	☆ 100-160~200	☆ 100-160~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.1-0.15~0.25	-	☆ 150-200~250	-	-	☆ 180-240~300	-	-
	Stainless Steel (Precipitation Hardening)	0.1-0.15~0.25	-	★ 90-120~150	-	-	-	-	-
	Gray Cast Iron	0.1-0.2~0.3	-	-	-	★ 120-180~250	-	-	-
	Nodular Cast Iron	0.1-0.15~0.25	-	-	-	★ 100-150~200	-	-	-
	Ni-base heat-resistant alloys	0.1-0.12~0.2	-	☆ 20-30~50	-	-	★ 20-30~50	-	-
	SM *1GL	Carbon Steel	0.06-0.12~0.2 (0.06-0.08~0.12)	★ 200-250~300	☆ 120-180~250	☆ 120-180~250	-	-	-
Alloy Steel		0.06-0.12~0.2 (0.06-0.08~0.12)	★ 180-220~250	☆ 100-160~220	☆ 100-160~220	-	-	-	-
Mold Steel		0.06-0.08~0.15 (0.06-0.08~0.10)	★ 150-180~220	☆ 80-140~180	☆ 80-140~180	-	-	-	-
Stainless Steel (Austenitic related)		0.06-0.12~0.2	-	☆ 100-160~200	☆ 100-160~200	-	-	-	-
Stainless Steel (Martensitic related)		0.06-0.12~0.2	-	☆ 150-200~250	-	-	★ 180-240~300	-	-
Stainless Steel (Precipitation Hardening)		0.06-0.12~0.2	-	☆ 90-120~150	-	-	-	-	-
Gray Cast Iron		0.06-0.12~0.2	-	-	-	☆ 120-180~250	-	-	-
Nodular Cast Iron		0.06-0.08~0.15	-	-	-	☆ 100-150~200	-	-	-
Ni-base heat-resistant alloys		0.06-0.1~0.15	-	☆ 20-30~50	-	-	★ 20-30~50	-	-
Titanium Alloys		0.06-0.08~0.15	-	★ 40-60~80	-	-	-	-	-
*2GH	Carbon Steel	0.2-0.3~0.4	-	☆ 120-180~250	☆ 120-180~250	-	-	-	-
	Alloy Steel	0.2-0.3~0.4	-	☆ 100-160~220	☆ 100-160~220	-	-	-	-
	Mold Steel	0.15-0.2~0.3	-	☆ 80-140~180	☆ 80-140~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.2-0.25~0.3	-	☆ 100-160~200	☆ 100-160~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.2-0.25~0.3	-	☆ 150-200~250	-	-	☆ 180-240~300	-	-
	Stainless Steel (Precipitation Hardening)	0.2-0.25~0.3	-	☆ 90-120~150	-	-	-	-	-
	Gray Cast Iron	0.2-0.3~0.4	-	-	-	☆ 120-180~250	-	-	-
	Nodular Cast Iron	0.15-0.2~0.3	-	-	-	☆ 100-150~200	-	-	-
	Ni-base heat-resistant alloys	0.15-0.2~0.25	-	☆ 20-30~50	-	-	★ 20-30~50	-	-
	AM	Non-ferrous metals	0.1-0.2~0.3	-	-	-	-	★ 200-600~900	☆ 200-500~800

\* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

\*1. GL Chipbreaker is recommended for Surface finish oriented milling.

\*2. GH Chipbreaker : Fine pitch

⇒fz≤0.3 (mm/t)

⇒Not recommended

★ : 1st Recommendation

☆ : 2nd Recommendation

M

Milling

Insert

Lead Angle 45°~20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

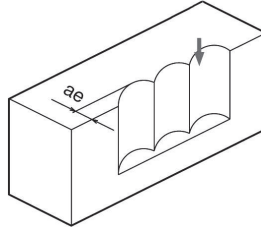
Others



● Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM (GL)	GH
Coarse pitch (with shim)	●	●	●
Fine pitch (without shim)	●	●	△ (Feed rate is recommended fz=0.3mm/t or under)
Extra fine pitch (without shim)	●	●	Not recommended

■ Vertical milling (Plunging)



Cutting Dia.	Max. Width of Cut (ae)
All items	8mm

● Cutter type and chipbreaker selection

Milling Purpose	Cutter Type			Chipbreaker			
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL
General milling for steel and alloy steel		●		●			
Steel and alloy steel (at chattering due to low rigidity machine or poor clamping power)	●				●		
Productivity oriented (Running cost decrease) (ap=4mm and over, fz=0.25mm/t and over)	●					●	
Surface finish oriented	●	●					●
General milling of stainless steel		●			●		
Stainless steel (at chattering due to low rigidity machine or poor clamping power)	●				●		
Cast Iron (for processing efficiency improvement)			●	●			
Cast Iron (ap=4mm and over, fz=0.25mm/t and over)	●					●	

■ Case Studies

**FC300**

- Machine Part
- Vc=170m/min
- apxae=2.5x130mm
- fz=0.183mm/t (Vf=500mm/min)
- Wet
- MFWN90160R-8T (8 inserts)
- WNMU080608EN-GM (PR1510)

<b>PR1510</b>	Chip Evacuation Rate = 163cc/min
Competitor A (Positive Cutter)	Chip Evacuation Rate = 68cc/min

Competitor A proceeded machining under low cutting conditions, as the workpiece was slipping because of the unstable chucking. With MFWN, stable machining was possible at higher cutting conditions. (User Evaluation)

**Manganese Steel**

- Construction machine part
- Vc=150m/min
- apxae=1x100mm
- fz=0.2mm/t (Vf=668mm/min)
- Dry
- MFWN90100R-7T (7 inserts)
- WNMU080608EN-GM (PR1525)

<b>PR1525</b>	Machining efficiency : 2 pcs/edge
Competitor B (Negative Cutter) (Vertical inserts)	1 pc/edge

Despite instability with the long overhang of the workpiece, MFWN doubled tool life, improving the efficiency by 150%. (User Evaluation)

Cutting Edge Angle 88°, High Efficiency Cutter

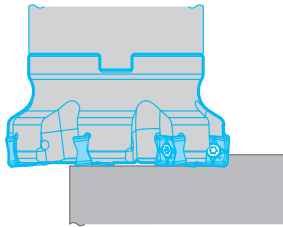
# MFSN88

- Economical Double-sided 8-edge Insert
- Reduces Chattering with a Low Cutting Force Design
- Suitable for Shoulder Roughing.
- Applicable to Various Types of Machining with Product Lineup from  $\phi 32$

## 1 Economical Double-sided 8-edge Insert Suitable for Shoulder Roughing

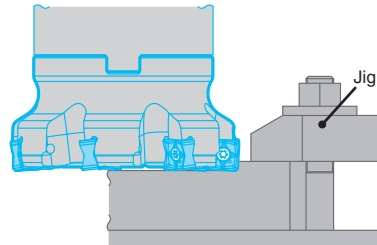
Cost reduction in approximately 90° corner cutting

Shoulder Roughing **Cost reduction by switching from 90° cutter with positive inserts**

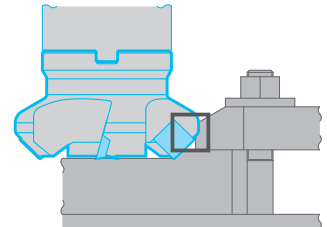


Facing Without Interfering with Fixtures

MFSN88



Conventional 45° Cutter

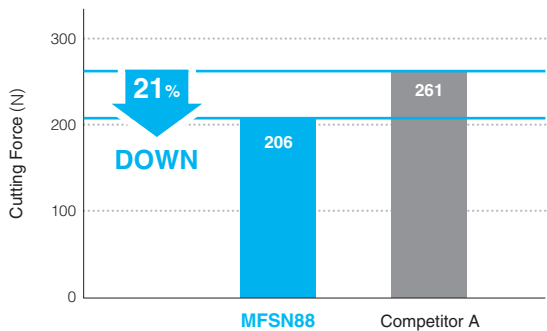


See page M91 for unmachined corner portion

## 2 Reduces Chattering with a Low Cutting Force Design

Chatter Resistant Medium to Roughing Machining Range

Cutting Force Comparison (Internal evaluation)



Thrust force is cutting resistance

Cutting Conditions :  $V_c = 200$  m/min,  $f_z = 0.15$  mm/t,  $a_p = 3$  mm  
Cutter Dia.  $\phi 63$  Workpiece Material : S50C

## 3 Extended Tool Life by MEGACOAT NANO Technology Insert Lineup Also Contains Cermet Grade

Insert grade and chipbreaker lineup for various machining application



1st Recommendation (General purpose) GM Chipbreaker



Tough Edge GH Chipbreaker



For Stainless Steel SM Chipbreaker

M

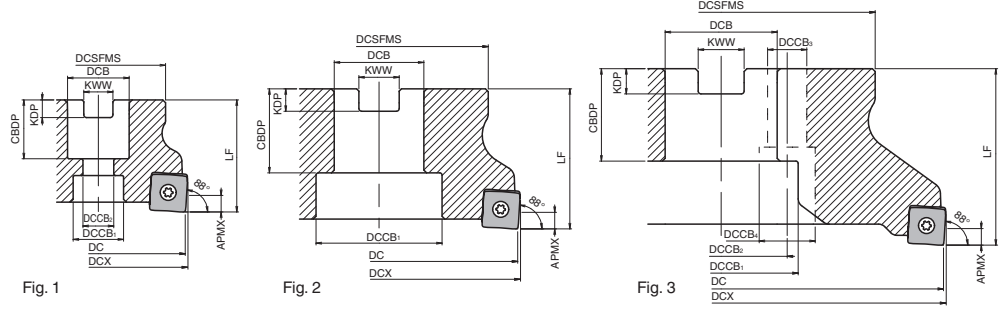
Milling

- Insert
- Lead Angle 45°-20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

# MFSN88 Face Mill



Rake Angle	A.R.	R.R.	
	(MAX.) +10°	DC=50 : -12° DC=63 : -10° DC=80 : -9°	DC=100 : -8° DC=125 : -7.5° DC=160 : -7°



## Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)												Drawing	Weight (kg)	Shim	
				DC	DCX	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW	DCCB <sub>3</sub>	DCCB <sub>4</sub>				
Metric	Fine pitch	MFSN 88050R-4T-M-G	●	4	50	52	48	22	17.5	11	40	21	6.3	10.4	-	-	Fig. 1	0.3	No
		MFSN 88063R-5T-M-G	●	5	63	65			18									0.4	
		MFSN 88080R-6T-M-G	●	6	80	82	70	27	20	13	50	24	7	12.4	-	-	Fig. 2	1.1	
		MFSN 88100R-7T-M-G	●	7	100	102	78	32	45	8								14.4	
		MFSN 88125R-9T-M-G	●	9	125	127	89	40	55	-	63	33	9	16.4	14	20	Fig. 3	2.4	
		MFSN 88160R-11T-M-G	●	11	160	162	110											4.2	
Metric	Extra fine pitch	MFSN 88050R-5T-M-G	●	5	50	52	48	22	17.5	11	40	21	6.3	10.4	-	-	Fig. 1	0.3	No
		MFSN 88063R-7T-M-G	●	7	63	65			18									0.4	
		MFSN 88080R-9T-M-G	●	9	80	82	70	27	20	13	50	24	7	12.4	-	-	Fig. 2	1.1	
		MFSN 88100R-11T-M-G	●	11	100	102	78	32	45	8								14.4	
		MFSN 88125R-13T-M-G	●	13	125	127	89	40	55	-	63	33	9	16.4	14	20	Fig. 3	2.5	
		MFSN 88160R-15T-M-G	●	15	160	162	110											4.3	
Bore Dia. Inch spec	Fine pitch	MFSN 88080R-6T-G	●	6	80	82	70	25.4	20	13	50	27	6	9.5	-	-	Fig. 1	1.1	No
		MFSN 88100R-7T-G	●	7	100	102	78	31.75	45	8								12.7	
		MFSN 88125R-9T-G	●	9	125	127	89	38.1	55	-	63	38	10	15.9	-	-	Fig. 2	2.5	
		MFSN 88160R-11T-G	●	11	160	162	110	50.8	70									11	
	Extra fine pitch	MFSN 88080R-9T-G	●	9	80	82	70	25.4	20	13	50	27	6	9.5	-	-	Fig. 1	1.1	No
		MFSN 88100R-11T-G	●	11	100	102	78	31.75	45	8								12.7	
		MFSN 88125R-13T-G	●	13	125	127	89	38.1	55	-	63	38	10	15.9	-	-	Fig. 2	2.6	
		MFSN 88160R-15T-G	●	15	160	162	110	50.8	70									11	

Applicable Inserts ● M90

## Spare Parts (common to Metric / Inch spec)

Description		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
Fine pitch	MFSN 88050R-4T-M-G	SB-4090TRP Recommended tightening torque for Insert Clamp 3.5N·m	DTPM-15	P-37	HH10X30
	MFSN 88063R-5T-M-G				HH10X30
	MFSN 88080R-6T(-M)-G				HH12X35
	MFSN 88100R-7T(-M)-G				-
	MFSN 88125R-9T(-M)-G				-
	MFSN 88160R-11T(-M)-G				-
Extra fine pitch	MFSN 88050R-5T-M-G	SB-4090TRP Recommended tightening torque for Insert Clamp 3.5N·m	DTPM-15	P-37	HH10X30
	MFSN 88063R-7T-M-G				HH10X30
	MFSN 88080R-9T(-M)-G				HH12X35
	MFSN 88100R-11T(-M)-G				-
	MFSN 88125R-13T(-M)-G				-
	MFSN 88160R-15T(-M)-G				-

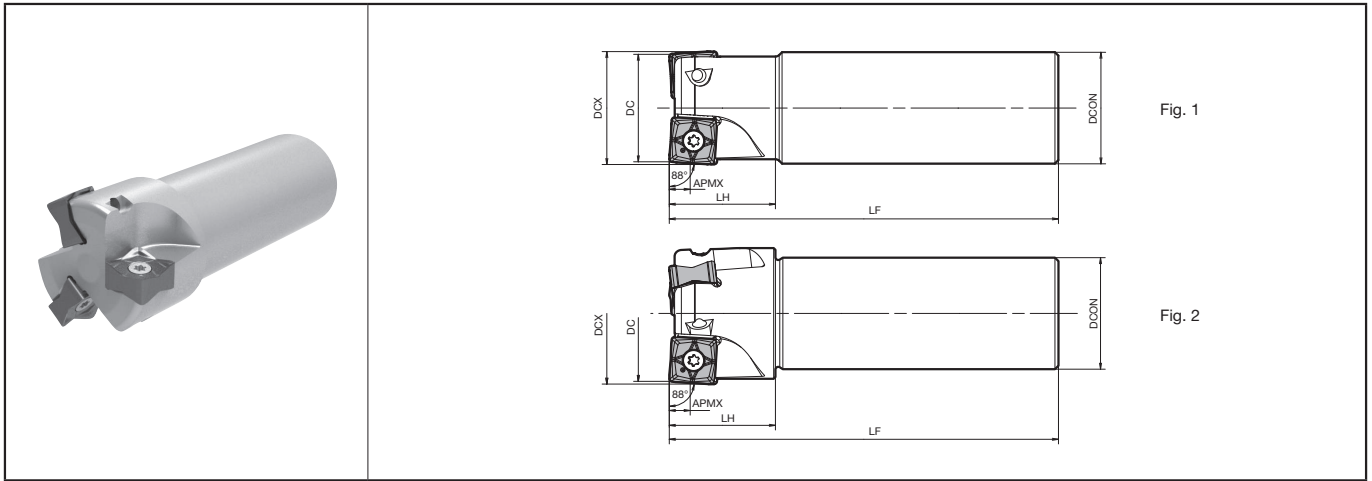
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Insert Grades  
Turnable  
Indexable Inserts  
CNC & PC Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

## MFSN88 End Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Rake Angle		Drawing	Spare Parts		
			DC	DCX	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.	Clamp Screw		Wrench	Anti-seize Compound	
<b>MFSN 88032R-S32-2T-G</b>	●	2	32	34	32	110	30	5	10°	-15.5°	Fig. 1	SB-4090TRP	DTPM-15	P-37	
<b>88040R-S32-3T-G</b>	●	3	40	42						-13°	Fig. 2	Tightening Torque 3.5N-m			

### Applicable Inserts

Classification of usage	P	Carbon Steel / Alloy Steel	■	☆	★	
		Mold Steel	■	☆	★	
M		Stainless Steel (Austenitic related)		★	☆	
		Stainless Steel (Martensitic related)		★		
		Stainless Steel (Precipitation Hardening)		★		
K		Gray Cast Iron				★
		Nodular Cast Iron				★
N		Non-ferrous Metals				
S		Ni-base heat-resistant alloys		★		
		Titanium Alloys		★		
H		Hard Materials				□

★ : Roughing / 1st Choice  
 ☆ : Roughing / 2nd Choice  
 ■ : Finishing / 1st Choice  
 □ : Finishing / 2nd Choice  
 (In case hardness is 45HRC or under)

Insert	Description	Dimension (mm)					Cermet	MEGACOAT NANO			
		IC	S	D1	BS	RE		TN620M	PR1535	PR1525	PR1510
 General purpose	 <b>SNMU 130508EN-GM</b>						●	●	●	●	
 Low cutting force	 <b>SNMU 130508EN-SM</b>	13	5.51	4.7	1.0	0.8		●	●	●	
 Tough Edge (For Heavy Milling)	 <b>SNMU 130508EN-GH</b>							●	●	●	

Recommended Cutting Conditions M91

● : Std. Item

M

Milling

Insert

Lead Angle  
45°-20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others

# ◆ Recommended Cutting Conditions

## ● Coated Carbide

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)		
			MEGACOAT NANO		
			PR1535	PR1525	PR1510
GM	Carbon Steel	0.1- <b>0.2</b> -0.3	☆ 120- <b>180</b> -250	★ 120- <b>180</b> -250	-
	Alloy Steel	0.1- <b>0.2</b> -0.3	☆ 100- <b>160</b> -220	★ 100- <b>160</b> -220	-
	Mold Steel	0.1- <b>0.15</b> -0.25	★ 80- <b>140</b> -180	★ 80- <b>140</b> -180	-
	Stainless Steel (Austenitic related)	0.1- <b>0.15</b> -0.25	☆ 100- <b>150</b> -200	☆ 100- <b>150</b> -200	-
	Stainless Steel (Martensitic related)	0.1- <b>0.15</b> -0.25	☆ 100- <b>150</b> -200	-	-
	Stainless Steel (Precipitation Hardening)	0.1- <b>0.15</b> -0.25	★ 90- <b>120</b> -150	-	-
	Gray Cast Iron	0.1- <b>0.2</b> -0.3	-	-	★ 120- <b>180</b> -250
	Nodular Cast Iron	0.1- <b>0.15</b> -0.25	-	-	★ 100- <b>150</b> -200
	Ni-base heat-resistant alloys	0.1- <b>0.12</b> -0.2	☆ 20- <b>30</b> -50	-	-
SM	Carbon Steel	0.06- <b>0.12</b> -0.2	-	☆ 120- <b>180</b> -250	-
	Alloy Steel	0.06- <b>0.12</b> -0.2	-	☆ 100- <b>160</b> -220	-
	Mold Steel	0.06- <b>0.08</b> -0.15	-	☆ 80- <b>140</b> -180	-
	Stainless Steel (Austenitic related)	0.06- <b>0.12</b> -0.2	★ 100- <b>150</b> -200	☆ 100- <b>150</b> -200	-
	Stainless Steel (Martensitic related)	0.06- <b>0.12</b> -0.2	★ 100- <b>150</b> -200	-	-
	Stainless Steel (Precipitation Hardening)	0.06- <b>0.12</b> -0.2	☆ 90- <b>120</b> -150	-	-
	Gray Cast Iron	0.06- <b>0.12</b> -0.2	-	-	☆ 120- <b>180</b> -250
	Nodular Cast Iron	0.06- <b>0.1</b> -0.15	-	-	☆ 100- <b>150</b> -200
	Ni-base heat-resistant alloys	0.06- <b>0.08</b> -0.15	★ 20- <b>30</b> -50	-	-
	Titanium Alloys	0.06- <b>0.08</b> -0.15	★ 40- <b>60</b> -80	-	-
GH	Carbon Steel	0.15- <b>0.25</b> -0.35	-	☆ 120- <b>180</b> -250	-
	Alloy Steel	0.15- <b>0.25</b> -0.35	-	☆ 100- <b>160</b> -220	-
	Mold Steel	0.1- <b>0.2</b> -0.3	-	☆ 80- <b>140</b> -180	-
	Gray Cast Iron	0.15- <b>0.25</b> -0.35	-	-	☆ 120- <b>180</b> -250
	Nodular Cast Iron	0.1- <b>0.2</b> -0.3	-	-	☆ 100- <b>150</b> -200

\* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

★ : 1st Recommendation  
☆ : 2nd Recommendation

\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

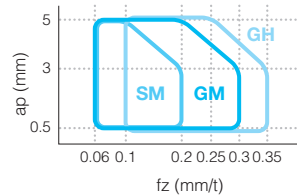
## ● Cermet

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
			Cermet TN620M
GM	Carbon Steel	0.06- <b>0.12</b> -0.15	★ 200- <b>250</b> -300
	Alloy Steel	0.06- <b>0.12</b> -0.15	★ 180- <b>220</b> -250
	Mold Steel	0.06- <b>0.1</b> -0.13	★ 150- <b>180</b> -220

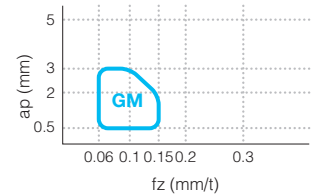
★ : 1st Recommendation

## ● Applicable Chipbreaker Range

Coated Carbide



Cermet



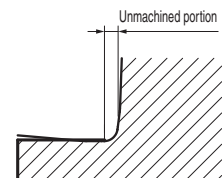
## ● Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	△ (Feed rate is recommended fz=0.2mm/t or under)

Not Available for vertical milling (plunging).

## ● Reference data of unmachined corner portion

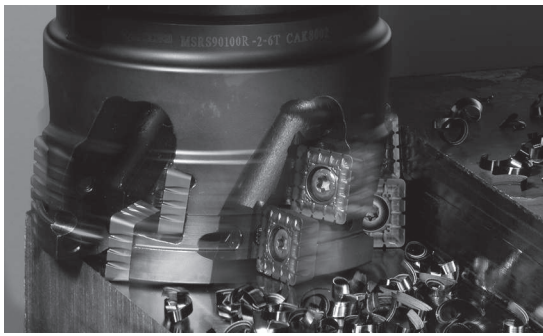
ap	1 mm	2 mm	3 mm	4 mm	5 mm
Unmachined portion	0.82 mm	0.93 mm	0.97 mm	1.00 mm	1.04 mm



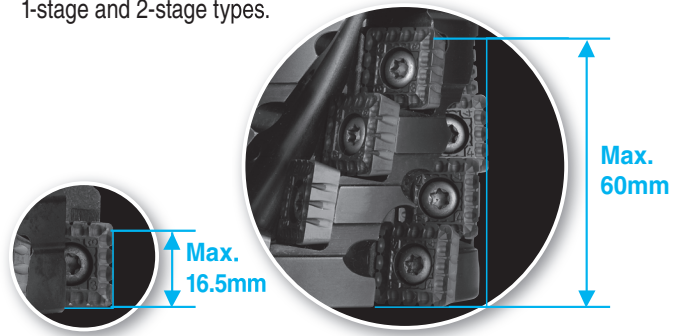
Insert Grades  
A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

Turnable Inserts  
CNC & PC Tools  
External  
Small Parts Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

# Heavy Milling Cutter MSRS90



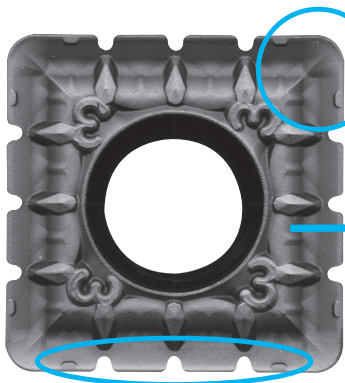
● **Wide selection of cutting edge length according to cutting conditions**  
4-stage type (ø80, ø100) is added to the standard lineup as well as 1-stage and 2-stage types.



- **High efficiency, low cutting force and stable machining without chattering**
- **Neutral and corner-R insert**

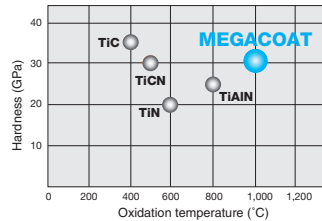
Applicable to shouldering (cutting edge angle : 90°), high feed milling (cutting edge angle : 30°), plunging, and side cutter.

## Custom-ordered milling cutter with high performance notched neutral inserts provides various applications



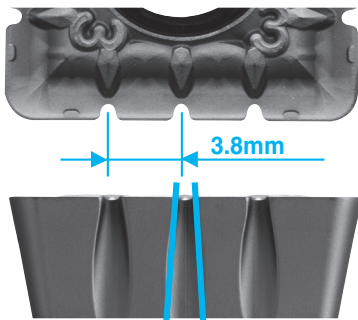
Neutral insert with corner-R is available to various applications

### Long tool life : MEGACOAT



High hardness and high oxidation resistance  
long tool life : MEGACOAT

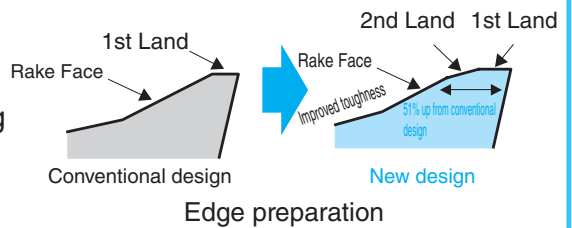
### Notched insert SPMT180616EN



The notched insert breaks chips into small pieces and reduces cutting force.

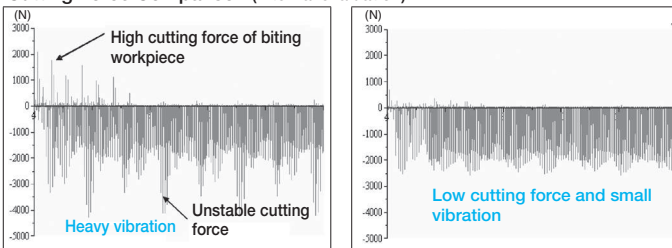
The second land near the cutting edge improves edge strength.

For neutral (Right / Left) hand  
Applicable for various cutting edge angle.  
Cutting edge length : 18mm



- **Low cutting force (Notched insert benefit)**

Cutting Force Comparison (Internal evaluation)



Competitor A

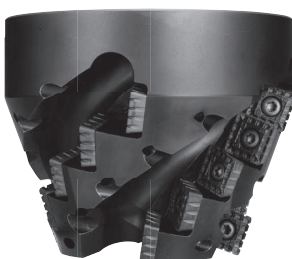
MSRS90

**Notched insert realizes lower cutting force and smaller vibration**

M

Milling

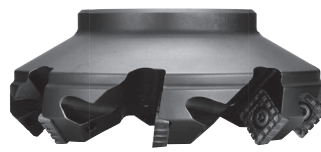
- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others



Tapered cutter



Vertical Milling (Plunging) cutter



45° Face Mill










High Feed Cutter



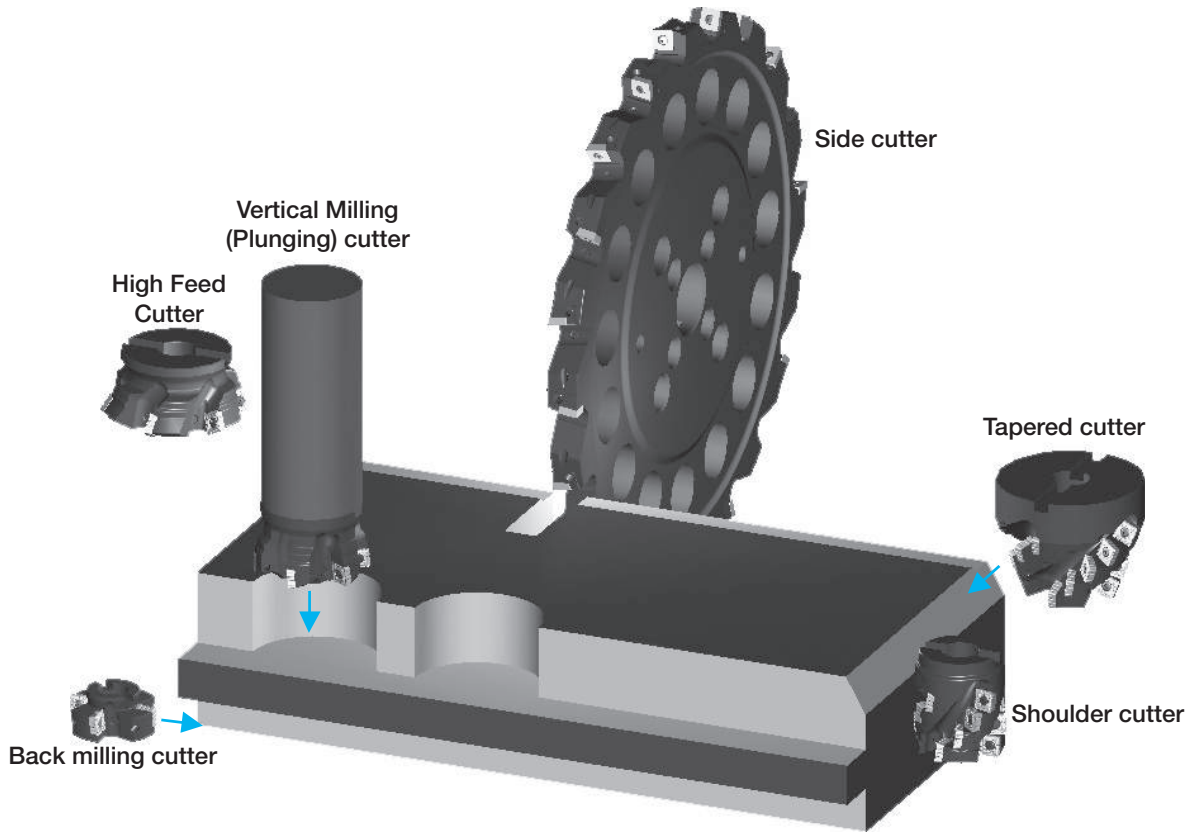
Shoulder cutter



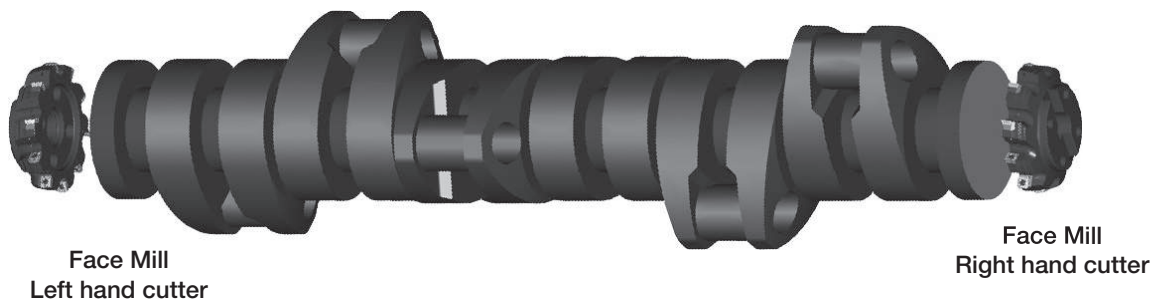
## Applicable Inserts : Available for various applications

Applications	Chipbreaker selection	3-Notched		4-Notched		Without notch
General purpose	Standard	 NB3	+	 NB4		
Low Cutting Force	Low Cutting Force	 NB3P	+	 NB4P		
Edge Strength Oriented	Without notch (Usable with notched inserts)	(  NB3	or	 NB4	)	+ 

## Various expansive possibilities (Custom-ordered and standard milling cutter)

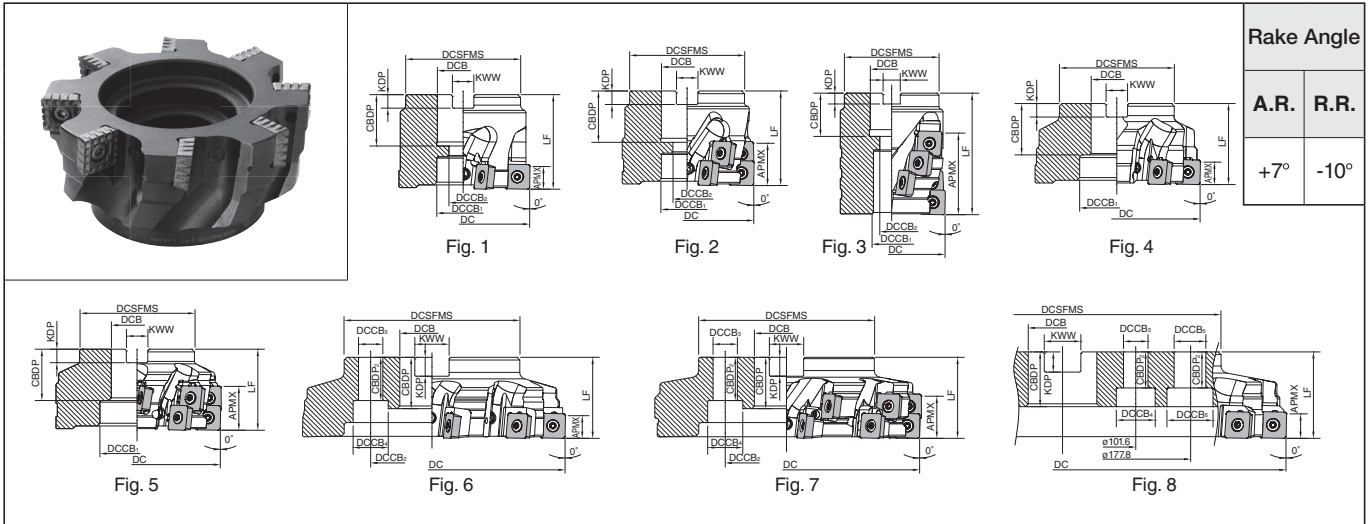


### ● Shaft length determination



The custom-ordered milling cutter can be customized for your requirements such as diameter, cutting edge angle, number of insert stages.

## MSRS90



### Toolholder Dimensions

Description	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm)																Drawing	Weight (kg)	
					DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBBDP	KDP	KWW	APMX	DCCB <sub>3</sub>	DCCB <sub>4</sub>	DCCB <sub>5</sub>	DCCB <sub>6</sub>	CBBDP <sub>2</sub>				
Metric	MSRS 90080R-1-4T-M	●	4	1																	Fig. 1	1.3	
	90080R-2-4T-M	●	8	2	80	70	27	20	13	60	24	7	12.4	31								Fig. 2	1.1
	90080R-4-4T-M	●	16	4						85				60								Fig. 3	1.4
	90100R-1-6T-M	●	6	1																		Fig. 1	2.2
	90100R-2-6T-M	●	12	2	100		32	45		70	30	8	14.4	31	-	-	-	-	-			Fig. 2	2.0
	90100R-4-6T-M	MTO	24	4		85				90				60								Fig. 3	3.1
	90125R-1-8T-M	●	8	1	125																	Fig. 4	2.6
	90125R-2-8T-M	MTO	16	2			40	55			33	9	16.4	31								Fig. 5	2.4
	90160R-1-8T-M	●	8	1	160	110								16.5	14	20	-	-	-	28		Fig. 6	4.2
	90160R-2-8T-M	MTO	16	2						66.7				31								Fig. 7	4.0
	90200R-1-10T-M	●	10	1	200									16.5								Fig. 6	6.7
	90200R-2-10T-M	MTO	20	2		140								31	18	26	-	-	32			Fig. 7	6.6
	90250R-1-12T-M	●	12	1	250		60	-		101.6				16.5								Fig. 6	12.6
	90250R-2-12T-M	MTO	24	2							40	14	25.7	31								Fig. 7	12.5
90315R-1-14T-M	●	14	1	315	220								16.5	17	27	22	32	25			Fig. 8	16.1	
90315R-2-14T-M	MTO	28	2										31								-	16.0	
Bore Dia. Inch spec	MSRS 90080R-1-4T	●	4	1																		Fig. 1	1.4
	90080R-2-4T	●	8	2	80	70	31.75	27	18	60	32	8	12.7	31								Fig. 2	1.2
	90080R-4-4T	●	16	4						85				60								Fig. 3	1.5
	90100R-1-6T	●	6	1																		Fig. 1	2.3
	90100R-2-6T	●	12	2	100			39	21	70				31								Fig. 2	2.1
	90100R-4-6T	MTO	24	4		85	38.1			90		10	15.9	60	-	-	-	-				Fig. 3	3.2
	90125R-1-8T	●	8	1	125																	Fig. 4	2.6
	90125R-2-8T	MTO	16	2				55						16.5								Fig. 5	2.4
	90160R-1-8T	●	8	1	160	100	50.8	70						16.5								Fig. 4	4.3
	90160R-2-8T	MTO	16	2							38	11	19.1	31								Fig. 5	4.1
	90200R-1-10T	●	10	1	200																	Fig. 6	6.7
	90200R-2-10T	MTO	20	2		130				60				31	18	26	-	-	32			Fig. 7	6.6
	90250R-1-12T	●	12	1	250		47.625	-		101.6				16.5								Fig. 6	12.6
	90250R-2-12T	MTO	24	2								14	25.4	31								Fig. 7	12.5
	90315R-1-14T	●	14	1	315	220								16.5	17	27	22	32	25			Fig. 8	16.1
	90315R-2-14T	MTO	28	2										31								-	16.0

● : Std. Item  
MTO : Made to order

## ● Applicable Inserts

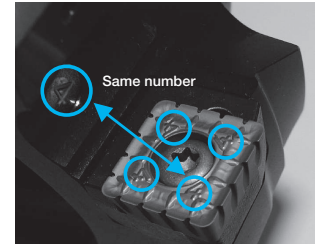
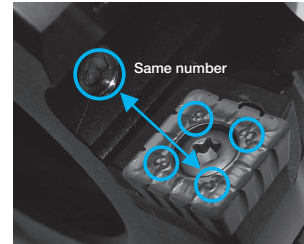
Description	Applicable Inserts  M24				
	3-Notched	4-Notched	3-Notched / Low cutting force	4-Notched / Low cutting force	Without notch
MSRS90...	SPMT 180616EN-NB3	SPMT 180616EN-NB4	SPMT 180616EN-NB3P	SPMT 180616EN-NB4P	SPMT 180616EN-V

## ● Caution when installing Notched Insert

It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body. For MSRS90, Notched Insert location indicator is marked at insert installed pocket of the cutter body.

When installing the inserts, match the number on the top surface of insert to the number 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



## ● Spare Parts

Description	Spare Parts							
	Clamp Screw	Wrench	Cartridge		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
Without cartridge			MAP-1806M	MAP-1806S (Bottom edge only)				
MSRS 90080R-○-4T			-	-	-	-		HH16X45
90100R-○-6T								HH20X55
90125R-○-8T								
With cartridge			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		-
MSRS 90160R-○-8T								
90315R-○-14T		SB-60120TR	TT-25L		Recommended tightening torque for Cartridge Clamp 3.5N·m			
Without cartridge							P-37	HH12X35
MSRS 90080R-○-4T-M								
90100R-○-6T-M								
90125R-○-8T-M								
With cartridge			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		-
MSRS 90160R-○-8T-M								
90315R-○-14T-M			Recommended tightening torque for Cartridge Clamp 3.5N·m					

Notes) \*1 : MAP-1806M is only for the bottom edge (1st stage) of MSRS90..R-1.

\*2 : MAP-1806S is only for the bottom edge (1st stage) of MSRS90..R-2... Use it only for the bottom edge (1st stage).

How to attach the cartridge : You need to tighten 2 clamp screws to fix the cartridge. Tighten the slant screw first and then tighten the other screw.

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

## ◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Cutting Speed Vc (m/min)	
	Standard NB3+NB4	Low Cutting Force NB3P+NB4P	MEGACOAT	
			PR1230	PR1210
Soft Steel	0.1~0.2~0.25	0.1~0.2~0.25	★ 120~150~220	☆ 120~150~220
Carbon Steel	0.1~0.2~0.25	0.1~0.2~0.25	★ 100~150~200	☆ 100~150~200
Alloy Steel	0.1~0.15~0.2	0.1~0.15~0.2	★ 100~150~200	☆ 100~150~200
Mold Steel	0.1~0.15~0.2	0.1~0.12~0.15	★ 100~150~180	☆ 100~150~180
Gray Cast Iron	0.1~0.2~0.3	0.1~0.2~0.25	☆ 100~180~250	★ 100~180~250
Nodular Cast Iron	0.1~0.2~0.25	0.1~0.18~0.2	☆ 100~180~220	★ 100~180~220
Stainless Steel	Not recommended			
Aluminum / Copper	Not recommended			

★ : 1st Recommendation ☆ : 2nd Recommendation

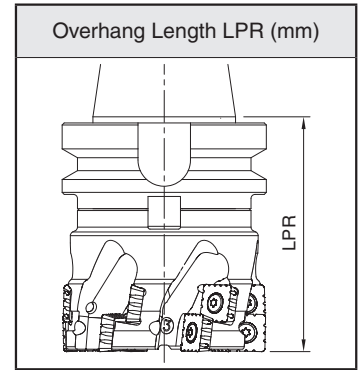
Insert Grades  
Turning  
Indexable Inserts  
CNC & PC Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

## Cutting Conditions (Shouldering)

### In case of MSRS90100R-1-6T

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap × ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 120mm	180	0.2	15 × 80	826
	120~200mm	180	0.2	15 × 40	413
	201mm and over	230	0.1	15 × 40	263
Carbon Steel	Less than 120mm	150	0.2	15 × 80	689
	120~200mm	150	0.2	15 × 40	344
	201mm and over	200	0.1	15 × 40	229



### In case of MSRS90100R-2-6T

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap × ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 120mm	180	0.2	30 × 50	1,032
	120~200mm	180	0.2	30 × 30	619
	201mm and over	230	0.1	30 × 25	329
Carbon Steel	Less than 120mm	150	0.2	30 × 50	861
	120~200mm	150	0.2	30 × 30	517
	201mm and over	200	0.1	30 × 25	287

### In case of MSRS90100R-4-6T

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap × ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 140mm	180	0.2	60 × 20	826
	140~200mm	180	0.2	60 × 10	413
	201mm and over	230	0.1	60 × 10	263
Carbon Steel	Less than 140mm	150	0.2	60 × 20	689
	140~200mm	150	0.2	60 × 10	344
	201mm and over	200	0.1	60 × 10	229

## Case Studies

### FCD450

**Industrial parts**

- Vc=150m/min
- ap x ae=6 x 65mm
- fz=0.15mm/t (Vf=430mm/min)

MSRS90100R-1-6T(ø100 -6 inserts)  
SPMT180616EN-NB3/NB4 (PR1210)

<b>MSRS90(PR1210)</b>	Chip Evacuation Rate = 258cc/min
Competitor B	107cc/min

· MSRS90 more than doubled the machining efficiency compared with competitor B.  
· Competitor B machined with 2 passes (ap x ae=3 x 65mm). MSRS90 machined with only 1 pass.  
· Cutting time was reduced. (User Evaluation)

### SCM420

**Construction machine part**

- Vc=200m/min
- ap x ae=10 x 50mm
- fz=0.1mm/t (Vf=400mm/min)

MSRS90125R-1-8T(ø125 -8 inserts)  
SPMT180616EN-NB3/NB4 (PR1230)

<b>MSRS90(PR1230)</b>	Chip Evacuation Rate = 200cc/min
Competitor C	153cc/min

· MSRS90 improved the machining efficiency to 1.3 times that of competitor C.  
· Competitor C machined with ap x ae=5 x 50mm  
· Tool cost is reduced to 1/3 although competitor C is expensive using 2-corner insert.  
· MSRS90 reduced machining cost as well as improved machining efficiency. (User Evaluation)

### SKD

**Shipbuilding parts**

- Vc=150m/min
- ap x ae=10 x 10~50mm
- fz=0.1mm/t (Vf=240mm/min)

MSRS90160R-1-8T(ø160 -8 inserts)  
SPMT180616EN-NB3/NB4 (PR1230)

<b>MSRS90(PR1230)</b>	Chip Evacuation Rate = 120cc/min
Competitor D	60cc/min

· MSRS90 more than doubled the machining efficiency compared with competitor D.  
· Competitor D machined with ap x ae=5 x 10~50mm  
⇒ Low cutting force of MSRS90 enabled twice as large ap as that of competitor.  
· It can double the ap as well as increase the cutting speed (Vc=100 ⇒150).  
⇒ Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time). (User Evaluation)

### SNCM

**Power generation parts**

- Vc=160m/min
- ap x ae=10 x 0~20mm
- fz=0.15mm/t (Vf=500mm/min)

MSRS90125R-1-8T(ø125 -8 inserts)  
SPMT180616EN-NB3/NB4 (PR1230)

<b>MSRS90(PR1230)</b>	12 surfaces/edge
Competitor E	8 surfaces/edge

· MSRS90 showed 1.5 times longer tool life than that of competitor E.  
· Competitor E machined with 2 passes on a side (ap x ae=12 x 0 to 10mm).  
· Competitor E was poor in feed rate (Vf=400mm/min).  
⇒ Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time).  
· Although competitor E is load due to high cutting force. MSRS90 operates fairly quietly. (User Evaluation)



# Heavy Milling Cutter MSR

High efficiency Heavy Milling

BT50 Integral Arbor type

PR1230  
(For Steel)

Low cutting force type

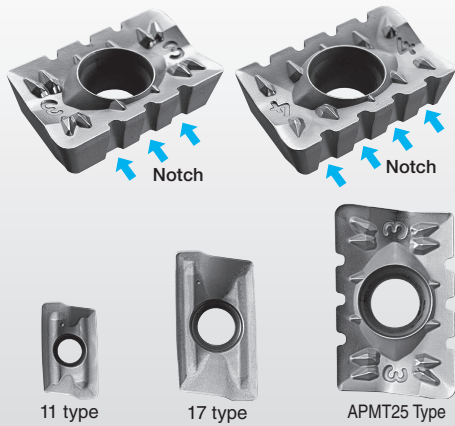
PR1210  
(For Cast Iron)



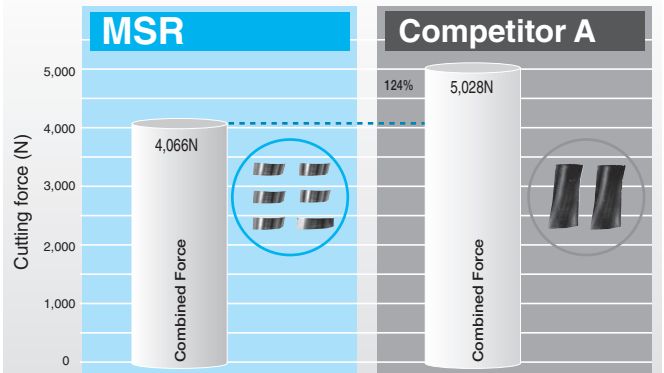
Notched insert reduces cutting force, and enables high feed rates by reducing chattering. Improved chip evacuation and low cutting force with the special chipbreaker. Enables heavy milling and deep cutting, and also drastically improves machining efficiency. (Reduction of cutting time)

## Notched Insert

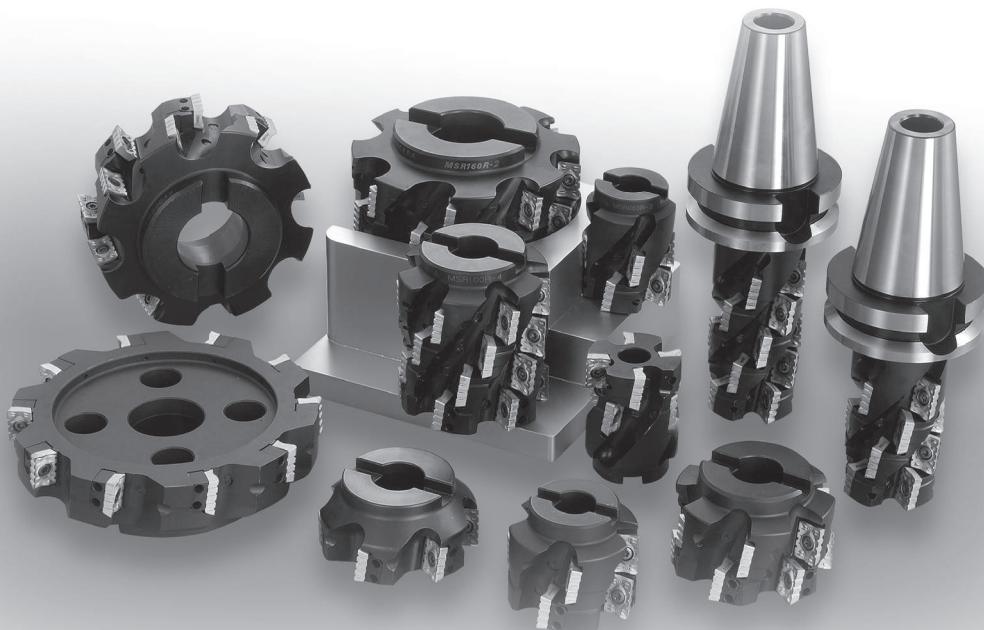
### Size Comparison (Full-Scale)



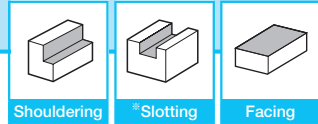
## Cutting Force Comparison



\* The exclusive notched chipbreaker provides low cutting force and good chip evacuation. (Internal evaluation)



Insert Grades	A
Turnable Indexable Inserts	B
CBN & PCBN Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T



Shouldering

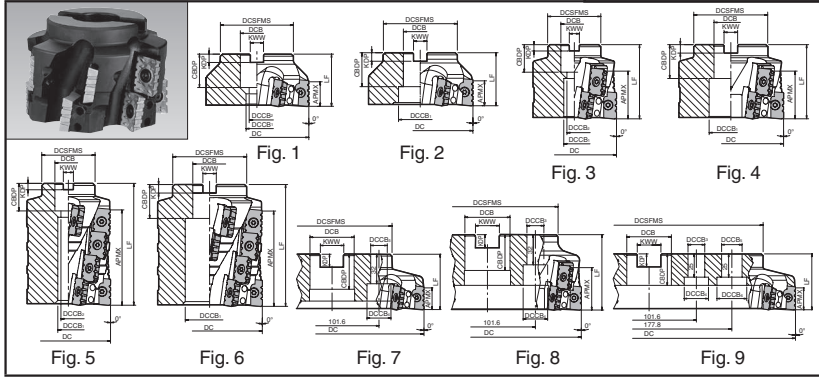
\*Slotting

Facing

\* Not recommended for 4 stages type

## MSR

Rake Angle  
 ø63~ø80      ø100~  
 A.R. : +9°      A.R. : +9°  
 R.R. : -8°      R.R. : -5°



### Spare Parts (Bore Dia. : common to Inch type / Metric type)

Description	Spare Parts					
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-□						
MSR 080R-□	SB-60120TR	TT-25L	MAP-2506	SB-40140TR	DT-15	P-37
315R-□	for Insert Clamp		for Shim Clamp			

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

### Toolholder Dimensions (Metric)

Description	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm)													Drawing	Weight (kg)	
					DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	DCCB <sub>3</sub>	DCCB <sub>4</sub>	DCCB <sub>5</sub>			DCCB <sub>6</sub>
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	4	2	63	50	27	20	14	85	22	7.2	12.4	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	4	2	80	55	27	20	14	70	22	7.2	12.4	45	-	-	-	-	Fig. 3	1.5
080R-4M	●	16	4	4	80	55	27	20	14	115	22	7.2	12.4	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	6	2	100	70	32	42	-	70	28	8	14.4	45	-	-	-	-	Fig. 4	2.0
100R-4M	●	24	4	4	100	70	32	42	-	115	28	8	14.4	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	6	2	125	85	40	58	-	70	30	9	16.4	45	-	-	-	-	Fig. 4	3.7
125R-4M	●	24	4	4	125	85	40	58	-	115	30	9	16.4	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	8	2	160	100	40	68	-	70	30	10	16.4	45	-	-	-	-	Fig. 4	6.8
200R-1M	●	10	10	1	200	130	60	-	-	60	38	15	25.4	23.5	18	26	-	-	Fig. 7	7.0
200R-2M	●	20	10	2	200	130	60	-	-	80	38	15	25.4	45	18	26	-	-	Fig. 8	9.9
250R-1M	●	12	12	1	250	130	60	-	-	60	38	15	25.4	23.5	18	26	-	-	Fig. 7	10.3
250R-2M	●	24	12	2	250	130	60	-	-	80	38	15	25.4	45	18	26	-	-	Fig. 8	14.2
315R-1M	MTO	14	14	1	315	230	60	-	-	60	35	15	25.4	23.5	17	27	22	32	Fig. 9	15.5

- Shim is not available for MSR063R (DC=63).
- Mounting bolt (HH12X35) is included for MSR063R / MSR080R.
- It is not recommended using only top edge part (under ap=30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
- Deep slotting is not recommended for this cutter.

### Toolholder Dimensions (Bore Dia. : Inch spec)

Description	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm)													Drawing	Weight (kg)	
					DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	DCCB <sub>3</sub>	DCCB <sub>4</sub>	DCCB <sub>5</sub>			DCCB <sub>6</sub>
MSR 063R-1	●	4	4	1	63	50	25.4	20	14	65	26	6	9.5	23.5	-	-	-	-	Fig. 1	0.8
063R-2	●	8	4	2	63	50	25.4	20	14	85	26	6	9.5	45	-	-	-	-	Fig. 3	1.0
080R-1	●	4	4	1	80	55	25.4	20	14	50	26	6	9.5	23.5	-	-	-	-	Fig. 1	1.1
080R-2	●	8	4	2	80	55	25.4	20	14	70	26	6	9.5	45	-	-	-	-	Fig. 3	1.6
080R-2-31.75	●	8	4	2	80	70	31.75	27	18	70	32	8	12.7	45	-	-	-	-	Fig. 3	1.7
080R-4	●	16	4	4	80	55	25.4	20	14	115	26	6	9.5	90	-	-	-	-	Fig. 5	2.6
080R-4-31.75	●	16	4	4	80	70	31.75	27	18	115	32	8	12.7	90	-	-	-	-	Fig. 5	2.7
100R-1	●	6	6	1	100	70	31.75	42	-	50	28	8	12.7	23.5	-	-	-	-	Fig. 2	1.6
100R-2	●	12	6	2	100	70	31.75	42	-	70	28	8	12.7	45	-	-	-	-	Fig. 4	2.2
100R-4	●	24	4	4	100	70	31.75	42	-	115	28	8	12.7	90	-	-	-	-	Fig. 6	3.6
125R-1	●	6	6	1	125	85	38.1	54	-	60	30	9	16.4	23.5	-	-	-	-	Fig. 2	3.5
125R-2	●	12	6	2	125	85	38.1	54	-	70	30	9	16.4	45	-	-	-	-	Fig. 4	3.8
125R-4	●	24	4	4	125	85	38.1	54	-	115	30	9	16.4	90	-	-	-	-	Fig. 6	6.1
160R-1	●	8	8	1	160	100	50.8	68	-	60	30	10	16.4	23.5	-	-	-	-	Fig. 2	5.8
160R-2	●	16	8	2	160	100	50.8	68	-	70	30	10	16.4	45	-	-	-	-	Fig. 4	6.4
160R-4	●	32	4	4	160	100	50.8	68	-	115	30	10	16.4	90	-	-	-	-	Fig. 6	10.7
200R-1	●	10	10	1	200	130	47.625	-	-	60	38	14	25.4	23.5	18	26	-	-	Fig. 7	7.5
200R-2	●	20	10	2	200	130	47.625	-	-	80	38	14	25.4	45	18	26	-	-	Fig. 8	10.4
250R-1	●	12	12	1	250	130	47.625	-	-	60	38	14	25.4	23.5	18	26	-	-	Fig. 7	10.9
250R-2	●	24	12	2	250	130	47.625	-	-	80	38	14	25.4	45	18	26	-	-	Fig. 8	14.7
315R-1	MTO	14	14	1	315	220	47.625	-	-	60	35	14	25.4	23.5	17	27	22	32	Fig. 9	16.0

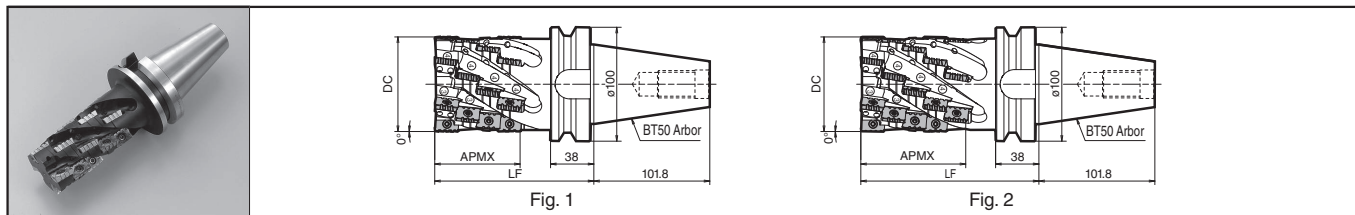
- Shim is not available for MSR063R (DC=63).
- Mounting bolt (HH12X40) is included for MSR063R and MSR080R. Mounting bolt (HH16X45) is included for MSR080R-□-31.75.
- It is not recommended using only top edge part (under ap=30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
- Deep slotting is not recommended for this cutter.

● : Std. Item

MTO : Made to order



## MSR-BT50







### ● Toolholder Dimensions (BT50 Integral Arbor type)

Description	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm)					Rake Angle	Drawing	Weight (kg)	Spare Parts					
					DC	LF	APMX	A.R.	R.R.				Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
<b>MSR 063R-BT50-4</b>	●	16	4	4	63	160	90	+9°	-8°	Fig. 1	5.7	SB-60120TR	TT-25L	-	-	-	P-37	
<b>063R-BT50-5</b>	●	20		5		180	111							Fig. 2	6.2			
<b>080R-BT50-4</b>	●	16	4	4	80	160	90	+9°	-8°	Fig. 1	6.9	for Insert Clamp	MAP-2506	SB-40140TR	DT-15	P-37		
<b>080R-BT50-5</b>	●	20		5		180	111										Fig. 2	7.4
<b>100R-BT50-4</b>	●	24	6	4	100	160	90	+9°	-5°	Fig. 1	9.6	for Shim Clamp	MAP-2506	SB-40140TR	DT-15	P-37		
<b>100R-BT50-5</b>	●	30		5		180	111										Fig. 2	10.5

- Shim is not available for MSR063R (DC=63).
- It is not recommended using only top edge part (under ap=30mm) for 4 stages / 5 stages type. If ap is small, use previous page's 1 stage type or 2 stages type.
- Deep slotting is not recommended for this cutter.

### ● Applicable Inserts

Description	Applicable Inserts <b>M18</b> (Handed Insert shows Right-hand)			
				
<b>MSR... MSR...M</b>	<b>APMT 2506 ○○ ER-NB3</b>	<b>APMT 2506 ○○ ER-NB4</b>	<b>APMT 250616ER-NB3P</b>	<b>APMT 250616ER-NB4P</b>
For custom-ordered cutter	<b>APMT 250616EL-NB3</b>	<b>APMT 250616EL-NB4</b>	-	-

### Recommended Cutting Conditions **M100**

#### ● Caution when installing Notched Insert

It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body.  
For MSR, Notched Insert location indicator is marked at insert installed area.

Please bear the following in mind when installing inserts to toolholders.  
(Indication is marked near the insert pocket for MSR.)

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

(No. of Inserts - Example)

Description	No. of Inserts	No. of Flutes	No. of Inserts Notched	
			NB3	NB4
<b>MSR 100R-1</b>	6	6	3	3
<b>100R-2</b>	12		6	6
<b>100R-4</b>	24		12	12

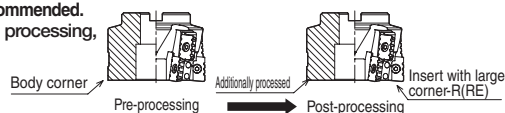
## ● Caution when installing the Insert with Corner-R (RE) 4.0

● When using inserts with corner-R(RE) 4.0mm, additional modifications of the cutter body will be necessary.

Ref. to the table below for the recommended modifications.

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

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



## ◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
	Low Cutting Force	General purpose	MEGACOAT		PVD Coated Carbide
	NB3P+NB4P	NB3+NB4	PR1230	PR1210	PR830
Carbon Steel	0.15	0.2	★ 100~ <b>150</b> ~200	-	☆ 100~ <b>150</b> ~180
Cast Iron	0.15	0.2	-	★ 100~ <b>150</b> ~200	-
Stainless Steel	Not recommended				
Aluminum / Copper	Not recommended				

\* For MSR, cutting speed should be carefully adjusted depending on the length of toolholder protruding from the end of machine spindle. ★: 1st Recommendation ☆: 2nd Recommendation  
 • When the overhang length of toolholder is small, → set the cutting speed to slightly higher than the recommended cutting conditions.  
 • When the overhang length of toolholder is long, → set the cutting speed to slightly lower than the recommended cutting conditions.

## ■ Cutting Conditions

### 1) Shouldering

#### ● In case of MSR100R-1

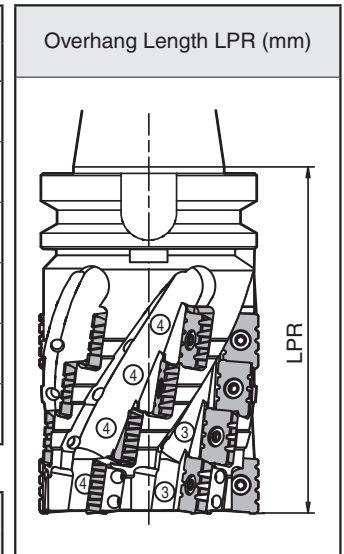
Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	20 x 80	920
	100~200mm	150	0.2	20 x 40	460
	201mm and over	100	0.2	20 x 30	228
Cast Iron	Less than 100mm	180	0.2	20 x 80	1,100
	100~200mm	180	0.2	20 x 40	550
	201mm and over	120	0.2	20 x 30	276

#### ● In case of MSR100R-2

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	40 x 40	920
	130~230mm	150	0.2	40 x 20	460
	231mm and over	100	0.2	40 x 20	304
Cast Iron	Less than 130mm	180	0.2	40 x 40	1,100
	130~230mm	180	0.2	40 x 20	550
	231mm and over	120	0.2	40 x 20	368

#### ● In case of MSR100R-4

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 180mm	150	0.2	75 x 20	863
	180~280mm	150	0.2	75 x 10	431
	281mm and over	100	0.2	75 x 10	285
Cast Iron	Less than 180mm	180	0.2	75 x 20	1,035
	180~280mm	180	0.2	75 x 10	518
	281mm and over	120	0.2	75 x 10	345



## 2) Slotting

### ● In case of MSR100R-1

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	7 x 100	403
	100~200mm	120	0.2	4 x 100	184
	201mm and over	100	0.2	3 x 100	114
Cast Iron	Less than 100mm	180	0.2	14 x 100	966
	100~200mm	150	0.2	7 x 100	403
	201mm and over	120	0.2	4 x 100	184

### ● In case of MSR100R-2

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	7 x 100	403
	130~230mm	120	0.2	4 x 100	184
	231mm and over	100	0.2	3 x 100	114
Cast Iron	Less than 130mm	180	0.2	14 x 100	966
	130~230mm	150	0.2	7 x 100	403
	231mm and over	120	0.2	4 x 100	184

### ● In case of MSR160R-1

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	5 x 160	384
	100~200mm	120	0.2	3 x 160	182
	201mm and over	100	0.2	2 x 160	102
Cast Iron	Less than 100mm	180	0.2	10 x 160	928
	100~200mm	150	0.2	5 x 160	384
	201mm and over	120	0.2	4 x 160	243

### ● In case of MSR160R-2

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	5 x 160	384
	130~230mm	120	0.2	3 x 160	182
	231mm and over	100	0.2	2 x 160	102
Cast Iron	Less than 130mm	180	0.2	10 x 160	928
	130~230mm	150	0.2	5 x 160	384
	231mm and over	120	0.2	4 x 160	243

Notes) MSR ... -4 (No. of stage)  
Slotting is not recommended.

## Q&A



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

**A-1**  $V_c=150\text{m/min}$ ,  $f_z=0.2\text{mm/t}$ , larger cutting depth and smaller cutting width

In case of MSR100R-2

e.g.) Load meter 120%

e.g.) Load meter 90%

1st Pass	ap x ae: 15x75mm	3rd Pass	2nd Pass	1st Pass
2nd Pass				
3rd Pass				

**Q-2** Required equipment for MSR?

**A-2** Max. spindle revolution is  $4,000\text{min}^{-1}$  or under. BT50 or larger.

\* MSR is not only for Double column machining center. The reason why not recommended for high RPM spindle machine is its less torque.  
\* Although MSR works with BT40 shank, maximum available  $f_z$  is about  $0.1\text{mm/tooth}$ .

**Q-3** What are the points to remember in case of less power machine?

**A-3** Do not use large size cutters.  $\Rightarrow \phi 63$  or  $\phi 80$  is recommended.  
Please increase cutting speed and decrease feed rate.  
Set up conditions to get the largest available torque by checking torque curve of the machine.  
Tried under condition of  $V_c=150\text{m/min}$ , enough torque was not gained because of high gear.  
In this case, it has to be prioritized using  $V_c$  which can exert enough torque as  $V_c=120\text{m/min}$ .  
\* Machine torque curve will be prioritized.

**Q-4** In case of unstable workpiece.

**A-4** Decrease feed ratio at the start machining the workpiece.

\* Almost all cases of moving workpiece happens when start machining.

◎ Effective for increasing cutting speed and decrease feed rate.

$V_c=150\text{m/min}$ ,  $f_z=0.2\text{mm/t}$   
↓  
 $V_c=200\text{m/min}$ ,  $f_z=0.15\text{mm/t}$

**Q-5** What is the tool life?

**A-5** Chip weight :  $700\text{kg/Corner}$  (Result by PR660)  
Cutting time :  $90\text{min}$  (calculated value)  
Cutting distance :  $65\text{m}$  (calculated value)  
How great  $1,000\text{cc/min}$ ?  $\Rightarrow$  About  $7.8\text{kg}$  chips removed per minute  
Tool life time= $700\text{kg}$  (Chip weight) $\div 7.8\text{kg}$  (Chip evacuation amount per 1min)= $90\text{min}$   
Cutting distance= $90\text{min}$  (Time by the end of tool life) $\times 717\text{mm/min}$  (Table feed ratio per 1min)= $65\text{m}$   
\* In case of cutting  $V_c=150\text{m/min}$ ,  $ap \times ae$  :  $20 \times 70\text{mm}$ ,  $V_f=717\text{mm/min}$ .  
\* Tool : MSR100R-2 (6 inserts)

**Q-6** How to reduce chattering.

**A-6** In chattering occurs, then the following conditions are recommended.  
 $\Rightarrow$  Reduce cutting speed and increase feed rate.

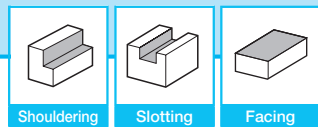
In case of Steel

·  $V_c = 80\text{m/min}$   
·  $f_z = 0.25\text{mm/t}$

In case of Cast Iron

·  $V_c = 80\text{m/min}$   
·  $f_z = 0.35\text{mm/t}$

- Insert
- Lead Angle  
 $45^\circ \sim 20^\circ$
- Lead Angle  
 $15^\circ$
- Lead Angle  
 $0^\circ/2^\circ$
- High Feed  
Cutter
- Multi-  
Function
- Slot Mill
- Ball-nose  
Radius
- Others

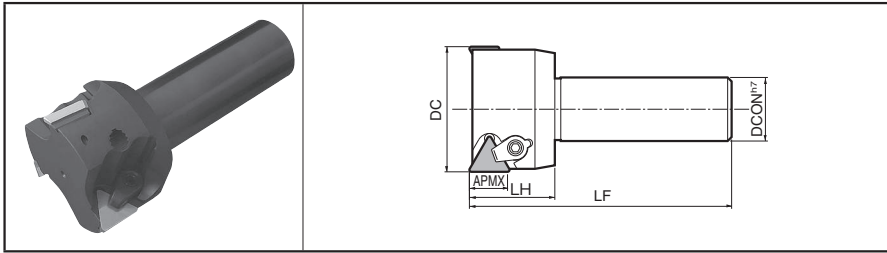


Shouldering

Slotting

Facing

## MTP90 with cylindrical shank



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Spare Parts				
			DC	DCON	LF	LH	APMX	A.R.	R.R.	Clamp	Clamp screw	Wrench	Shim	Shim Screw
<b>MTP 9050</b>	●	3	50	32	130	43	18	+8°	0°					
<b>9063</b>	●	3	63											

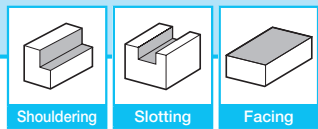
### Applicable Inserts

Description	Applicable Inserts <a href="#">M12</a>		
<b>MTP 90...</b>	TPMR 2204PDER-H	TPKR 2204PDER-S	TPKN 2204PDTR 2204PDFR

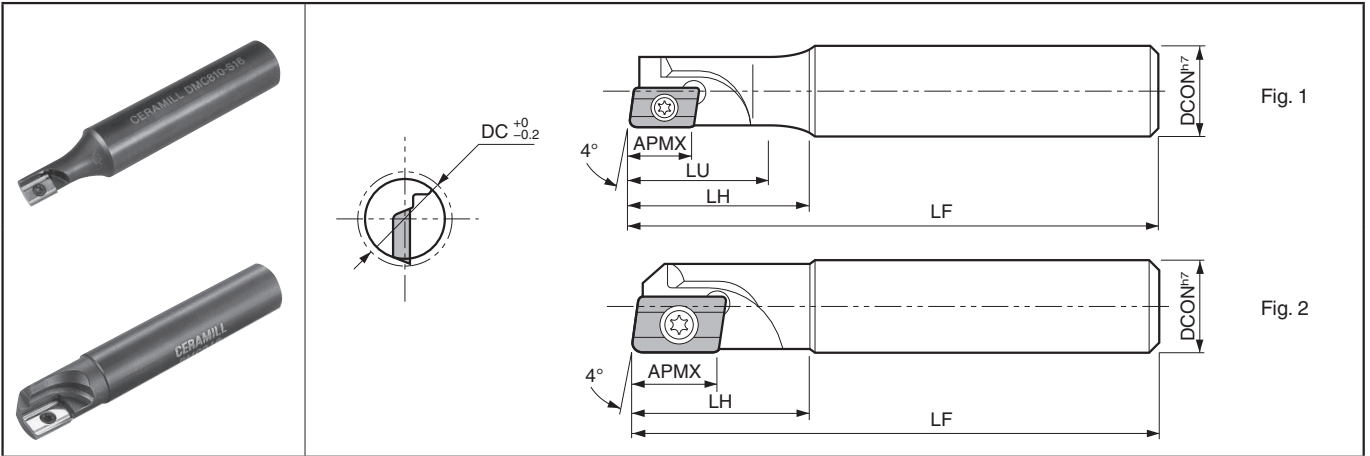
### Recommended Cutting Conditions

Workpiece Material	Feed fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)			
		Cermet		MEGACOAT	
		TN100M	PR1225	PR1210	KW10
Carbon Steel	~0.25	★ 120-200	★ 120-250	-	-
Alloy Steel	~0.25	★ 100-180	★ 100-220	-	-
Mold Steel	~0.20	★ 100-180	★ 80-180	-	-
Stainless Steel	~0.20	☆ 120-200	★ 120-220	-	-
Cast Iron	~0.25	-	-	★ 100-220	☆ 80-150
Non-ferrous Metals	~0.20	-	-	-	★ 100-300

★ : 1st Recommendation ☆ : 2nd Recommendation



## DMC End Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Rake Angle		Drawing	Spare Parts	
			DC	DCON	LF	LH	LU	APMX	A.R.	R.R.		Clamp Screw	Wrench
<b>DMC 810-S16</b>	●	1	10	16	90	27	16	8.5	+3°	-11°	Fig. 1	SB-2545TR	FT-8
<b>811-S16</b>	●		11										
<b>812-S16</b>	●		12										
<b>813-S16</b>	□		13										
<b>814-S16</b>	●		14		100	33.5	25		+6°	-8°			
<b>815-S16</b>	●		15										
<b>816-S16</b>	●		2		16	31	25		+8°	-4°			
<b>820-S20</b>	●		3		20	20	120						
<b>825-S25</b>	□	25		25	46	40	-5°						
<b>DMC 810</b>	●	1	10	10	70	20		-	8.5	+3°	-6°	Fig. 2	SB-2545TR
<b>812</b>	●		12	12	80	25	-	-5°					
<b>DMC 016</b>	□	2	16	16	90	25	-	11.0	+4°	-2°	Fig. 2	SB-3060TR	FT-10
<b>020</b>	●		20	20	110	30	-	+5°	0°				

### Applicable Inserts

Description	Applicable Inserts M20	
<b>DMC800(-S00)</b>	NDCT 090204TR 090204FR	NDMM 090204ER-SP
<b>DMC000</b>	NDCT 120208TR 120208FR	NDMM 120204ER-SP 120208ER-SP

Recommended Cutting Conditions M105

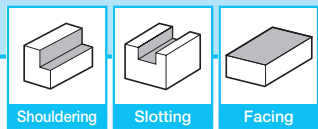
M

Milling

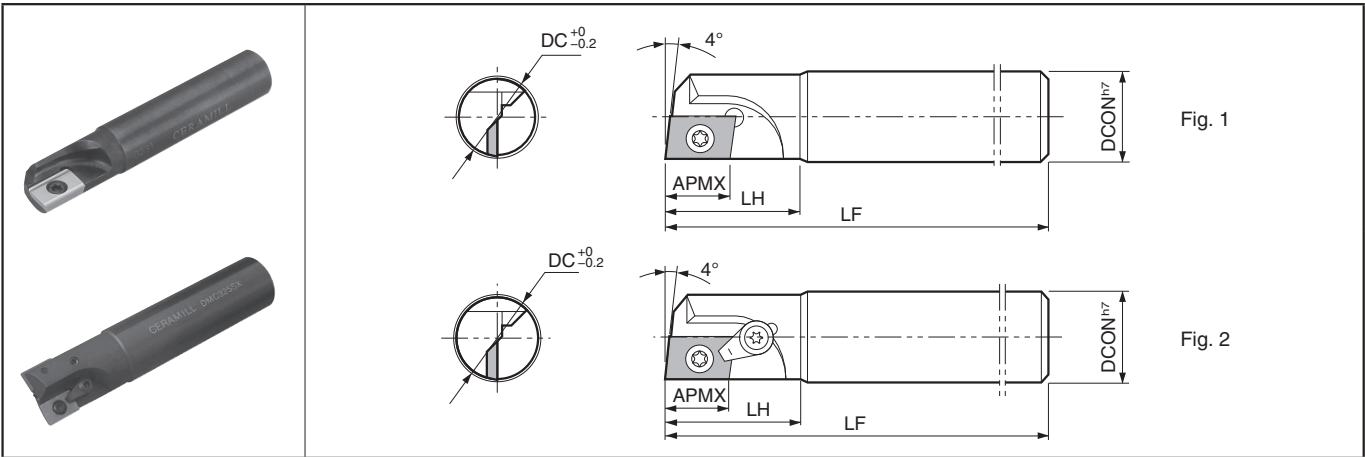
- Insert
- Lead Angle 45°-20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

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





# DMC-SX End Mill



## Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle			Drawing	Spare Parts		
			DC	DCON	LF	LH	APMX	A.R.	R.R.	Clamp Set		Clamp Screw	Wrench	
<b>DMC 316SXT</b>	●	1	16	16	90	30	14.0	+3°	-3°	Fig. 1	-	SB-4060TR	FT-15	
<b>320SX</b>	●		20	20	110									
<b>325SX</b>	●		25	25	120									
<b>332SX</b>	●		32	32	130									
<b>340SX</b>	●		40	32	150									
<b>DMC 320SX-200</b>	●	1	20	20	200	50	14.0	+3°	-3°	Fig. 1	-	SB-4065TR	FT-15	
<b>325SX-220</b>	●	25	25	220	60									
<b>332SX-250</b>	●	32	32	250	80									

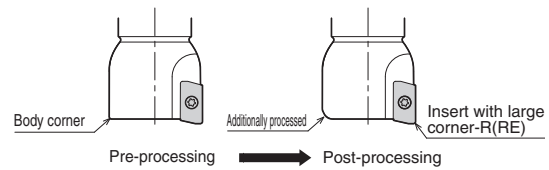
## Applicable Inserts

Description	Applicable Inserts <b>M20</b>		
<b>DMC 316SXT</b>	NDCW 150302TR	NDCT 150308TR 150308FR (NDCT 150308TRX)	NDMM 150304ER-SP 150308ER-SP
<b>320SX</b>	150304TR		
<b>325SX</b>	150308TR		
<b>332SX</b>	150320TR		
<b>340SX</b>	150330TR		
<b>DMC 320SX-200</b>	150340TR		
<b>325SX-220</b>	(NDCW 150308TRX)		
<b>332SX-250</b>	(NDCW 150308FRX)		

■ When using inserts with corner-R(RE) 2.0 or larger, additional modifications of the cutter body will be necessary. Additional modifications for the body will be necessary. Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 0.8mm or less.)

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

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



( ) insert is also attachable, however toolholder will be out from insert bottom. (Ref. to lower section of M106)

## DMC / DMC-SX Recommended Cutting Conditions

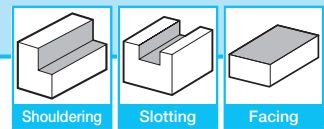
Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)		Max. ap (mm)		
		Cermet	Carbide	Cutting Dia. (DC)	Slotting (ap)	Shouldering (apxae)
		TN100M	KW10			
Carbon Steel	~0.2	★ 120-200		~ø12 ø14-	2 3	6x2 9x3
Alloy Steel	~0.2	★ 100-180		~ø12 ø14-	2 3	6x2 9x3
Mold Steel	~0.15	★ 100-180		~ø12 ø14-	2 3	6x2 9x3
Stainless Steel	~0.15	☆ 120-200		~ø12 ø14-	1.5 2	4x2 6x2
Cast Iron	~0.2		★ 80-150	~ø12 ø14-	2 3	6x2 9x3
Non-ferrous Metals	~0.2		★ 100-300	~ø12 ø14-	2 3	6x2 9x3

· Use DMC800 with ap=6mm MAX. for shouldering.

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item

Insert Grades  
Turning  
Indexable Inserts  
CNC & PC D Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index

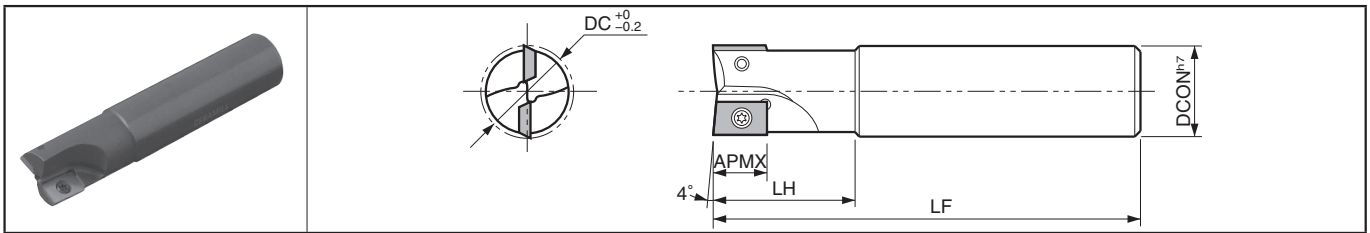


Shouldering

Slotting

Facing

## DMC-H End Mill (High Rake)



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Drawing	Spare Parts		
			DC	DCON	LF	LH	APMX	A.R.	R.R.		Clamp Screw	Wrench	
<b>DMC 316H</b>	●	1	16	16	90	30	14.0	+5°	-3.5°	-			FT-15
<b>320H</b>	●		20	20	110			+6°	-2°				
<b>325H</b>	●		25	25	120			+8°	0°				
<b>332H</b>	●	2	32	32	130	40							
<b>340H</b>	●		40		150								

### Applicable Inserts

Description	Applicable Inserts <b>M20</b>			Applicable Inserts <b>M25</b>
<b>DMC 316H</b> <b>320H</b> <b>325H</b> <b>332H</b> <b>340H</b>	NDMM 150304ER-SP 150308ER-SP	NDCT 150308TRX	NDCW 150308TRX 150308FRX	NDCW 150302FRX-NE 150302FRX (PCD)

### DMC-H Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)				Max. ap (mm)		
		TN100M	KW10	PCD		Cutting Dia. (DC)	Slotting (ap)	Shouldering (apxae)
				KPD230 (KPD001)	KPD010			
Carbon Steel	~0.2	★ 120-200				~ø20 ø25~	4 8	8x4 14x6
Alloy Steel	~0.2	★ 100-180				~ø20 ø25~	4 8	8x4 13x6
Mold Steel	~0.15	★ 100-180				~ø20 ø25~	3 6	5x2 10x3
Stainless Steel	~0.15	☆ 120-200				~ø20 ø25~	3 6	6x2 13x3
Cast Iron	~0.2		★ 80-150			~ø20 ø25~	4 6	8x4 14x6
Non-ferrous Metals	~0.2		★ 100-300	★ 300-500	☆ 300-500	~ø20 ø25~	4 6	8x4 14x6

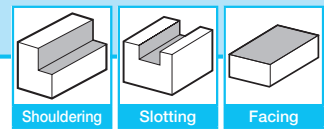
★ : 1st Recommendation ☆ : 2nd Recommendation

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

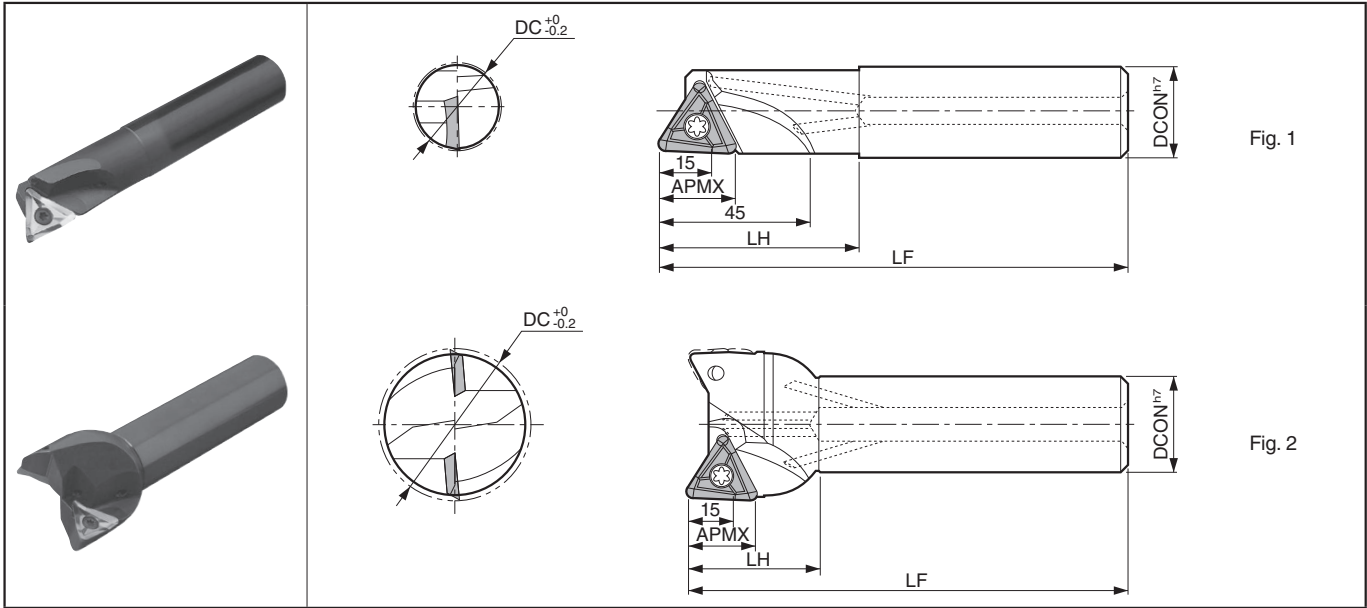
Insert Description			Insert Description		
NDCT...TRX NDCW...(T/F)RX		NDCW...TR NDCT...(T/F)R	NDCT...TRX NDCW...(T/F)RX		NDCW...TR NDCT...(T/F)R
Toolholder Description			Toolholder Description		
<b>DMC-H</b>	No interference of relief surface	Less relief (ap must be under 5mm.)	<b>DMC-SX</b>	No interference of relief surface	No interference of relief surface
Toolholder			Toolholder		
A	A direction	A direction	B	B direction	B direction

● : Std. Item

# End Mill for Aluminum Machining MEAL



## MEAL (Aluminum Machining, with coolant hole)



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Drawing	Spare Parts		
			DC	DCON	LF	LH	APMX	A.R.	R.R.		Clamp Screw	Wrench	
<b>MEAL 25-S25</b>	<input type="checkbox"/>	1	25	25	140	60	20	+12°	-7°	Fig.1			
<b>50-S32</b>	<input checked="" type="checkbox"/>	2	50	32	150	45		-3.5°	-3.5°	Fig.2			

### Applicable Inserts

Description	Applicable Inserts
<b>MEAL 25-S25</b> <b>50-S32</b>	TEMT 250624-AQ

### Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
		Carbide
Non-ferrous Metals	0.1~0.3	<b>KW10</b> ★ 300~500

- ap is recommended to be under 15mm.

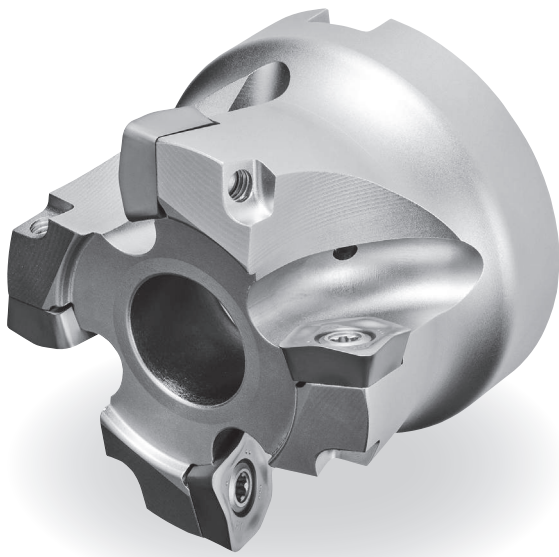
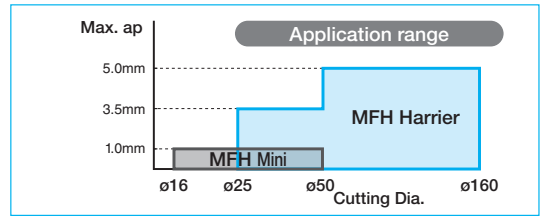
★ : 1st Recommendation

Insert Grades  
A  
Turning  
B  
Indexable Inserts  
C  
CNC & PCO Tools  
D  
External  
E  
Small Parts  
F  
Machining  
Boring  
F  
Grooving  
G  
Cut-off  
H  
Threading  
J  
Drilling  
K  
Solid Tools  
L  
Milling  
M  
Tools for  
N  
Turning Mill  
P  
Spare Parts  
R  
Technical  
Information  
T  
Index

# MFH Harrier

Anti chattering !

Applicable to various applications with 3 types of inserts  
Increased chip evacuation and shortened cutting time



## POINT.1 Various applications with 3 types of inserts

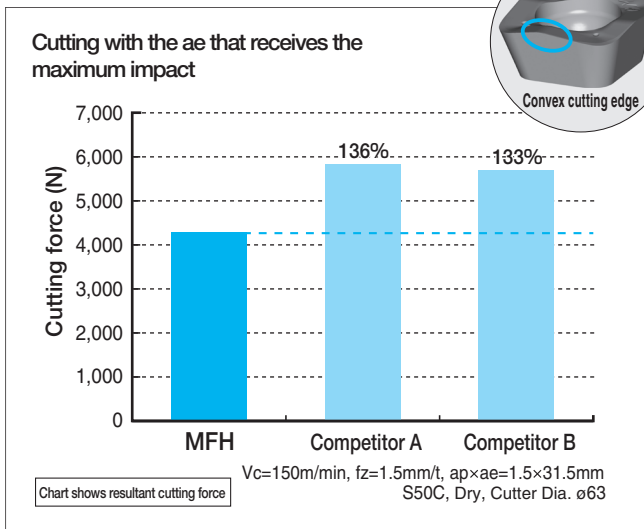
	GM type (General purpose)	LD type (Large ap)	FL type (With Wiper Edge)
Shape			
Applications	<b>1st recommendation for general purpose</b> → Facing, Pocketing, Helical milling	<b>Max. ap=5mm</b> → Applicable for scale removal at high efficiency	<b>Wide wiper edge</b> → Applicable for both roughing and finishing, for small machining center

3 types of inserts according to your application  
Applicable to a wide range of application

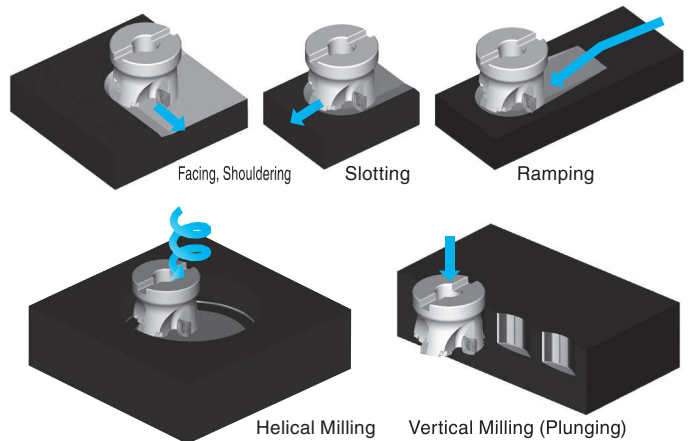
•For inclination angle at contouring, refer to the table above M116

## POINT.2 3D convex cutting edge reduces shock of biting workpiece

•Cutting Force (Shock) Comparison when Biting Workpiece  
(Internal evaluation)



## POINT.3 Multi-functional cutter for ramping, helical milling, etc.

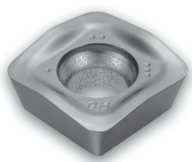


\* GM type is applicable for all the above applications  
\* LD type and FL type are not applicable for Helical Milling, Plunging and Contouring of rising wall (Please refer to M116)

**POINT.4**

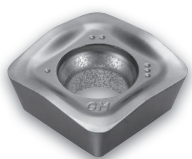
# Applicable for Variety of Workpieces from Steel to Heat-resistant Alloys

New grade for difficult-to-cut material which controls sudden fracture and realizes stable machining



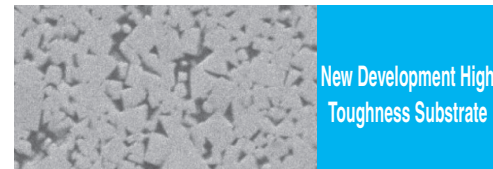
CA6535

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

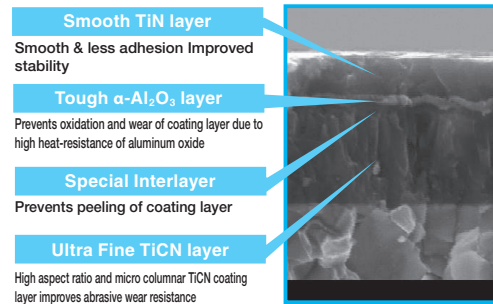


PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel  
Stable and longer tool life by special nano coating layer MEGACOAT NANO  
New Development High Toughness Substrate

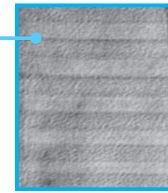


New Development High Toughness Substrate



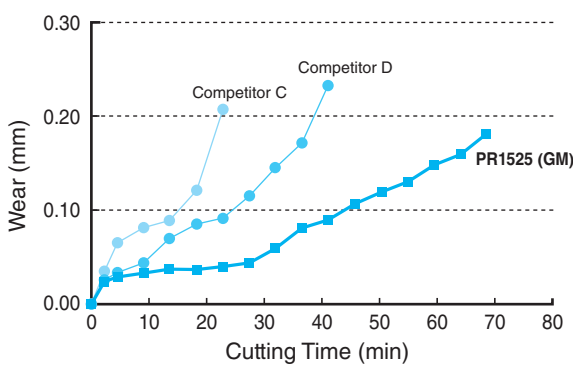
- Smooth TiN layer**  
Smooth & less adhesion Improved stability
- Tough  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> layer**  
Prevents oxidation and wear of coating layer due to high heat-resistance of aluminum oxide
- Special Interlayer**  
Prevents peeling of coating layer
- Ultra Fine TiCN layer**  
High aspect ratio and micro columnar TiCN coating layer improves abrasive wear resistance

MEGACOAT base multi-layer structure



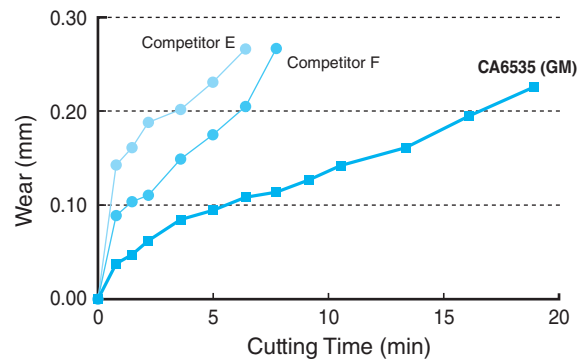
## Wear Resistance Comparison (Internal evaluation)

### SKD11



<Cutting Conditions>Vc=150m/min, fz=1.5mm/t, apxae=1.0x16mm, Dry

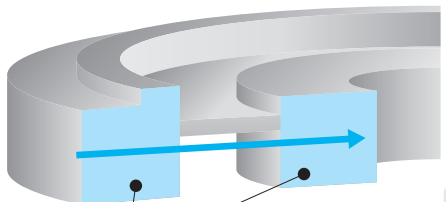
### Ni-base heat-resistant alloys



<Cutting Conditions>Vc=30m/min, fz=0.8mm/t, apxae=1.0x40mm, Wet

## Case Studies

### SFVAF22B (Forged alloy steel)



Machined portion

Machining efficiency  
3 times increase

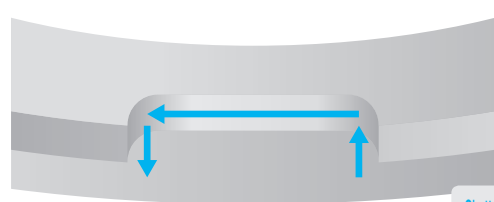
- Turbine parts · Vc=160m/min · fz=1.17mm/t
- apxae=1.5xmax.160mm · Dry
- MFH160R-14-8T (8 inserts) · SOMT140520ER-GM (PR1525)

<b>PR1525</b>	Chip Evacuation Rate = 720cc/min
<b>Competitor G</b>	Chip Evacuation Rate = 240cc/min

- Small machining noise even at 3 times higher feed rate
- Good edge condition without chipping and stable machining

(User Evaluation)

### SUS304F



Chattering reduced  
Machining efficiency 1.6 times

- Clutch · Vc=120m/min · fz=1.2mm/t
- apxae=1.0x20mm · Dry
- MFH32-S32-10-2T (2 inserts) · SOMT100420ER-GM (PR1535)

<b>PR1535</b>	Chip Evacuation Rate = 58cc/min
<b>Competitor H</b>	Chip Evacuation Rate = 36cc/min

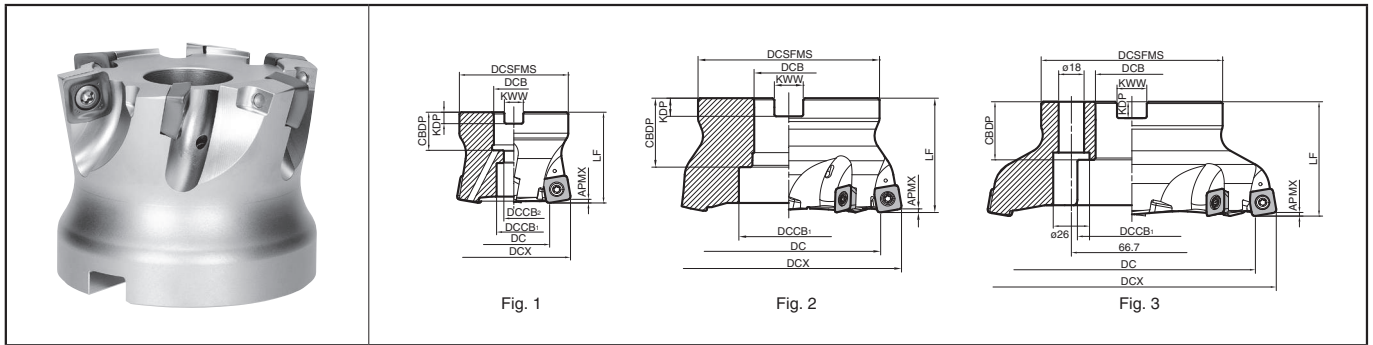
- Competitor H caused chattering but MFH realized stable machining
- Good edge condition and long tool life

(User Evaluation)

- Insert Grades
- Turnable Inserts
- External
- Small Parts
- Boring
- Grooving
- Cut-off
- Threading
- Drilling
- Solid Tools
- Milling
- Tools for Mill
- Spare Parts
- Technical Information
- Index

# MFH High Feed Cutter

## MFH Harrier Face Mill



### Toolholder Dimensions (SOMT10 type)

Bore Dia.	Description	Stock	No. of Inserts	Dimension (mm)														Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )		
				DCX	DC			DCS <sub>FMS</sub>	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW	APMX	APMX <sub>2</sub> *1	A.R.							
GM	LD	FL																							
Metric	MFH 050R-10-4T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 (3.5)	1.2	+10°	Yes	Fig. 1	0.4	10,000			
	050R-10-5T-M	●	5																						
	063R-10-5T-22M	●	5																						
	063R-10-6T-22M	●	6	63	46	50.5	49.5	60	27	20	13	63	24	7	12.4	1.5 (3.5)	1.2				+10°	Yes	Fig. 1	0.7	8,800
	063R-10-5T-27M	●	5																						
	063R-10-6T-27M	●	6																						
080R-10-7T-M	●	7	80	63	67.5	66.5	76	31.75	26	17	63	32	8	12.7	1.5 (3.5)	1.2	+10°	Yes	Fig. 1	1.6				7,600	
MFH 050R-10-4T	●	4																							
050R-10-5T	●	5																							
Inch spec	063R-10-5T	●	5	63	46	50.5	49.5	60	22.225	19	11	50	19	5	8.4	1.5 (3.5)				1.2	+10°	Yes	Fig. 1	0.4	10,000
	063R-10-6T	●	6																						
	080R-10-7T	●	7																						
	080R-10-7T	●	7																						

\*1 For APMX<sub>2</sub>, refer to the figure in the next page  
\*2 Dimension in ( ) is when attaching LD type

### Toolholder Dimensions (SOMT14 type)

Bore Dia.	Description	Stock	No. of Inserts	Dimension (mm)														Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )					
				DCX	DC			DCS <sub>FMS</sub>	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW	APMX	APMX <sub>2</sub> *1	A.R.										
GM	LD	FL																										
Metric	MFH 050R-14-4T-M	●	4	50	27	33	32	47	22	19	11	50	21	6.3	10.4	2	2	+10°	Yes	Fig. 1	0.4	8,800						
	063R-14-4T-22M	●	4																									
	063R-14-5T-22M	●	5																									
	063R-14-4T-27M	●	4	63	40	46	45	60	27	20	13	63	24	7	12.4	2	2				+10°	Yes	Fig. 1	0.6	7,400			
	063R-14-5T-27M	●	5																									
	080R-14-5T-M	●	5																									
	080R-14-6T-M	●	6	80	57	63	62	76	32	26	17	63	28	8	14.4	2	2							+10°	Yes	Fig. 2	1.4	6,400
	100R-14-6T-M	●	6																									
	100R-14-7T-M	●	7																									
100R-14-7T-M	●	7	100	77	83	82	96	38	26	17	63	33	9	16.4	2	2	+10°	Yes	Fig. 2	2.4							5,600	
125R-14-7T-M	●	7																										
160R-14-8T-M	●	8																										
Inch spec	MFH 050R-14-4T	●	4	50	27	33	32	47	22.225	19	11	50	19	5	8.4	2				2	+10°	Yes	Fig. 1				0.4	8,800
	063R-14-4T	●	4																									
	063R-14-5T	●	5																									
	080R-14-5T	●	5	80	57	63	62	76	31.75	26	17	63	32	8	12.7	2				2				+10°	Yes	Fig. 1	0.6	7,400
	080R-14-6T	●	6																									
	100R-14-6T	●	6																									
	100R-14-7T	●	7	100	77	83	82	96	38	26	17	63	10	15.9	2	2	+10°	Yes	Fig. 1	1.3							6,400	
	125R-14-7T	●	7																									
160R-14-8T	●	8																										
Inch spec	125R-14-7T	●	7	125	102	108	107	100	38.1	55	-	38	10	15.9	2	2				+10°	Yes	Fig. 1	2.4				5,600	
	160R-14-8T	●	8																									
	160R-14-8T	●	8																									
Inch spec	160R-14-8T	●	8	160	137	143	142	100	50.8	72	-	38	11	19.1	2	2							+10°	No	Fig. 2	2.9	4,800	
	160R-14-8T	●	8																									

\*1 For APMX<sub>2</sub>, refer to the figure in the next page  
\*2 Dimension in ( ) is when attaching LD type

M

Milling

Insert

Lead Angle 45°~20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

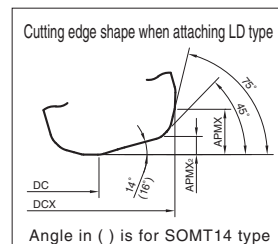
Others

● : Std. Item



● Spare Parts (Face Mill)

Description	Spare Parts					Applicable Inserts
	Clamp Screw	Wrench		Anti-seize Compound	Mounting bolt	
<b>MFH</b> 050R-10-...-M 050R-10-... 063R-10-... 063R-10-...-22M 063R-10-...-27M 080R-10-...-M 080R-10-...	SB-4090TRPN	DTPM-15	TTP	P-37	HH10X30 HH12X35 HH16X40 HH12X35	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
Recommended tightening torque for Insert Clamp 3.5N·m						
<b>MFH</b> 050R-14-...-M 050R-14-... 063R-14-... 063R-14-...-22M 063R-14-...-27M 080R-14-...-M 080R-14-... 100R-14-...-M 100R-14-... 125R-14-... 160R-14-...	SB-50120TRP	TTP-20		P-37	W10X31 HH10X30 HH12X35 HH16X40 HH12X35 HH16X40 — — —	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL
Recommended tightening torque for Insert Clamp 4.5N·m						



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

● Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ M115

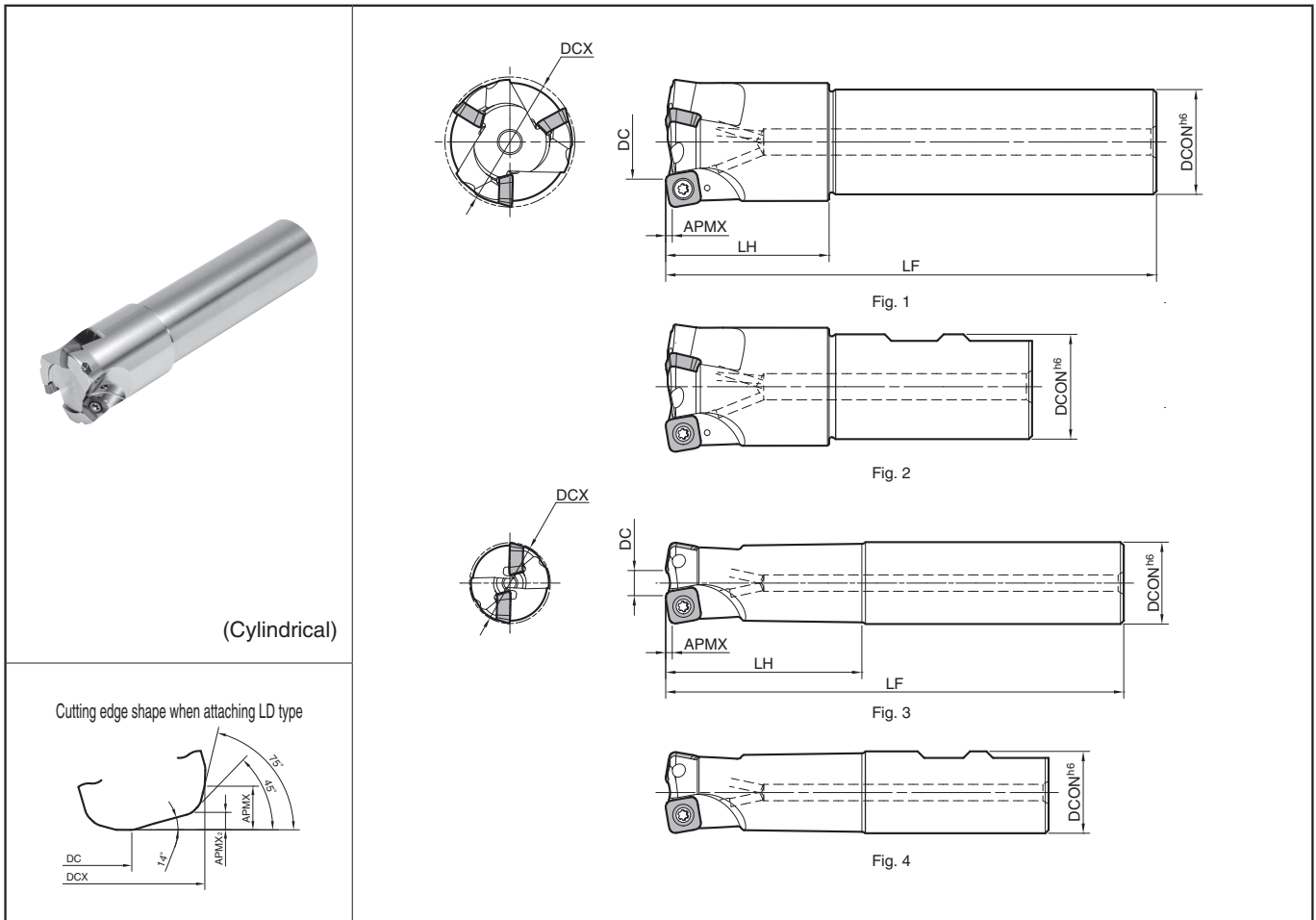
● Applicable Inserts ➔ M17

Insert	Description	Dimension (mm)					Angle	CVD Coated Carbide	MEGACOAT NANO			
		IC	S	D1	BS	RE			AN	CA6535	PR1535	PR1525
 General purpose	SOMT 100420ER-GM	10.30	4.58	4.6	-	2.0	16°	●	●	●	●	
	140520ER-GM	14.14	5.56	5.8	-	2.0	16°	●	●	●	●	
 Large ap	SOMT 100420ER-LD	10.45	4.58	4.6	0.9	2.0	16°	●	●	●	●	
	140520ER-LD	14.76	5.56	5.8	1.6	2.0	16°	●	●	●	●	
 With Wiper Edge	SOMT 100420ER-FL	10.44	4.58	4.6	1.4	2.0	16°	●	●	●	●	
	140514ER-FL	14.57	5.56	5.8	3.1	1.4	16°	●	●	●	●	

Insert Grades  
 Turnable Inserts  
 Indexable Inserts  
 CN & PCD Tools  
 External  
 Small Parts  
 Machining  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Tools for Turning Mill  
 Spare Parts  
 Technical Information  
 Index

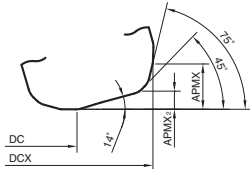
# MFH High Feed Cutter

## MFH Harrier End Mill (SOMT10 type)



(Cylindrical)

Cutting edge shape when attaching LD type



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )
			DCX	DC			DCON	LF	LH	APMX	APMX <sub>2</sub>	A.R.						
Cylindrical	MFH 25-S25-10-2T	●	2	25	8	12.5	11.5	25	140	60	1.5 *(3.5)	1.2	+10°	Yes	Fig. 3	0.4	17,000	
	28-S25-10-2T	●	2	28	11	15.5	14.5			40					Fig. 1	0.5	15,500	
	32-S32-10-2T	●	2	32	15	19.5	18.5	32	150	70					Fig. 3	0.8	14,000	
	32-S32-10-3T	●	3	32	15	19.5	18.5			50					Fig. 1			
	35-S32-10-2T	●	2	35	18	22.5	21.5	32	150	50						Fig. 1	0.9	11,500
	35-S32-10-3T	●	3	35	18	22.5	21.5			50								
	40-S32-10-3T	●	3	40	23	27.5	26.5	32	117	60					Fig. 4	0.4	17,000	
	40-S32-10-4T	●	4	40	23	27.5	26.5			70								Fig. 2
Weldon	MFH 25-W25-10-2T	●	2	25	8	12.5	11.5	25	117	60	1.5 *(3.5)	1.2	+10°	Yes	Fig. 4	0.4	17,000	
	32-W32-10-3T	●	3	32	15	19.5	18.5	32	131	70								
	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								
Long Shank	MFH 25-S25-10-2T-200	●	2	25	8	12.5	11.5	25	200	120	1.5 *(3.5)	1.2	+10°	Yes	Fig. 3	0.6	17,000	
	28-S25-10-2T-200	●	2	28	11	15.5	14.5			40					Fig. 1	0.7	15,500	
	32-S32-10-2T-200	●	2	32	15	19.5	18.5	32	120	120					Fig. 3	1.0	14,000	
	35-S32-10-2T-200	●	2	35	18	22.5	21.5			50					Fig. 1	1.4	13,000	
	40-S32-10-4T-250	●	4	40	23	27.5	26.5	250	50	1.5								11,500
Extra Long Shank	MFH 25-S25-10-2T-300	●	2	25	8	12.5	11.5	25	300	180	1.5 *(3.5)	1.2	+10°	Yes	Fig. 3	1.0	17,000	
	28-S25-10-2T-300	●	2	28	11	15.5	14.5			40					Fig. 1	1.1	15,500	
	32-S32-10-2T-300	●	2	32	15	19.5	18.5	32	180	180					Fig. 3	1.6	14,000	
	35-S32-10-2T-300	●	2	35	18	22.5	21.5			50					Fig. 1	1.7	13,000	
	40-S32-10-4T-300	●	4	40	23	27.5	26.5	32	50	1.8								11,500

\* Dimension in ( ) is when attaching LD type

● : Std. Item

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

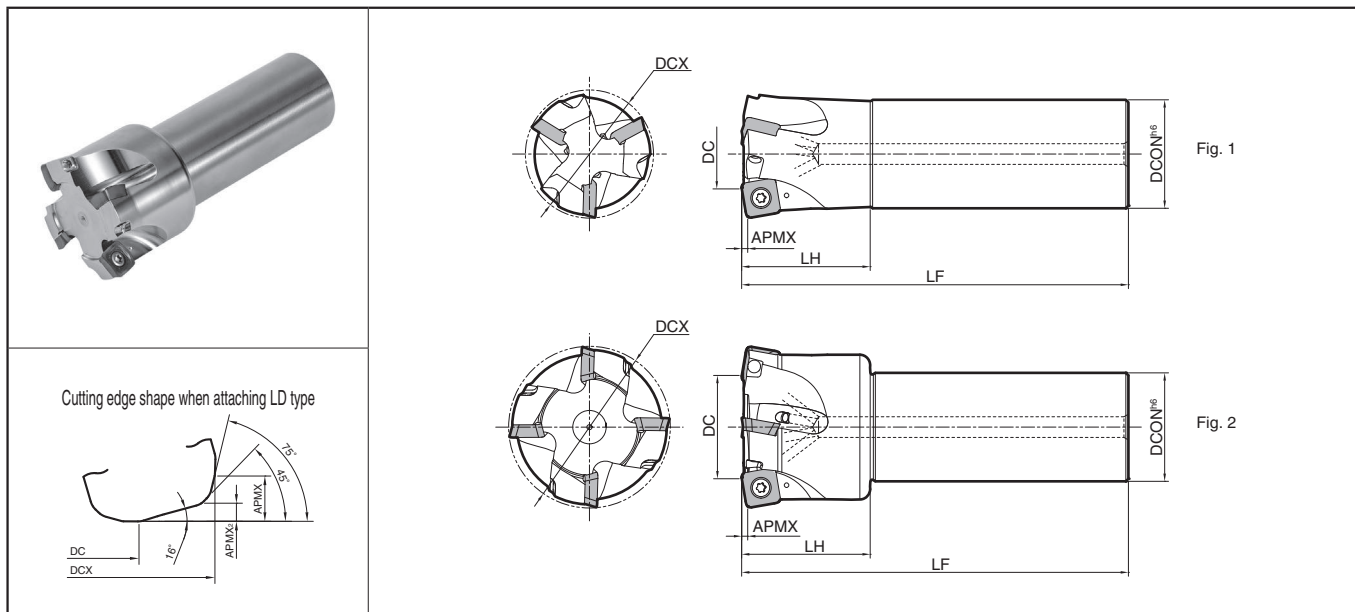
Slot Mill

Ball-nose  
Radius

Others

Insert Grades  
A  
Turning  
B  
Indexable Inserts  
C  
CNC & PCO Tools  
D  
External  
E  
Small Parts  
Machining  
F  
Boring  
G  
Grooving  
H  
Cut-off  
J  
Threading  
K  
Drilling  
L  
Solid Tools  
M  
Milling  
N  
Tools for  
Turning Mill  
P  
Spare Parts  
R  
Technical  
Information  
T  
Index

## MFH Harrier End Mill (SOMT14 type)



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )
			DCX	DC			DCON	LF	LH	APMX	APMX <sub>2</sub>	A.R.				
<b>MFH 50-S42-14-3T</b>	●	3		50	27	33							32	42	150	50
<b>63-S42-14-4T</b>	●	4	63	40	46	45	Fig. 2	1.7	7,400							
<b>80-S42-14-5T</b>	●	5	80	57	63	62	2.3	6,400								

\* Dimension in ( ) is when attaching LD type

### Spare Parts and Applicable Inserts

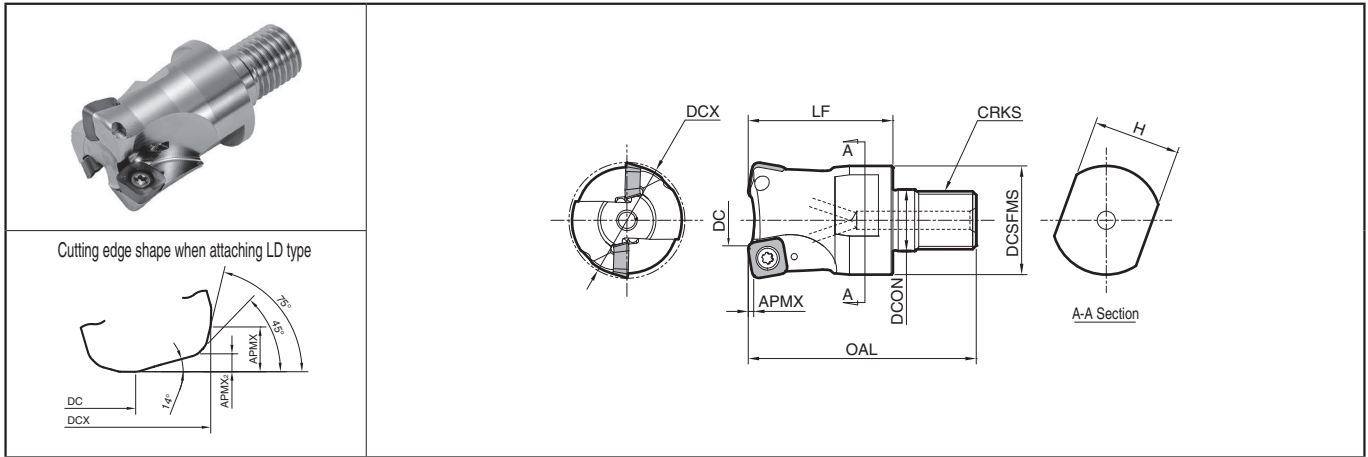
Description	Spare Parts			Applicable Inserts ● M17 , M111
	Clamp Screw	Wrench	Anti-seize Compound	
<b>MFH ...-10-...</b>	SB-4075TRP <small>Recommended tightening torque for Insert Clamp 3.5N·m</small>	DTPM-15 TTP	P-37	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
<b>MFH ...-14-...</b>	SB-50120TRP <small>Recommended tightening torque for Insert Clamp 4.5N·m</small>	TTP-20	P-37	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL

- **Max. Revolution**  
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ● M115

# MFH Modular type

## MFH Harrier Head



### Toolholder Dimensions

Description	Stock	No. of inserts	Dimension (mm)											Rake Angle		Coolant Hole	Max. Revolution (min <sup>-1</sup> )
			DCX	DC			DCSFMS	DCON	OAL	LF	CRKS	H	APMX	APMX <sub>2</sub>	A.R.		
<b>MFH 25-M12-10-2T</b>	●	2	25	8	12.5	11.5	23	12.5	57	35	M12xP1.75	19	1.5 *(3.5)	1.2	+10°	Yes	17,000
<b>28-M12-10-2T</b>	●	2	28	11	15.5	14.5											15,500
<b>32-M16-10-2T</b>	●	2	32	15	19.5	18.5	30	17	63	40	M16xP2.0	24	1.5 *(3.5)	1.2	+10°	Yes	14,000
<b>32-M16-10-3T</b>	●	3															13,000
<b>35-M16-10-2T</b>	●	2	35	18	22.5	21.5	30	17	63	40	M16xP2.0	24	1.5 *(3.5)	1.2	+10°	Yes	13,000
<b>35-M16-10-3T</b>	●	3															11,500
<b>40-M16-10-3T</b>	●	3	40	23	27.5	26.5	30	17	63	40	M16xP2.0	24	1.5 *(3.5)	1.2	+10°	Yes	11,500
<b>40-M16-10-4T</b>	●	4															11,500

See page [M52](#) for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle) \* Dimension in ( ) is when attaching LD type

### Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts ● <a href="#">M17</a> , <a href="#">M111</a>
	Clamp Screw	Wrench	Anti-seize Compound	
<b>MFH ...-10-...</b>	SB-4075TRP <small>Recommended tightening torque for Insert Clamp 3.5N·m</small>	DTPM-15	P-37	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL

#### ● Max. Revolution

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

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

Recommended Cutting Conditions [M115](#)

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others

● : Std. Item

◆ Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz : mm/t)					Recommended Insert Grades (Cutting Speed Vc: m/min)			
		MFH25-...	MFH32-...	MFH40-...	MFH...R-10-...	MFH...R-14-...	MEGACOAT NANO			CVD Coated Carbide CA6535
							PR1535	PR1525	PR1510	
GM	Carbon Steel	0.5-0.8-1.0 (ap ≤ 1.0mm) 0.2-0.4-0.5 (ap ≤ 1.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.3-0.7-1.0 (ap ≤ 1.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.4-1.0-1.5 (ap ≤ 1.5mm)	0.5-1.5-2.0		☆ 120-180-250	★ 120-180-250	-	-
	Alloy Steel	0.5-0.8-1.0 (ap ≤ 1.0mm) 0.2-0.4-0.5 (ap ≤ 1.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.3-0.7-1.0 (ap ≤ 1.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.4-1.0-1.5 (ap ≤ 1.5mm)	0.5-1.5-2.0		☆ 100-160-220	★ 100-160-220	-	-
	Mold Steel (~ 40HRC)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		☆ 80-140-180	★ 80-140-180	-	-
	Mold Steel (40 ~ 50HRC)	0.15-0.3-0.5 (ap ≤ 1.0mm) 0.15-0.2-0.25 (ap ≤ 1.5mm)	0.2-0.5-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.45 (ap ≤ 1.5mm)	0.2-0.6-0.9 (ap ≤ 1.0mm) 0.2-0.5-0.7 (ap ≤ 1.5mm)	0.2-0.7-1.0		☆ 60-100-130	★ 60-100-130	-	-
	Stainless Steel (Austenitic related)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		☆ 100-160-200	☆ 100-160-200	-	-
	Stainless Steel (Martensitic related)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		☆ 150-200-250	-	-	★ 180-240-300
	Stainless Steel (Precipitation Hardening)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		★ 90-120-150	-	-	-
	Gray Cast Iron	0.5-0.8-1.0 (ap ≤ 1.0mm) 0.2-0.4-0.5 (ap ≤ 1.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.3-0.7-1.0 (ap ≤ 1.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.4-1.0-1.5 (ap ≤ 1.5mm)	0.5-1.5-2.0		-	-	★ 120-180-250	-
	Nodular Cast Iron	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		-	-	★ 100-150-200	-
	Ni-base heat-resistant alloys	0.2-0.4-0.6 (ap ≤ 1.0mm) 0.15-0.2-0.3 (ap ≤ 1.5mm)	0.2-0.5-0.9 (ap ≤ 1.0mm) 0.2-0.4-0.6 (ap ≤ 1.5mm)	0.2-0.6-1.0 (ap ≤ 1.0mm) 0.2-0.5-0.8 (ap ≤ 1.5mm)	0.2-0.8-1.2		☆ 20-30-50	-	-	★ 20-30-50
	Titanium Alloys	0.2-0.4-0.6 (ap ≤ 1.0mm) 0.15-0.2-0.3 (ap ≤ 1.5mm)	0.2-0.5-0.9 (ap ≤ 1.0mm) 0.2-0.4-0.6 (ap ≤ 1.5mm)	0.2-0.6-1.0 (ap ≤ 1.0mm) 0.2-0.5-0.8 (ap ≤ 1.5mm)	0.2-0.8-1.2		★ 40-60-80	-	☆ 30-50-70	-
	LD	Carbon Steel	0.5-0.8-1.0 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.06-0.15-0.3 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.2-0.3 (ap ≤ 3.5mm)	0.5-1.5-2.0 (ap ≤ 1.0mm) 0.06-0.2-0.3 (ap ≤ 3.5mm)	0.5-1.5-2.0 (ap ≤ 2.0mm) 0.06-0.2-0.4 (ap ≤ 5.0mm)	☆ 120-180-250	★ 120-180-250	-
Alloy Steel		0.5-0.8-1.0 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.06-0.15-0.3 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.2-0.3 (ap ≤ 3.5mm)	0.5-1.5-2.0 (ap ≤ 1.0mm) 0.06-0.2-0.3 (ap ≤ 3.5mm)	0.5-1.5-2.0 (ap ≤ 2.0mm) 0.06-0.2-0.4 (ap ≤ 5.0mm)	☆ 100-160-220	★ 100-160-220	-	-
Mold Steel (~ 40HRC)		0.5-0.7-0.8 (ap ≤ 1.0mm) 0.06-0.08-0.15 (ap ≤ 3.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 2.0mm) 0.06-0.15-0.3 (ap ≤ 5.0mm)	☆ 80-140-180	★ 80-140-180	-	-
Mold Steel (40 ~ 50HRC)		0.2-0.3-0.5 (ap ≤ 1.0mm) 0.03-0.05-0.1 (ap ≤ 3.5mm)	0.2-0.5-0.8 (ap ≤ 1.0mm) 0.03-0.08-0.15 (ap ≤ 3.5mm)	0.2-0.6-0.9 (ap ≤ 1.0mm) 0.03-0.1-0.15 (ap ≤ 3.5mm)	0.2-0.7-1.0 (ap ≤ 1.0mm) 0.03-0.1-0.15 (ap ≤ 3.5mm)	0.2-0.7-1.0 (ap ≤ 2.0mm) 0.03-0.1-0.2 (ap ≤ 5.0mm)	☆ 60-100-130	★ 60-100-130	-	-
Stainless Steel (Austenitic related)		0.5-0.7-0.8 (ap ≤ 1.0mm) 0.06-0.08-0.15 (ap ≤ 3.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 2.0mm) 0.06-0.15-0.3 (ap ≤ 5.0mm)	★ 100-160-200	☆ 100-160-200	-	-
Stainless Steel (Martensitic related)		0.5-0.7-0.8 (ap ≤ 1.0mm) 0.06-0.08-0.15 (ap ≤ 3.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 2.0mm) 0.06-0.15-0.3 (ap ≤ 5.0mm)	☆ 150-200-250	-	-	★ 180-240-300
Stainless Steel (Precipitation Hardening)		0.5-0.7-0.8 (ap ≤ 1.0mm) 0.06-0.08-0.15 (ap ≤ 3.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 2.0mm) 0.06-0.15-0.3 (ap ≤ 5.0mm)	★ 90-120-150	-	-	-
Gray Cast Iron		0.5-0.8-1.0 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.06-0.15-0.3 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.2-0.3 (ap ≤ 3.5mm)	0.5-1.5-2.0 (ap ≤ 1.0mm) 0.06-0.2-0.3 (ap ≤ 3.5mm)	0.5-1.5-2.0 (ap ≤ 2.0mm) 0.06-0.2-0.4 (ap ≤ 5.0mm)	-	-	★ 120-180-250	-
Nodular Cast Iron		0.5-0.7-0.8 (ap ≤ 1.0mm) 0.06-0.08-0.15 (ap ≤ 3.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.06-0.1-0.2 (ap ≤ 3.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.06-0.15-0.2 (ap ≤ 3.5mm)	0.5-1.2-1.8 (ap ≤ 2.0mm) 0.06-0.15-0.3 (ap ≤ 5.0mm)	-	-	★ 100-150-200	-
Ni-base heat-resistant alloys		0.2-0.4-0.6 (ap ≤ 1.0mm) 0.03-0.05-0.1 (ap ≤ 3.5mm)	0.2-0.5-0.9 (ap ≤ 1.0mm) 0.03-0.08-0.15 (ap ≤ 3.5mm)	0.2-0.6-1.0 (ap ≤ 1.0mm) 0.03-0.1-0.15 (ap ≤ 3.5mm)	0.2-0.8-1.2 (ap ≤ 1.0mm) 0.03-0.1-0.15 (ap ≤ 3.5mm)	0.2-0.8-1.2 (ap ≤ 2.0mm) 0.03-0.1-0.2 (ap ≤ 5.0mm)	☆ 20-30-50	-	-	★ 20-30-50
Titanium Alloys		0.2-0.4-0.6 (ap ≤ 1.0mm) 0.03-0.05-0.1 (ap ≤ 3.5mm)	0.2-0.5-0.9 (ap ≤ 1.0mm) 0.03-0.08-0.15 (ap ≤ 3.5mm)	0.2-0.6-1.0 (ap ≤ 1.0mm) 0.03-0.1-0.15 (ap ≤ 3.5mm)	0.2-0.8-1.2 (ap ≤ 1.0mm) 0.03-0.1-0.15 (ap ≤ 3.5mm)	0.2-0.8-1.2 (ap ≤ 2.0mm) 0.03-0.1-0.2 (ap ≤ 5.0mm)	★ 40-60-80	-	☆ 30-50-70	-
FL		Carbon Steel	0.5-0.8-1.0 (ap ≤ 1.0mm) 0.2-0.4-0.5 (ap ≤ 1.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.3-0.7-1.0 (ap ≤ 1.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.4-1.0-1.5 (ap ≤ 1.5mm)	0.5-1.5-2.0		☆ 120-180-250	★ 120-180-250	-
	Alloy Steel	0.5-0.8-1.0 (ap ≤ 1.0mm) 0.2-0.4-0.5 (ap ≤ 1.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.3-0.7-1.0 (ap ≤ 1.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.4-1.0-1.5 (ap ≤ 1.5mm)	0.5-1.5-2.0		☆ 100-160-220	★ 100-160-220	-	-
	Mold Steel (~ 40HRC)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		☆ 80-140-180	★ 80-140-180	-	-
	Mold Steel (40 ~ 50HRC)	0.15-0.3-0.5 (ap ≤ 1.0mm) 0.15-0.2-0.25 (ap ≤ 1.5mm)	0.2-0.5-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.45 (ap ≤ 1.5mm)	0.2-0.6-0.9 (ap ≤ 1.0mm) 0.2-0.5-0.7 (ap ≤ 1.5mm)	0.2-0.7-1.0		☆ 60-100-130	★ 60-100-130	-	-
	Stainless Steel (Austenitic related)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		★ 100-160-200	☆ 100-160-200	-	-
	Stainless Steel (Martensitic related)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		☆ 150-200-250	-	-	★ 180-240-300
	Stainless Steel (Precipitation Hardening)	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		★ 90-120-150	-	-	-
	Gray Cast Iron	0.5-0.8-1.0 (ap ≤ 1.0mm) 0.2-0.4-0.5 (ap ≤ 1.5mm)	0.5-1.0-1.5 (ap ≤ 1.0mm) 0.3-0.7-1.0 (ap ≤ 1.5mm)	0.5-1.2-1.8 (ap ≤ 1.0mm) 0.4-1.0-1.5 (ap ≤ 1.5mm)	0.5-1.5-2.0		-	-	★ 120-180-250	-
	Nodular Cast Iron	0.5-0.7-0.8 (ap ≤ 1.0mm) 0.2-0.3-0.4 (ap ≤ 1.5mm)	0.5-0.8-1.2 (ap ≤ 1.0mm) 0.3-0.6-0.8 (ap ≤ 1.5mm)	0.5-1.0-1.6 (ap ≤ 1.0mm) 0.4-0.8-1.2 (ap ≤ 1.5mm)	0.5-1.2-1.8		-	-	★ 100-150-200	-
	Ni-base heat-resistant alloys	0.2-0.4-0.6 (ap ≤ 1.0mm) 0.15-0.2-0.3 (ap ≤ 1.5mm)	0.2-0.5-0.9 (ap ≤ 1.0mm) 0.2-0.4-0.6 (ap ≤ 1.5mm)	0.2-0.6-1.0 (ap ≤ 1.0mm) 0.2-0.5-0.8 (ap ≤ 1.5mm)	0.2-0.8-1.2		☆ 20-30-50	-	-	★ 20-30-50
	Titanium Alloys	0.2-0.4-0.6 (ap ≤ 1.0mm) 0.15-0.2-0.3 (ap ≤ 1.5mm)	0.2-0.5-0.9 (ap ≤ 1.0mm) 0.2-0.4-0.6 (ap ≤ 1.5mm)	0.2-0.6-1.0 (ap ≤ 1.0mm) 0.2-0.5-0.8 (ap ≤ 1.5mm)	0.2-0.8-1.2		★ 40-60-80	-	☆ 30-50-70	-

\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ☆ : 1st Recommendation ☆ : 2nd Recommendation  
 \* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.  
 \* When finishing with LD type and FL type inserts, recommended feed rate for SOMT14 LD type : f=1.5(mm/rev) or less / for SOMT10 LD type : f=0.9(mm/rev) or less for SOMT14 FL type : f=3.0(mm/rev) or less / for SOMT10 FL type : f=1.4(mm/rev) or less  
 \* For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.  
 \* For slotting, internal coolant is recommended.

Insert Grades  
 Turnable  
 Indexable Inserts  
 CN & PCD Tools  
 External  
 Small Parts  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Tools for  
 Turn Mill  
 Spare Parts  
 Technical  
 Information  
 Index

A  
 B  
 C  
 D  
 E  
 F  
 G  
 H  
 J  
 K  
 L  
 M  
 N  
 P  
 R  
 T

# MFH High Feed Cutter

## Note for Machining Program (Approx. R)

Shape	Description	Insert Type	Cutting Edge Angle $\gamma$	Approx. R (mm)	Unmachined portion K (mm)	Max. inclination angle of workpiece at contouring
	MFH...-10-...	GM	10°	3.0	0.85	90°
		FL	14°	3.0	0.89	80°
		LD	14°	3.5	0.69	65°
	MFH...-14-...	GM	10°	3.5	1.37	90°
		FL	13°	3.0	1.36	80°
		LD	16°	5.0	1.06	65°

## Reference data for Ramping

### MFH...-10-...

Cutter Dia. DCX (mm)	25	28	32	35	40	50	63	80
Max. ramping angle RMPX	5°	4.5°	4°	3.5°	3°	2.5°	2°	1°
tan RMPX	0.087	0.078	0.070	0.061	0.052	0.043	0.035	0.017

### MFH...-14-...

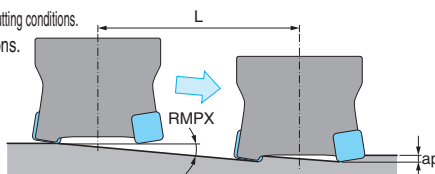
Cutter Dia. DCX (mm)	50	63	80	100	125	160
Max. ramping angle RMPX	2°	1.8°	1°	0.5°	0.4°	0.2°
tan RMPX	0.035	0.031	0.017	0.009	0.007	0.003

## Guide for Ramping (Slant Milling)

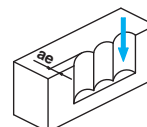
- Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
- Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$



## Vertical Milling (Plunging)



Insert Description	Max. Width of Cut (ae)
SOMT10	8mm
SOMT14	11.5mm

\*Vertical Milling (Plunging) is available only with GM type insert.

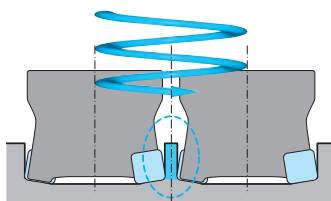
(LD type and FL type are not applicable)

•For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

## Guide for Helical milling

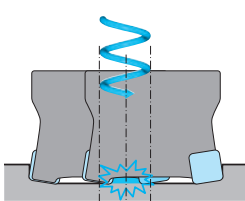
For helical milling, use between Min. cutting dia. and Max. cutting dia.

### Over Max. Cutting Dia.



Center core part remains after machining

### Under Min. Cutting Dia.

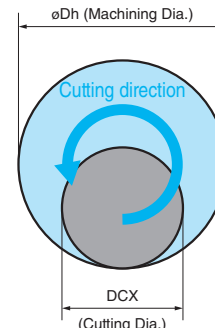


Center core part interferes with toolholder

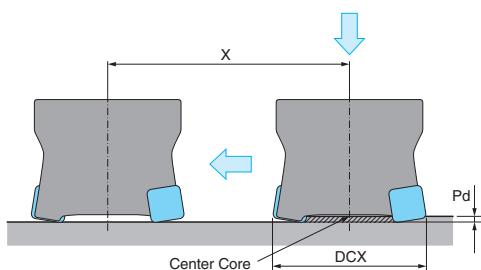
Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH...-10-...	2×DCX-18	2×DCX-2
MFH...-14-...	2×DCX-25	2×DCX-2

Unit : mm

- Sinking depth (h) at helical milling should be under Max. depth of cut (APMX) in the cutter dimension chart.
- Down-cut milling is recommended (refer to the right figure)
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.



## Guide for Drilling



## 3D machining

Insert Type	Ramping	Contouring (rising wall angle)	Vertical	Helical Milling	Pocketing
GM	✓	✓ (90°)	✓	✓	✓
LD	✓	△(65°)	×	×	×
FL	✓	△(80°)	×	×	×

• Some applications are not available depending on insert type.

• For FL and LD type, there is a limit of rising wall angle at contouring.

Description	GM type		LD type		FL type	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH...-10-...	1.5	DCX-18	1.5	DCX-14	1.5	DCX-15
MFH...-14-...	2	DCX-24	2	DCX-18	2	DCX-19

[Drilling depth] Please refer to Pd (Max. drilling depth) in the chart.

[When Traversing after Drilling]

- (1) Reduce feed rate 25% or less of the recommended conditions until the center core part (unmachined part) is removed.
- (2) When drilling, reduce feed rate per revolution to f=0.2mm/rev or under.

Unit : mm

M

Milling

Insert

Lead Angle 45°~20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

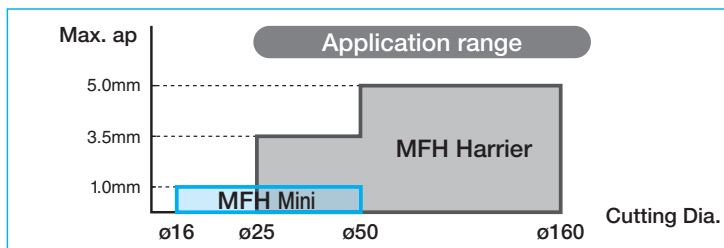


# MFH High Feed Cutter

## MFH Mini

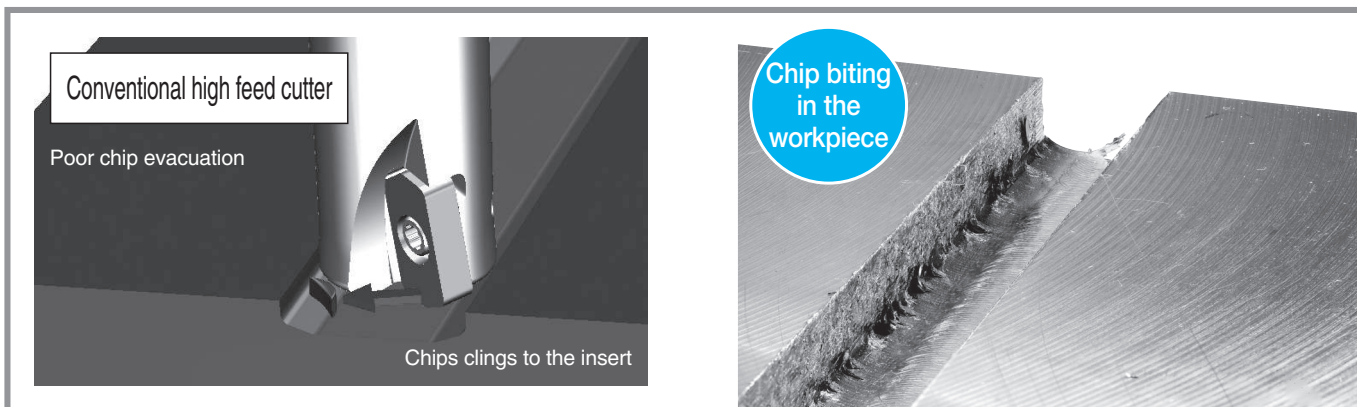
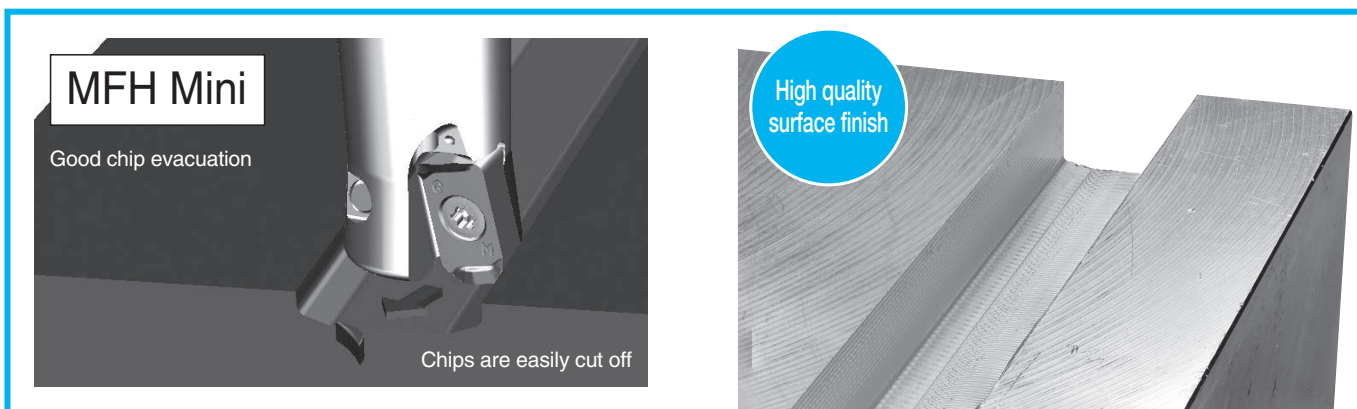
Cutter Dia. :  $\phi 16 \sim \phi 32$

- Economical Double-sided 4-edge Insert
- High efficiency and high feed machining at small dia. machining and small machining center

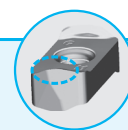


### POINT.1 Excellent chip evacuation

(Internal evaluation)



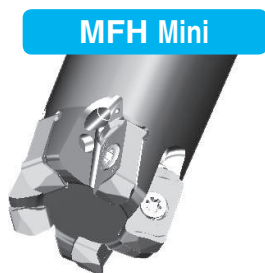
### MFH Mini controls chip biting with 3D convex cutting edge



Cutting Conditions : Workpiece Material SS400 Cutter Dia.  $\phi 16$  Vc=150m/min fz=0.6mm/t apxae=10mm(0.5mmx20 passes)x16mm Dry

### POINT.2 Multi edge design enables high efficiency machining

Cutter Dia.  $\phi 25$



5 inserts

MFH25-S25-03-5T



2 inserts

MFH25-S25-10-2T

### POINT.3 High efficiency and high feed machining at small machining center (BT30/BT40)

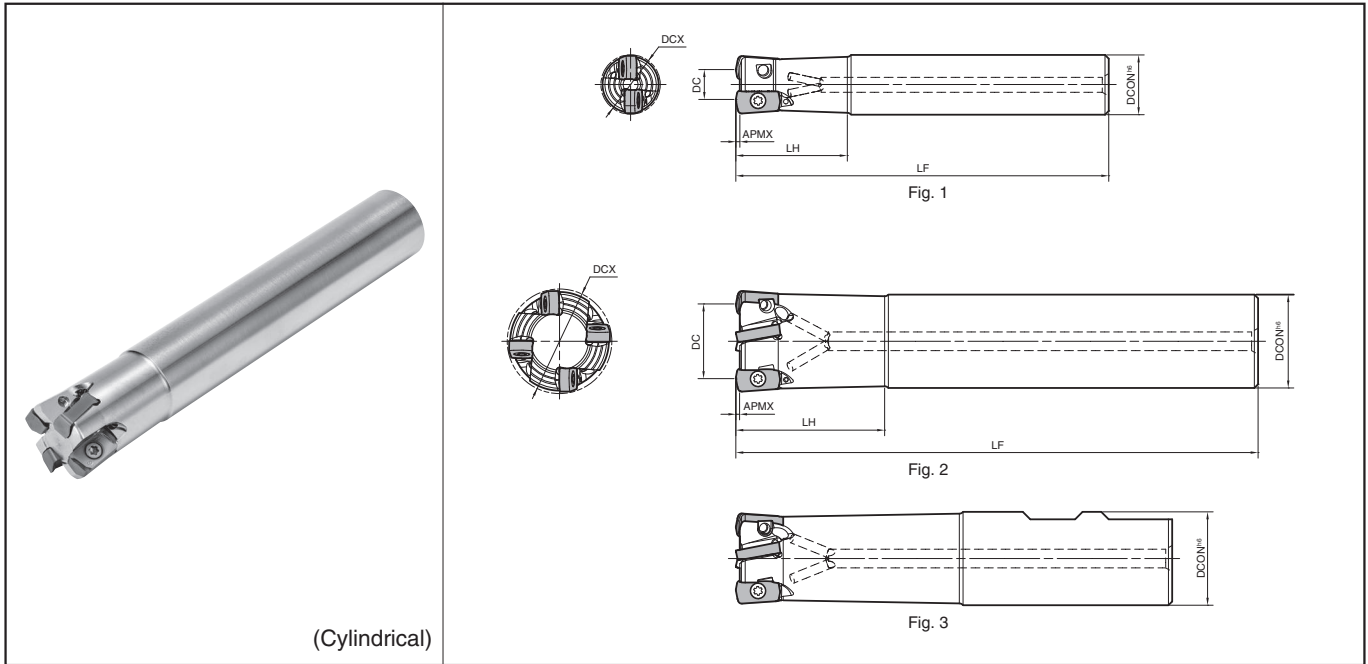


Suitable for roughing of mold

Insert Grades	A
Turnable Inserts	B
CBN & PCBN Tools	C
External Machining	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T

# MFH High Feed Cutter

## MFH Mini End Mill



(Cylindrical)

### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )						
			DCX	DC	DCON	LF	LH	APMX	A.R.											
Standard Shank	MFH 16-S16-03-2T	●	2	16	8	16	100	30	1	-10°	Yes	Fig. 1	0.1	18,800						
	20-S20-03-3T	●	3	20	12	20	130	50					0.3	15,700						
	20-S20-03-4T	●	4	25	17	25	140	60					0.5	13,400						
	25-S25-03-4T	●	5										0.8	11,400						
	25-S25-03-5T	●	6	32	24	32	150	70					0.5	12,400						
	32-S32-03-5T	●	5	32	24	32	150	70					0.1	17,900						
32-S32-03-6T	●	6	32	24	32	150	70	0.3				14,700								
Over Size (Straight)	MFH 17-S16-03-2T	●	2	17	9	16	100	20				1	-10°	Yes	Fig. 2	0.1	17,900			
	18-S16-03-2T	●	2	18	10	16	100	20								0.3	14,700			
	22-S20-03-3T	●	3	22	14	20	130	30								0.5	12,400			
	22-S20-03-4T	●	4	28	20	25	140	40								0.1	18,800			
	28-S25-03-4T	●	5													0.2	15,700			
	28-S25-03-5T	●	5	28	20	25	140	40								0.4	13,400			
Weldon	MFH 16-W16-03-2T	●	2	16	8	16	79	30							1	-10°	Yes	Fig. 3	0.7	11,400
	20-W20-03-3T	●	3	20	12	20	101	50											0.1	18,800
	20-W20-03-4T	●	4	25	17	25	117	60											0.2	15,700
	25-W25-03-4T	●	5																0.4	13,400
	25-W25-03-5T	●	5	32	24	32	131	70											0.6	13,400
	32-W32-03-5T	●	5	32	24	32	131	70	1.1	11,400										
32-W32-03-6T	●	6	32	24	32	131	70	0.2	18,800											
Long Shank	MFH 16-S16-03-2T-150	●	2	16	8	16	150	50	1	-10°	Yes							Fig. 1	0.3	15,700
	20-S20-03-3T-160	●	3	20	12	20	160	80											0.6	13,400
	25-S25-03-4T-180	●	4	25	17	25	180	100											0.2	18,800
	32-S32-03-5T-200	●	5	32	24	32	200	120											0.3	15,700

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

Recommended Cutting Conditions **M120**

### Max. Revolution

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

### Spare Parts

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
MFH ...-03-...	SB-3065TRP	DTPM-8	P-37
Recommended tightening torque for Insert Clamp 1.2N·m			

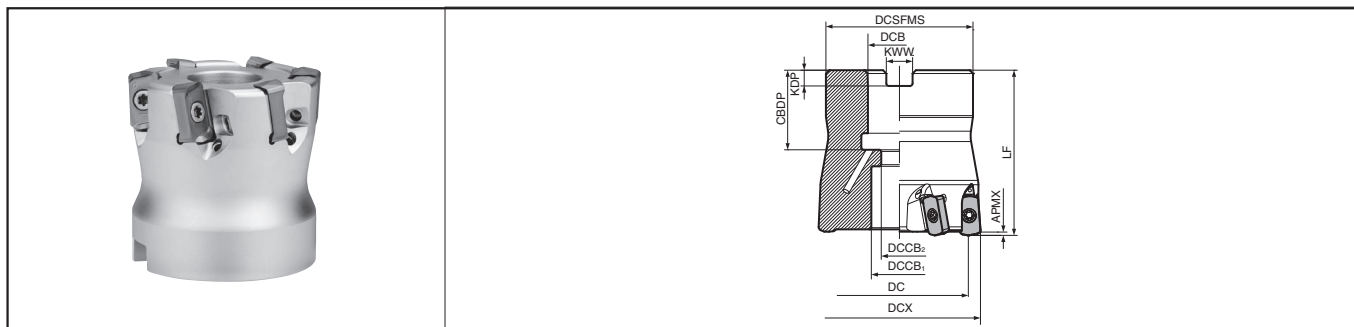
● : Std. Item

M  
Milling  
Insert  
Lead Angle 45°-20°  
Lead Angle 15°  
Lead Angle 0°/2°  
High Feed Cutter  
Multi-Function  
Slot Mill  
Ball-nose Radius  
Others

Insert Grades  
Turnable  
Indexable Inserts  
CNC & PCO Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

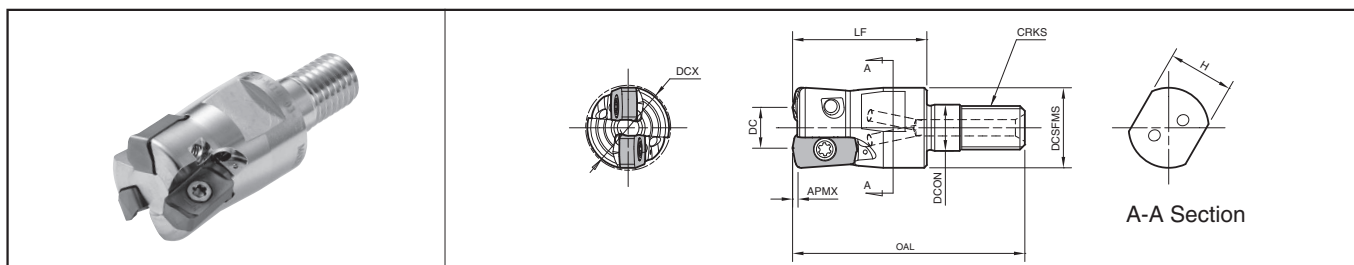
### MFH Mini Face Mill



#### Toolholder Dimensions

Bore Dia.	Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle	Coolant Hole	Weight (kg)	Max. Revolution (min <sup>-1</sup> )
				DCX	DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	A.R.			
Metric	MFH 040R-03-5T-M	●	5	40	32	38	16	15	9	40	19	5.6	8.4	1	-10°	Yes	0.2	9,900
	040R-03-6T-M	●	6															
	050R-03-8T-M	●	8															

### MFH Mini Head



#### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Rake Angle	Coolant Hole	Max. Revolution (min <sup>-1</sup> )	
			DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	A.PMX			A.R.
MFH 16-M08-03-2T	●	2	16	8	14.7	8.5	43	25	M8xP1.25	12	1	-10°	Yes	18,880
17-M08-03-2T	●		17	9										17,900
18-M08-03-2T	●		18	10										17,000
MFH 20-M10-03-3T	●	3	20	12	18.7	10.5	49	30	M10xP1.5	15	1	-10°	Yes	15,700
20-M10-03-4T	●	4												
22-M10-03-3T	●	3												
22-M10-03-4T	●	4	22	14	12.5	57	35	M12xP1.75	19	1	-10°	Yes	14,700	
MFH 25-M12-03-4T	●	4	25	17									23	
25-M12-03-5T	●	5	28	20									23	12,400
28-M12-03-4T	●	4			28	20	23							
28-M12-03-5T	●	5			32	24	30	17	63	40	M16xP2.0	24		
MFH 32-M16-03-5T	●	5												
32-M16-03-6T	●	6												

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


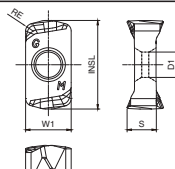
Recommended Cutting Conditions **M120**

#### Max. Revolution

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

See page **M52** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

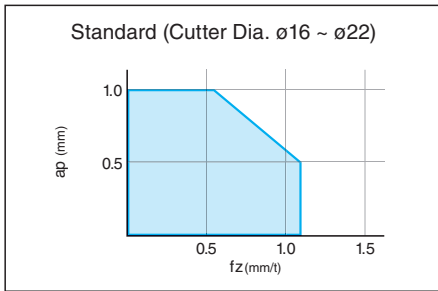
#### Applicable Inserts **M13**

Insert	Description	Dimension (mm)					MEGACOAT NANO			CVD Coated Carbide
		W1	S	D1	INSL	RE	PR1535	PR1525	PR1510	CA6535
 General purpose	 LOGU 030310ER-GM	6.2	3.96	3.45	11.9	1.0	●	●	●	●

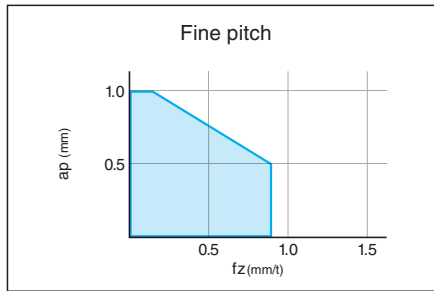
● : Std. Item

# MFH High Feed Cutter

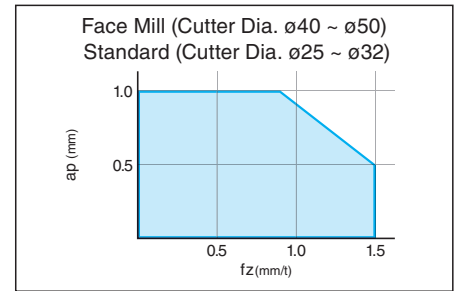
## Cutting Performance



MFH16-...-2T, MFH17-...-2T, MFH18-...-2T  
MFH20-...-3T, MFH22-...-3T



MFH20-...-4T, MFH22-...-4T, MFH25-...-5T  
MFH28-...-5T, MFH32-...-6T



MFH25-...-4T, MFH28-...-4T, MFH32-...-5T  
MFH040R-..., MFH050R-...

When using fine pitch type, reduce the cutting conditions compared with standard type.

## Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz : mm/t)							Recommended Insert Grades			
		* Recommended feed rate (Reference value) : ap = 0.5mm							(Cutting Speed Vc: m/min)			
		MFH16 -...-2T	MFH20 -...-3T	MFH20 -...-4T	MFH25 -...-4T	MFH25 -...-5T	MFH32 -...-5T	MFH32 -...-6T	MFH -...-R-03	MEGACOAT NANO		
								PR1535	PR1525	PR1510	CA6535	
GM	Carbon Steel	0.2-0.7-1.2	0.2-0.5-0.8	0.2-0.8-1.5	0.2-0.5-0.8	0.2-0.8-1.5	0.2-0.5-0.8	0.2-0.5-0.8	☆ 120-180-250	★ 120-180-250	-	-
	Alloy Steel								☆ 100-160-220	★ 100-160-220	-	-
	Mold Steel (-40HRC)	0.2-0.5-0.9	0.2-0.4-0.6	0.2-0.6-1.2	0.2-0.4-0.6	0.2-0.6-1.2	0.2-0.4-0.6	0.2-0.4-0.6	☆ 80-140-180	★ 80-140-180	-	-
	Mold Steel (40-50HRC)	0.2-0.3-0.5	0.2-0.25-0.3	0.2-0.3-0.6	0.2-0.25-0.3	0.2-0.3-0.6	0.2-0.25-0.3	0.2-0.25-0.3	☆ 60-100-130	★ 60-100-130	-	-
	Stainless Steel (Austenitic related)	0.2-0.5-0.9	0.2-0.4-0.6	0.2-0.6-1.2	0.2-0.4-0.6	0.2-0.6-1.2	0.2-0.4-0.6	0.2-0.4-0.6	☆ 100-160-200	☆ 100-160-200	-	-
	Stainless Steel (Martensitic related)								☆ 150-200-250	-	-	★ 180-240-300
	Stainless Steel (Precipitation Hardening)								★ 90-120-150	-	-	-
	Gray Cast Iron	0.2-0.7-1.2	0.2-0.5-0.8	0.2-0.8-1.5	0.2-0.5-0.8	0.2-0.8-1.5	0.2-0.5-0.8	0.2-0.5-0.8	-	-	★ 120-180-250	-
	Nodular Cast Iron	0.2-0.5-0.9	0.2-0.4-0.6	0.2-0.6-1.2	0.2-0.4-0.6	0.2-0.6-1.2	0.2-0.4-0.6	0.2-0.4-0.6	-	-	★ 100-150-200	-
	Ni-base heat-resistant alloys	0.2-0.3-0.6	0.2-0.25-0.4	0.2-0.4-0.8	0.2-0.25-0.4	0.2-0.4-0.8	0.2-0.25-0.4	0.2-0.25-0.4	☆ 20-30-50	-	-	★ 20-30-50
	Titanium Alloys								★ 40-60-80	-	☆ 30-50-70	-

Standard Fine pitch ★ : 1st Recommendation ☆ : 2nd Recommendation

\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.

For slotting, internal coolant or center through coolant is recommended.

Slotting and pocketing are not recommended for face mill type.

## Note for Machining Program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined portion (mm)
	R1.0	0	0.51
	R1.5	0	0.41
	R1.6 (Recommended)	0	0.39
	R2.0	0.09	0.31

Cutting Edge Angle : 12°

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others

## Reference data for Ramping

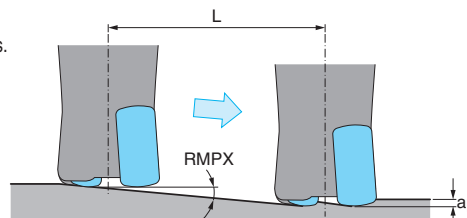
Description	Cutter Dia. DCX (mm)	16	17	18	20	22	25	28	32	40	50
MFH ...-03-...	Max. ramping angle RMPX	2.8°	2.5°	2.1°	1.7°	1.4°	1.2°	1°	0.8°	0.5°	0.4°
	tan RMPX	0.049	0.042	0.037	0.03	0.024	0.021	0.017	0.014	0.009	0.007

## Guide for Ramping (Slant Milling)

- Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
- Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$

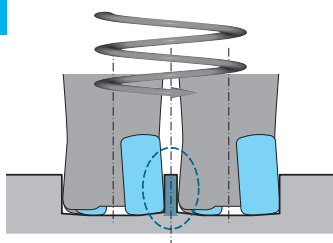


## Guide for Helical milling

- For helical milling, use between Min. cutting dia. and Max. cutting dia.

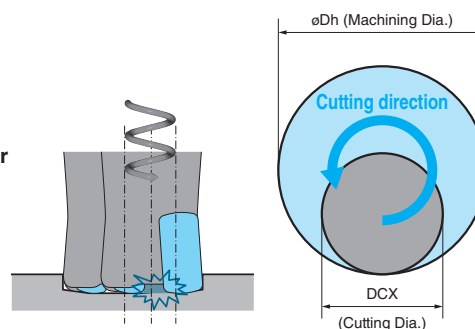
### Over Max. Cutting Dia.

Center core part remains after machining



### Under Min. Cutting Dia.

Center core part interferes with toolholder

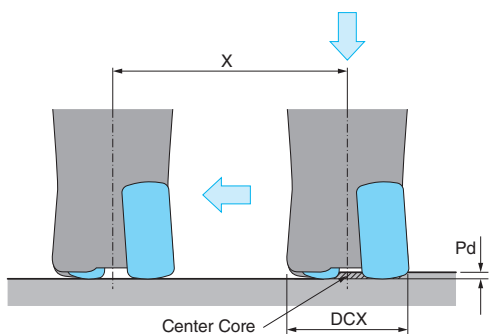


Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH...-03-...	2×DCX-8	2×DCX-2

Unit : mm

- Sinking depth at helical milling should be Max. ap (1mm) or under.
- Down-cut milling is recommended (refer to the figure above)
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

## Guide for Drilling



Description	GM type	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH...-03-...	1.0	DCX-9

Unit : mm

- \* When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
- \* When drilling, reduce feed rate per revolution to f=0.2mm/rev or under.

## Vertical milling (Plunging)

### Vertical milling (Plunging)

- Available for vertical milling (plunging).

Insert Description	Max. Width of Cut (ae)
LOGU03 type	3.5mm

- For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

# MFH Micro

Cutter Dia. :  $\phi 8 \sim \phi 16$

- Low Resistance and Durable Against Chatter for Highly Efficient Machining
- Max. ap 0.5 mm. Stable High Feed Machining on a Wide Range of Applications

3D convex cutting edge

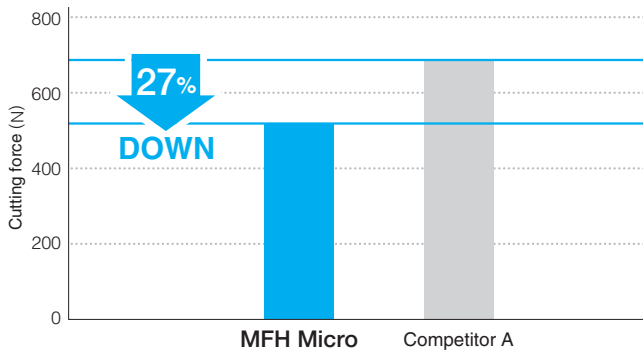


High Precision G Class Insert

## POINT.1 Stable Machining with Chattering Resistance

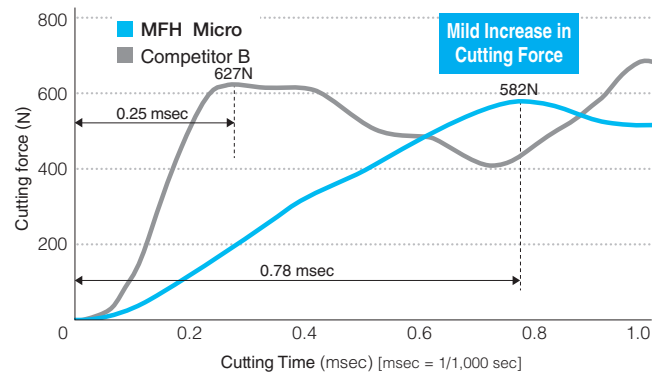
3D Convex Cutting Edge Controls Initial Impact when Entering the Workpiece

Cutting Force Comparison (Internal evaluation)



Cutting Conditions :  $V_c = 120$  m/min,  $f_z = 0.6$  mm/t,  $a_p = 0.4$  mm  
Cutter Dia.  $\phi 10$  mm, Slotting, Dry Workpiece Material : S50C

Increase in Cutting Force when Entering Workpiece (Internal evaluation)



Cutting Conditions :  $V_c = 120$  m/min,  $f_z = 0.6$  mm/t,  $a_p \times a_e = 0.4 \times 5$  mm  
Cutter Dia.  $\phi 10$  mm, Dry Workpiece Material : S50C

M

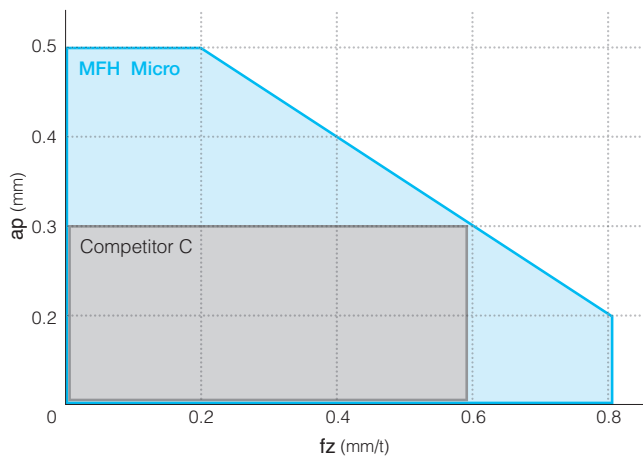
Milling

## POINT.2 Wide Range of Machining Applications

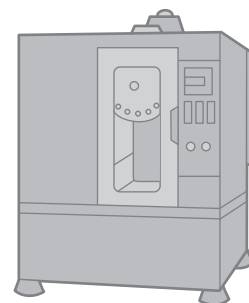
Wide Range of Machining Applications at a Maximum Depth of Cut of 0.5 mm

Stable Machining Even with Small Machining Centers

Cutting Performance Map (Cutter Dia.  $\phi 10$  mm)



(Internal evaluation)



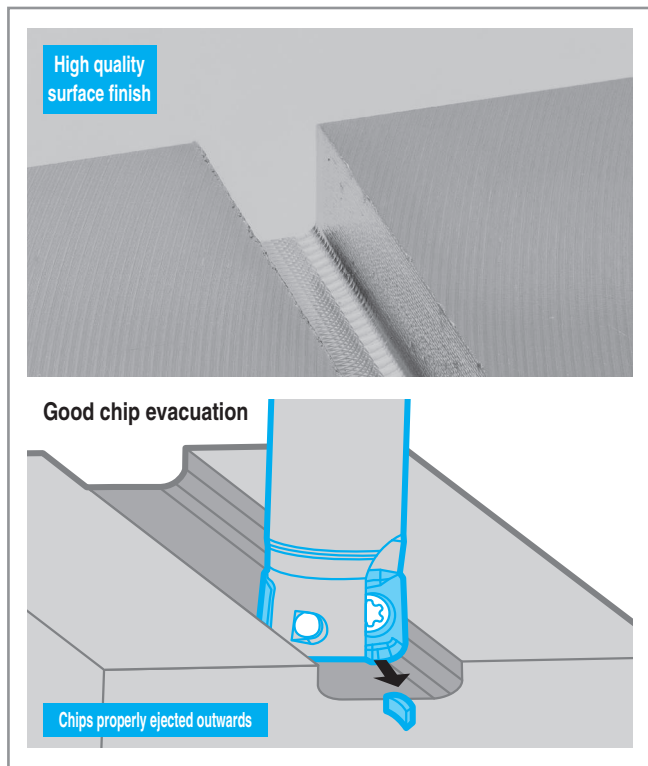
Applicable for BT30/ BT40



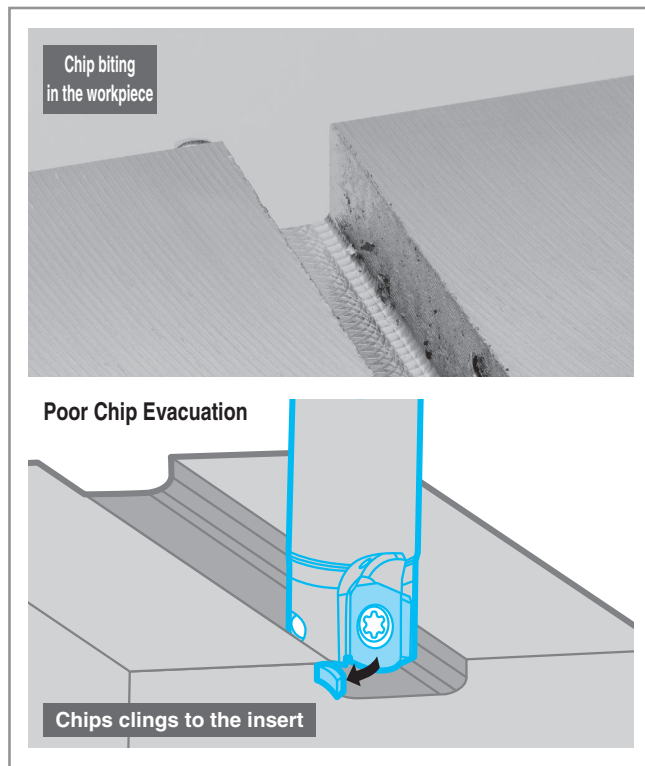
**POINT.3** Excellent chip evacuation

Controls Chip Biting with Convex Cutting Edge

MFH Micro



Competitor F



Cutting Conditions : Cutter Dia. DCX =  $\phi 10$  mm,  $V_c = 120$  m/min,  $f_z = 0.6$  mm/t,  $a_p = 0.4$  mm (25pass) Total 10 mm, Dry Workpiece Material : SS400 (Internal evaluation)

**POINT.4** Replaces Solid End Mills to Reduce Machining Costs

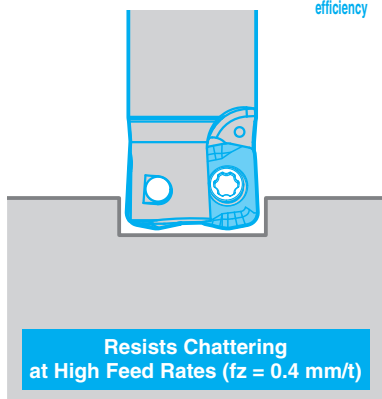
Suppresses Chattering and Increases Milling Efficiency

MFH Micro Compared to Solid End Mills

**MFH Micro**  $Q = 15.3$  cc/min

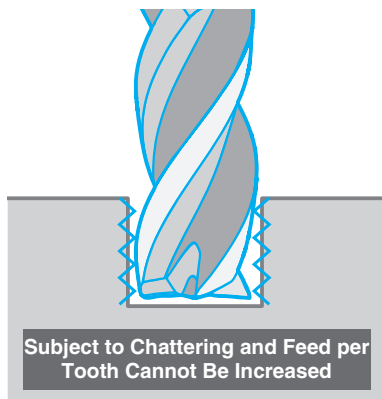
$V_c = 150$  m/min,  $f_z = 0.4$  mm/t  
 $a_p \times a_e = 0.4 \times 10$  mm, Dry  
 MFH10-S10-01-2T (2 inserts)  
 LPGT010210ER-GM (PR1525)

1.25 times  
 Machining efficiency



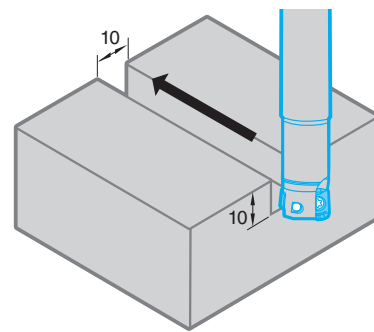
**Solid End Mill**  $Q = 12.2$  cc/min

$V_c = 80$  m/min,  $f_z = 0.04$  mm/t  
 $a_p \times a_e = 3 \times 10$  mm, Dry  
 $\phi 10$  (4 flutes)



**Machine Part Slotting**

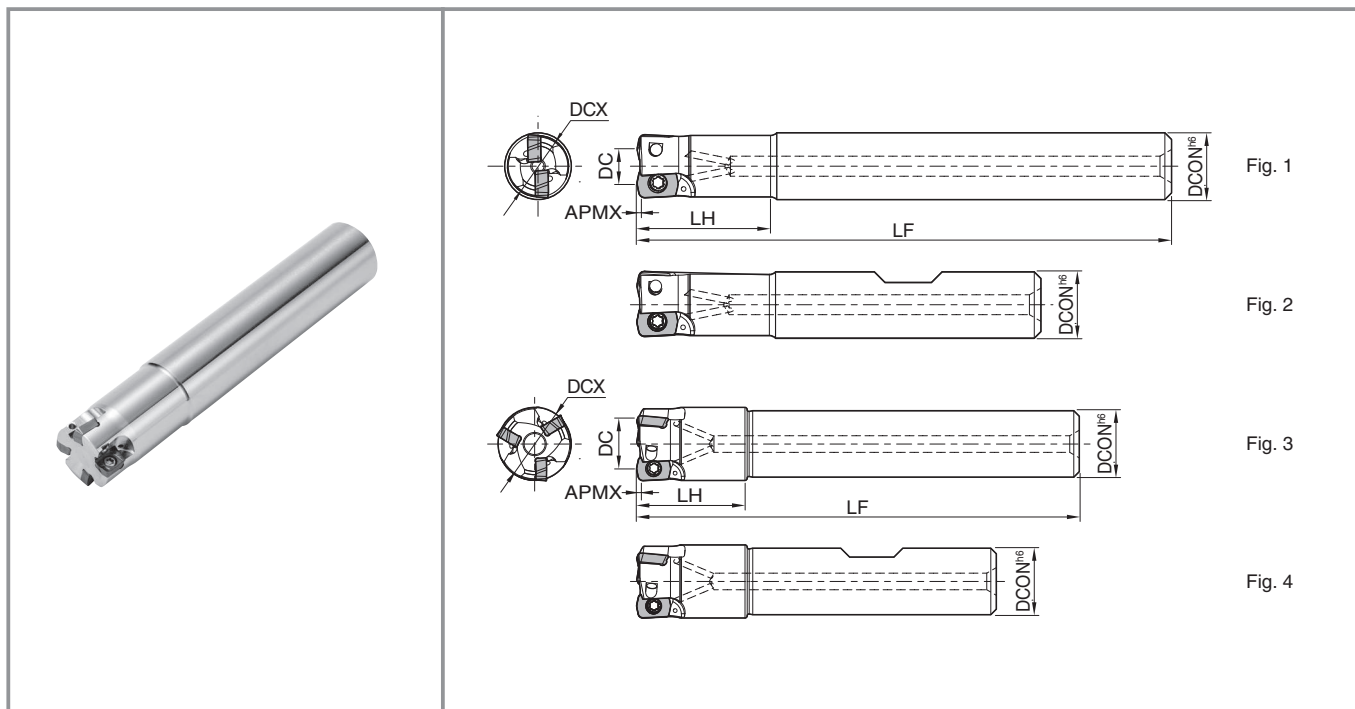
Workpiece Material : S50C



(User Evaluation)

Insert Grades	A
Turning Indexable Inserts	B
CAN & PCO Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T

## MFH Micro End Mill



### Toolholder Dimensions




Description	Stock	No. of Inserts	Dimension (mm)						Max. ramping angle	A.R.	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )	
			DCX	DC	DCON	LF	LH	APMX							
Standard Shank	MFH 08-S10-01-1T	●	1	8	4.2	10	75	16	0.5	4°	5°	Yes	Fig. 1	0.04	20,000
	10-S10-01-2T	●	2	10	6.2	10	80	20		3°				0.04	16,200
	12-S12-01-3T	●	3	12	8.2	12	80	20		2°				0.06	14,000
	16-S16-01-4T	●	4	16	12.2	16	90	25		1.2°				0.12	11,400
Over Size (Straight)	MFH 14-S12-01-3T	●	3	14	10.2	12	80	20	0.5	1.5°	5°	Yes	Fig. 3	0.07	12,500
Weldon	MFH 08-W10-01-1T	●	1	8	4.2	10	58	16	0.5	4°	5°	Yes	Fig. 2	0.03	20,000
	10-W10-01-2T	●	2	10	6.2	10	60	20		3°				0.03	16,200
	12-W12-01-3T	●	3	12	8.2	12	65	20		2°				0.05	14,000
	16-W16-01-4T	●	4	16	12.2	16	73	25		1.2°				0.1	11,400
Over Size (Weldon)	MFH 14-W12-01-3T	●	3	14	10.2	12	65	20	0.5	1.5°	5°	Yes	Fig. 4	0.05	12,500

🔧 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

### ■ Max. Revolution

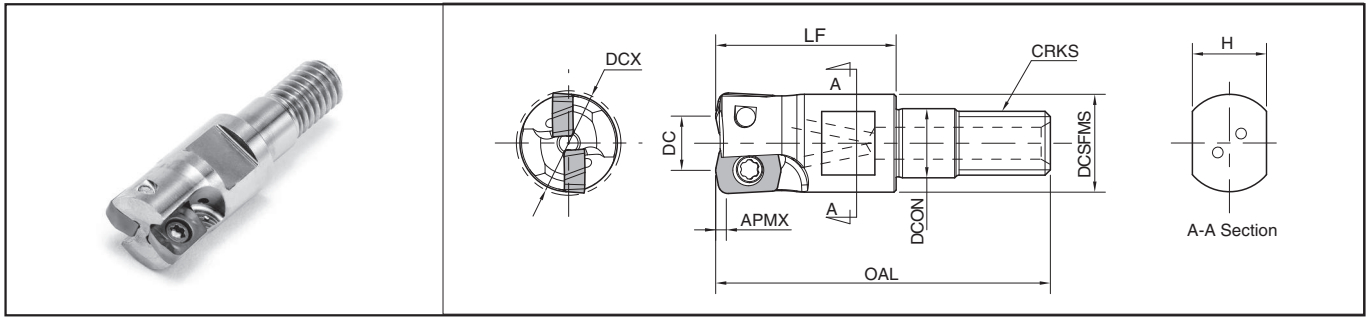
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.

### ● Spare Parts

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
MFH...-01-...	 SB-1840TRP	 FTP-6	 P-37

● : Std. Item

**MFH Micro Head**



**Toolholder Dimensions**

Description	Stock	No. of Inserts	Dimension (mm)									Max. ramping angle	Rake Angle		Coolant Hole	Max. Revolution (min <sup>-1</sup> )
			DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX		A.R.			
<b>MFH 08-M06-01-1T</b>	●	1	8	4.2	9.2	6.5	31.5	17	M6xP1.0	7	0.5	4°	+5°	Yes	20,000	
<b>10-M06-01-2T</b>	●	2	10	6.2								3°			16,200	
<b>12-M06-01-3T</b>	●	3	12	8.2	11.2	8.5	40	22	M8xP1.25	12	2°	14,000				
<b>14-M06-01-3T</b>	●	3	14	10.2							1.5°	12,500				
<b>MFH 16-M08-01-4T</b>	●	4	16	12.2	14.7	8.5	40	22	M8xP1.25	12	1.2°	11,400				

Please use commercial shanks for cutting diameter from ø8 to ø14 (Screw size : M6 x P1.0)

Check screw specifications for the shank in use

**Spare Parts**

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
<b>MFH...-01-...</b>	SB-1840TRP	FTP-6	P-37

**Actual End Mill depth (MFH16-M08-01-4T)**

Arbor Description	Applicable End Mill (Head)			Actual End Mill depth (mm)
	Description	Cutting Dia.	Dimension	LUX
		DC	LF	
<b>BT30K-M08-45</b>	<b>MFH16-M08-01-4T</b>	ø16	22	28.8
<b>BT40K-M08-55</b>	<b>MFH16-M08-01-4T</b>	ø16	22	28.7

➔ See page **M52** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

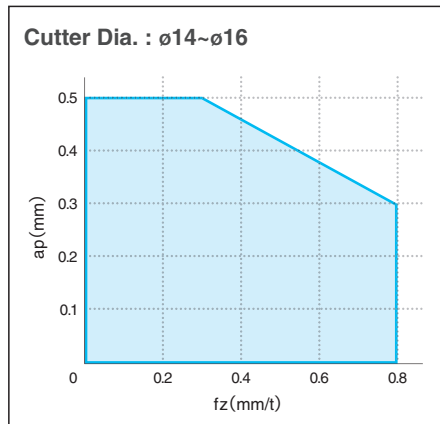
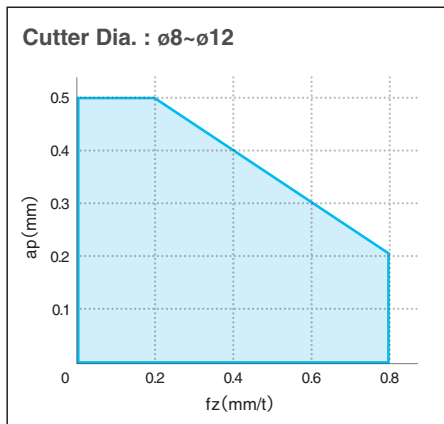
**Applicable Inserts** ➔ See Page **M13**

Insert	Description	Dimension (mm)					MEGACOAT NANO		CVD Coated Carbide
		W1	S	D1	INSL	RE	PR1535	PR1525	CA6535
 General purpose	<b>LPGT 010210ER-GM</b>	4.19	2.19	2.1	6.26	1.0	●	●	●

Recommended Cutting Conditions ➔ **M126**

# MFH Micro Dia. Cutter for High Feed Machining

## Cutting Performance



## Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz : mm/t) Recommended feed rate (fz : mm/t) : ap = 0.3mm (Reference value)					Recommended Insert Grades (Cutting Speed Vc: m/min)		
		MFH08-...-1T	MFH10-...-2T	MFH12-...-3T	MFH14-...-3T	MFH16-...-4T	MEGACOAT NANO		CVD Coated Carbide
							PR1525	PR1535	CA6535
GM	Carbon Steel	0.2- <b>0.4</b> -0.6			0.2- <b>0.5</b> -0.8		★ 120- <b>180</b> -250	☆ 120- <b>180</b> -250	-
	Alloy Steel	0.2- <b>0.4</b> -0.6			0.2- <b>0.5</b> -0.8		★ 100- <b>160</b> -220	☆ 100- <b>160</b> -220	-
	Mold Steel (~40HRC)	0.2- <b>0.3</b> -0.5			0.2- <b>0.4</b> -0.6		★ 80- <b>140</b> -180	☆ 80- <b>140</b> -180	-
	Mold Steel (40~50HRC)	0.2- <b>0.25</b> -0.3			0.2- <b>0.25</b> -0.4		★ 60- <b>100</b> -130	☆ 60- <b>100</b> -130	-
	Stainless Steel (Austenitic related)	0.2- <b>0.3</b> -0.5			0.2- <b>0.4</b> -0.6		☆ 100- <b>160</b> -200	★ 100- <b>160</b> -200	-
	Stainless Steel (Martensitic related)	0.2- <b>0.3</b> -0.5			0.2- <b>0.4</b> -0.6		-	☆ 150- <b>200</b> -250	★ 180- <b>240</b> -300
	Stainless Steel (Precipitation Hardening)	0.2- <b>0.3</b> -0.5			0.2- <b>0.4</b> -0.6		-	★ 90- <b>120</b> -150	-
	Gray Cast Iron	0.2- <b>0.4</b> -0.6			0.2- <b>0.5</b> -0.8		★ 120- <b>180</b> -250	-	-
	Nodular Cast Iron	0.2- <b>0.3</b> -0.5			0.2- <b>0.4</b> -0.6		★ 100- <b>150</b> -200	-	-
	Ni-base heat-resistant alloys	0.2- <b>0.25</b> -0.3			0.2- <b>0.25</b> -0.4		-	☆ 20- <b>30</b> -50	★ 20- <b>30</b> -50
	Titanium Alloys	0.2- <b>0.25</b> -0.3			0.2- <b>0.25</b> -0.4		-	★ 40- <b>60</b> -80	-

Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation ☆ : 2nd Recommendation

The bold-faced number indicates a center value of recommended cutting condition.

Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

Internal coolant is recommended for slotting.

## Note for Machining Program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined portion (mm)
	R1.0	0	0.21
	R1.2 (Recommended)	0	0.17
	R1.5	0.08	0.1
	R2.0	0.28	0.01

Cutting Edge Angle : 12°

M

Milling

- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

## Reference data for Ramping

Description	Cutter Dia. DCX (mm)	8	10	12	14	16
MFH...-01-...	Max. ramping angle RMPX	4.0°	3.0°	2.0°	1.5°	1.2°
	tan RMPX	0.070	0.052	0.035	0.026	0.021

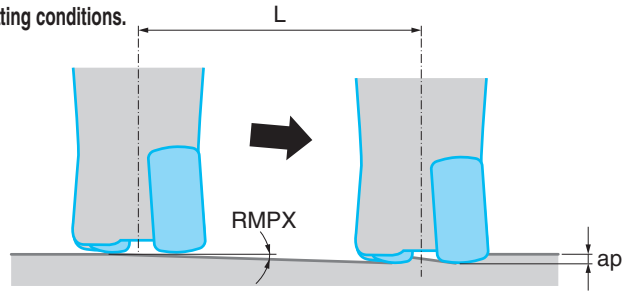
Decrease ramping angle if chips become excessively long.

## Guide for Ramping (Slant Milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.  
Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

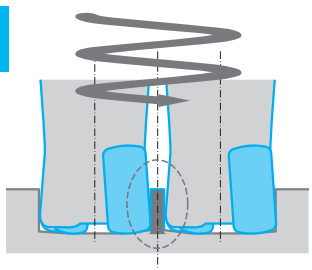
$$L = \frac{ap}{\tan RMPX}$$



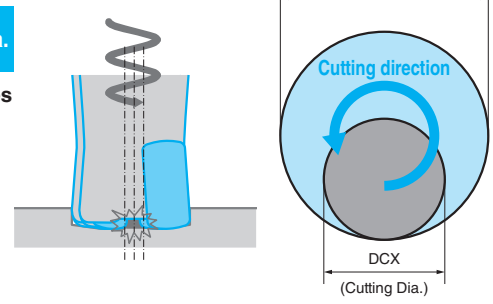
## Guide for Helical milling

For helical milling, use between Min. cutting dia. and Max. cutting dia.

⚠ Exceeding Max. Cutting Dia.  
Center core part remains after machining



⚠ Under Min. Cutting Dia.  
Center core part interferes with toolholder

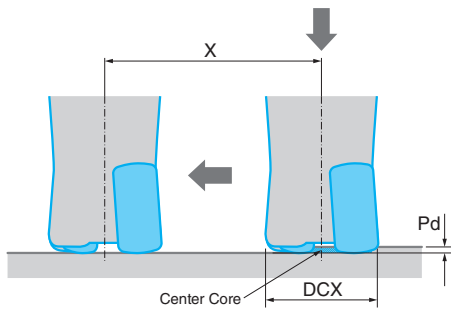


Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH...-01-...	2×DCX-3.5	2×DCX-2

Unit : mm

- Sinking depth at helical milling should be Max. ap (0.5mm) or under.
- Down-cut milling is recommended (refer to the figure above).
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

## Guide for Drilling



Description	GM type	
	Max. Cutting Depth Pd	Min. cutting length X for flat bottom surface
MFH...-01-...	0.5	DCX-3.5

Unit : mm

- \* When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
- \* When drilling, reduce feed rate per revolution to under f=0.2mm/rev.

## Vertical milling (Plunging)

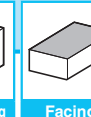
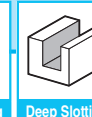
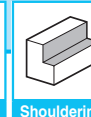
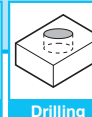
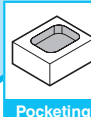
### Vertical milling (Plunging)

· Available for vertical milling (plunging).

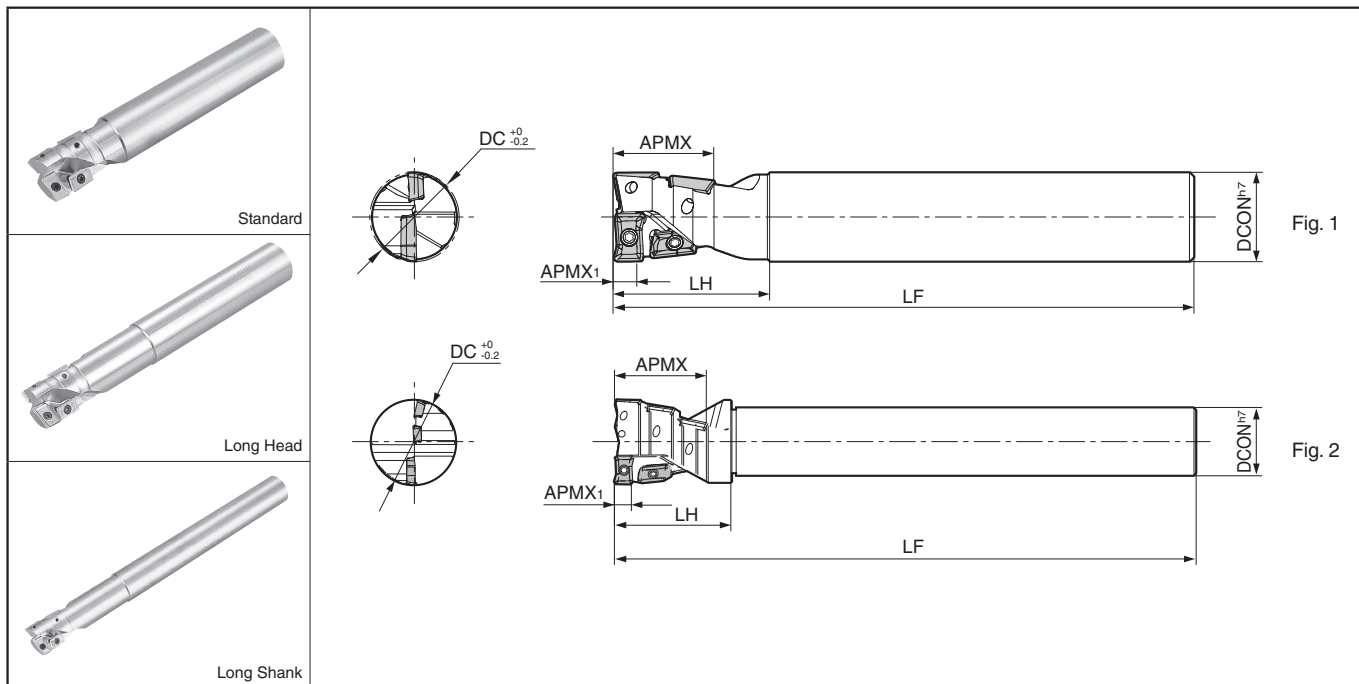
Insert Description	Max. Width of Cut (ae)
LOGT01 type	1.7mm

· For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

# Multi-Function Machining End Mill MEY



## MEY



### Toolholder Dimensions

Description	Stock	No. of Inserts	No. of Flutes	Dimension (mm)						Rake Angle		Drawing	Spare Parts			
				DC	DCON	LF	LH	APMX	APMX <sub>1</sub>	A.R.	R.R.		Clamp Screw	Wrench	Anti-seize Compound	
Standard	MEY 16-S16	●	4	2	16	16	120	31	19	4.5	+11°	-11°	Fig. 1	SB-2040TRG	DTM-6	P-37
	MEY 17-S16	●			17											
	MEY 20-S20	●			20											
	MEY 21-S20	●			21											
	MEY 25-S25	●			25											
	MEY 26-S25	●			26											
	MEY 32-S32	●			32											
	MEY 33-S32	●			33											
	MEY 40-S32	●			40											
	MEY 50-S42	●			50											
Long Head	MEY 16-S16-140H	●	4	2	16	16	140	51	19	4.5	+11°	-11°	Fig. 1	SB-2040TRG	DTM-6	P-37
	MEY 20-S20-150H	●			20											
	MEY 25-S25-170H	●			25											
	MEY 32-S32-180H	●			32											
		●			32											
Long Shank	MEY 16-S16-190	●	4	2	16	16	190	61	19	4.5	+11°	-11°	Fig. 1	SB-2040TRG	DTM-6	P-37
	MEY 17-S16-190	●			17											
	MEY 20-S20-200	●			20											
	MEY 21-S20-200	●			21											
	MEY 25-S25-220	●			25											
	MEY 26-S25-220	●			26											
	MEY 32-S32-230	●			32											
	MEY 33-S32-230	●			33											
	MEY 40-S32-240	●			40											
	MEY 50-S42-250	●			50											

\* APMX<sub>1</sub> shows the edge length of the complete 2-insert part.

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

M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

● : Std. Item



### ● Applicable Inserts

Description		Applicable Inserts <b>M19</b>			
		Side Edge		Center Edge	
		No. of Inserts	No. of Inserts		
<b>MEY</b>	16-S16(-...)	JOMT08T208ER-D	3	GOMT08T208ER-D	1
	17-S16(-...)				
	20-S20(-...)				
	21-S20(-...)	JOMT100308ER-D	3	GOMT100308ER-D	
	25-S25(-...)				
	26-S25(-...)				
	32-S32(-...)	JOMT13T308ER-D	3	GOMT13T308ER-D	
	33-S32(-...)				
	40-S32(-...)	JOMT160408ER-D	6	GOMT160408ER-D	
50-S42(-...)					

### ◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
	Drilling	Shouldering, Slotting	MEGACOAT		PVD Coated Carbide
			PR1225	PR1210	PR830
Carbon Steel	0.08~0.15	0.05~0.25	★ 120~250	-	☆ 120~200
Alloy Steel	0.08~0.15	0.05~0.25	★ 100~220	-	☆ 100~180
Mold Steel	0.08~0.12	0.05~0.15	★ 80~180	-	☆ 80~150
Stainless Steel	0.08~0.12	0.05~0.15	★ 120~220	-	☆ 100~180
Cast Iron	0.05~0.20	0.05~0.25	-	★ 100~220	-

★ : 1st Recommendation ☆ : 2nd Recommendation

### ● Caution of drilling

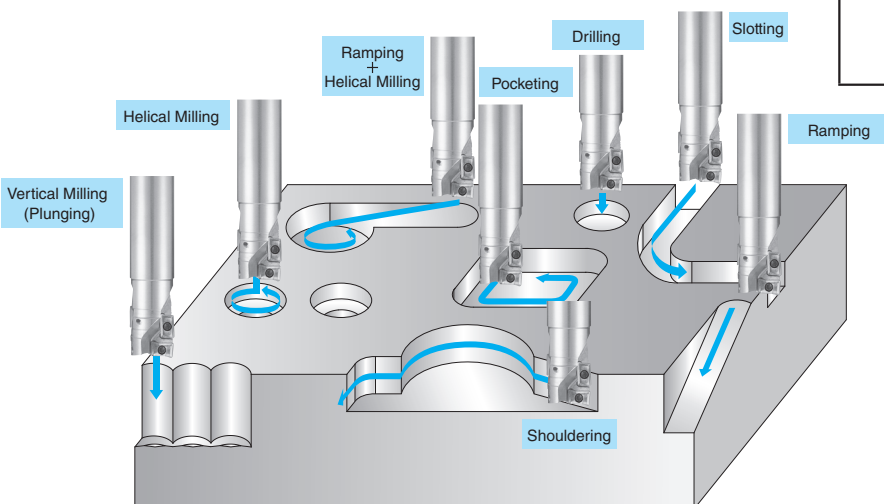
- (1) Drilling conditions should be calculated as one flute line.
- (2) Use compressed air during drilling.
- (3) Carbon steel other than low carbon steel can be drilled to a depth of 0.5D without step feeding.  
For soft steel or sticky material such as stainless steel, step feed drilling (0.5 ~ 1.0mm) is recommended.
- (4) For stainless steel drilling, coolant is recommended.
- (5) Please refer to right list for maximum hole depth.

Cutting Dia. (DC)	Max. hole depth (mm)
ø16	13
ø17	13
ø20	17
ø21	17
ø25	22
ø26	22
ø32	29
ø33	29
ø40	36
ø50	40

### ● Shape of the bottom of the drilled hole

Cutting Dia.	a (mm)	Shape of the bottom
ø16, ø17	0.5	
ø20, ø21	0.64	
ø25, ø26	0.85	
ø32, ø33	1.12	
ø40	1.54	
ø50	1.65	

### ■ Examples of MEY Multi-function Machining



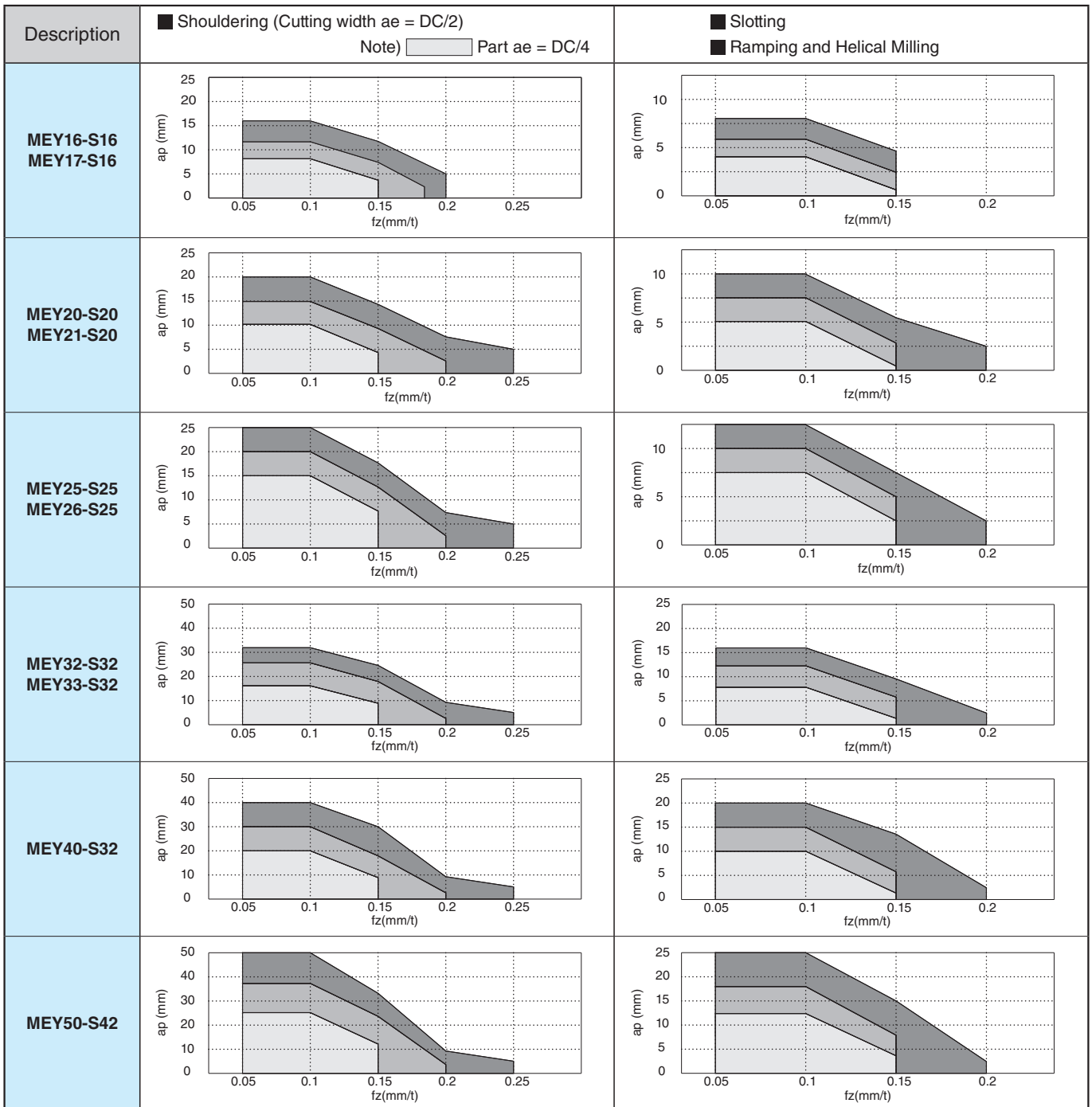
# Multi-Function Machining End Mill MEY

[Workpiece Material:S50C]

## Cutting Performance of MEY

Cutting Dia.	Description	Overhang Length LPR (mm)			Cutting Dia.	Description	Overhang Length LPR (mm)			Shape
ø16	MEY16-S16	31	[~61]	(Not Recommended)	ø25	MEY25-S25	40	[~70]	(Not Recommended)	
	MEY16-S16-140H	-	~61	[~91]		MEY25-S25-170H	-	70	[~100]	
	MEY16-S16-190	-	61	~91		MEY25-S25-220	-	~80	~100	
ø17	MEY17-S16	31	[~61]	(Not Recommended)	ø26	MEY26-S25	40	[~70]	(Not Recommended)	
	MEY17-S16-190	31	~61	~91		MEY26-S25-220	40	~70	~100	
ø20	MEY20-S20	35	[~65]	(Not Recommended)	ø32	MEY32-S32	50	[~80]	(Not Recommended)	
	MEY20-S20-150H	-	~65	[~95]		MEY32-S32-180H	-	~80	[~110]	
	MEY20-S20-200	-	65	~95		MEY32-S32-230	-	90	~110	
ø21	MEY21-S20	35	[~65]	(Not Recommended)	ø33	MEY33-S32	50	[~80]	(Not Recommended)	
	MEY21-S20-200	35	~65	~95		MEY33-S32-230	50	~80	~110	
ø40	MEY40-S32	55	[~85]	[~115]	ø50	MEY50-S42	70	[~100]	[~130]	
	MEY40-S32-240	55	~85	~115		MEY50-S42-250	70	~100	~130	

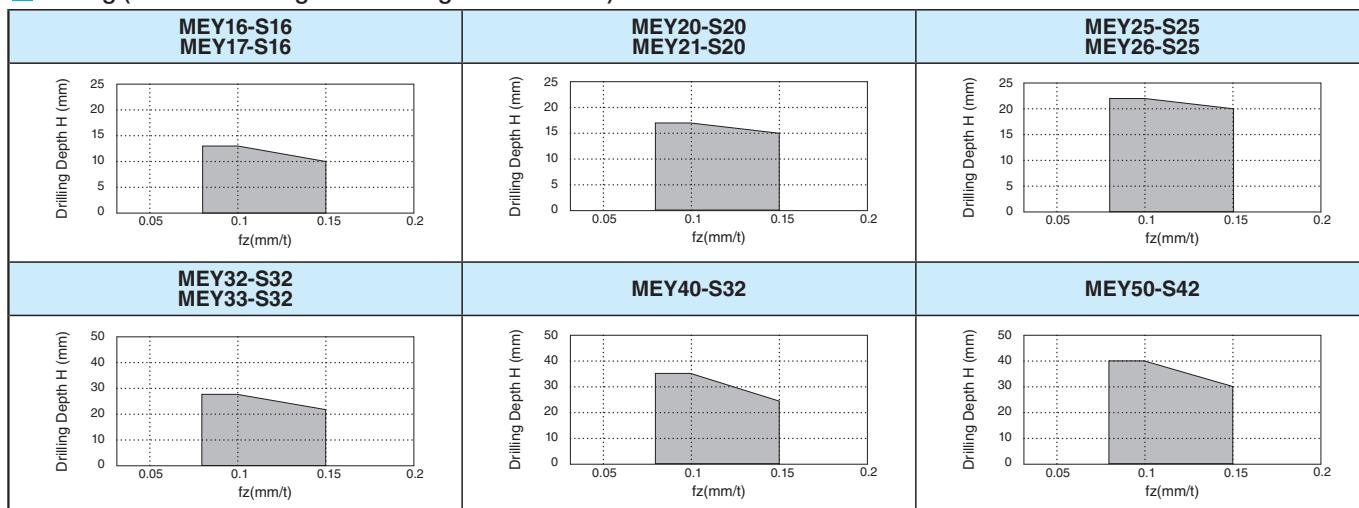
When using in [ ] dimension, be careful that the chucking length to the shank may get too short.



M  
Milling

- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

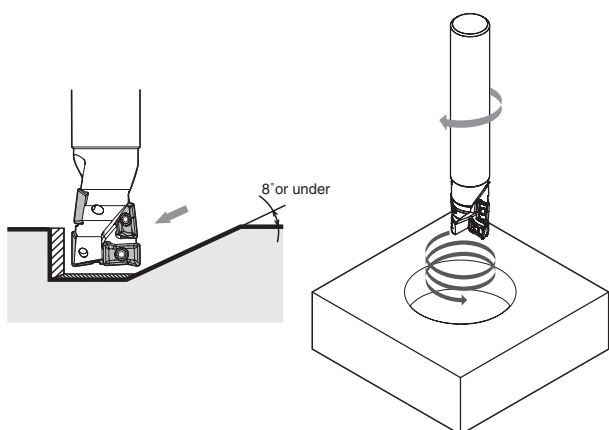
## Drilling (Standard / Long Head / Long Shank : S50C)



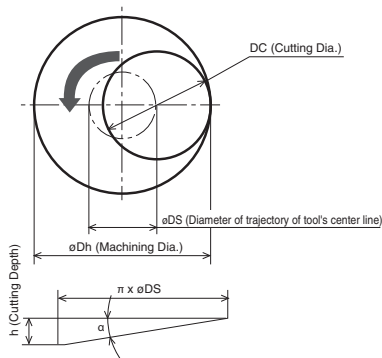
## How to Use MEY Effectively

### Ramping / Helical Milling

- Ramping angle is recommended to be 8° or under.
- Sinking depth per revolution when helical milling should be 1/2DC or under.
- Use compressed air during machining.



### Helical Milling Factors



$\phi DS$  (How to find diameter of trajectory of tool's center line)  
 $\phi DS = \phi Dh - DC$

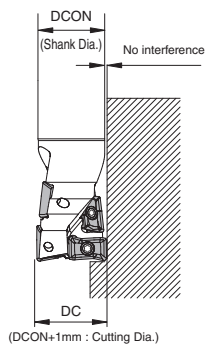
How to find "h"  
 $h = \pi \times \phi DS \times \tan \alpha$   
 ( $\alpha$  should be 8° or under)

### Shouldering

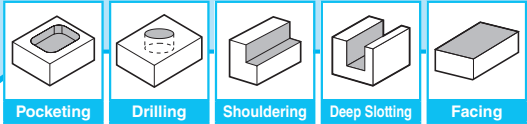
- Tools with 1mm larger cutting diameter than shank diameter are available.
- High wall shouldering is possible.

#### Lineup

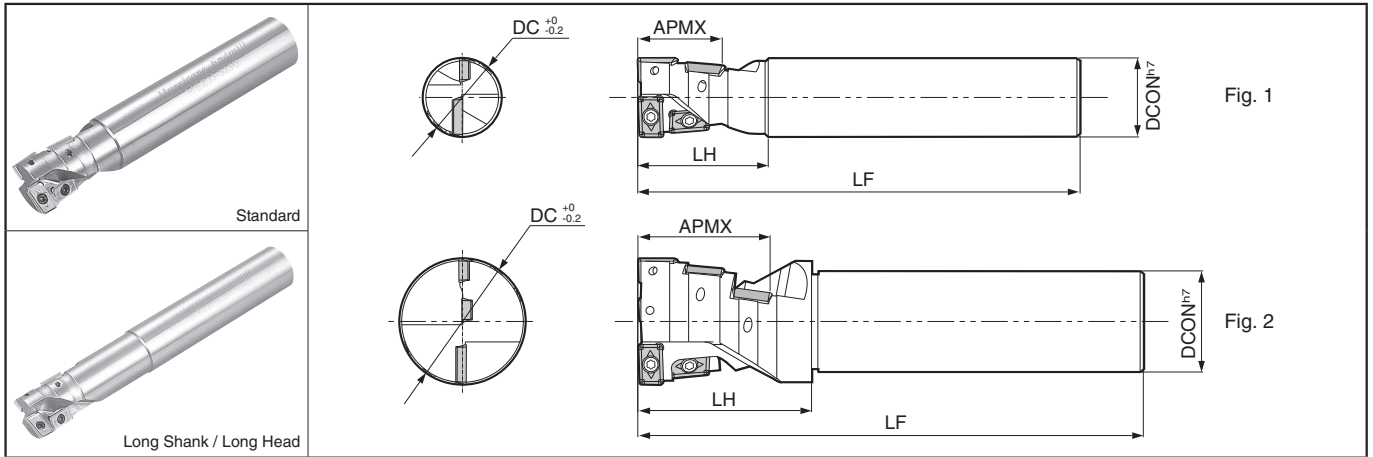
Description	DC (mm)	DCON (mm)
MEY17-S16	17	16
MEY21-S20	21	20
MEY26-S25	26	25
MEY33-S32	33	32
MEY17-S16-190	17	16
MEY21-S20-200	21	20
MEY26-S25-220	26	25
MEY33-S32-230	33	32



# Multi-Function Machining End Mill MEZ-G



## MEZ-G



### Toolholder Dimensions

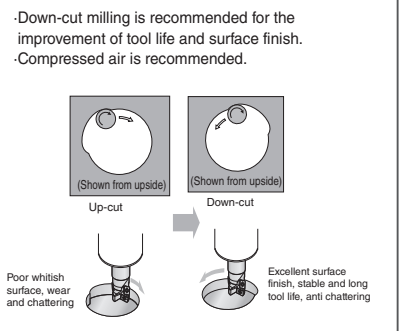
Description	Stock	No. of Inserts	No. of Flutes	Dimension (mm)					Rake Angle		Drawing	Spare Parts		See Page for Applicable Inserts M20	
				DC	DCON	LF	LH	APMX	A.R.	R.R.		Clamp Screw	Wrench		
Standard	MEZ 16-S16G	●	4	2	16	16	120	31	16	+9°	-5°	Fig. 1	SB-2040TRG	DTM-6	NDMT080208ER-D
	20-S20G	●			20	20	130	33	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D
	25-S25G	●			25	25	140	40	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D
	32-S32G	●			32	32	150	50	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D
	40-S32G	●			39	32	160	55	39		-3°		SB-3070TRG	DT-10	NEMT120308ER-D
	50-S42G	●			49	42	170	70	51		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D
Long Head	MEZ 16-S16-140HG	●	4	2	16	16	140	51	16	+9°	-5°	Fig. 1	SB-2040TRG	DTM-6	NDMT080208ER-D
	20-S20-150HG	●			20	20	150	53	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D
	25-S25-170HG	●			25	25	170	70	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D
	32-S32-180HG	●			32	32	180	80	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D
Long Shank	MEZ 16-S16-190G	●	4	2	16	16	190	61	16	+9°	-5°	Fig. 1	SB-2040TRG	DTM-6	NDMT080208ER-D
	20-S20-200G	●			20	20	200	63	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D
	25-S25-220G	●			25	25	220	80	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D
	32-S32-230G	●			32	32	230	90	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D
	40-S32-240G	●			39	32	240	55	39		-3°		SB-3070TRG	DT-10	NEMT120308ER-D
	50-S42-250G	●			49	42	250	70	51		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D

### Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)			
			Cermet		MEGACOAT	
	Drilling	Shouldering, Slotting	TN100M	PR1225	PR1210	KW10
Carbon Steel	0.05~0.2	0.05~0.2	★ 120-200	★ 120-250	-	-
Alloy Steel	0.05~0.2	0.05~0.2	★ 100-180	★ 100-220	-	-
Mold Steel	0.05~0.12	0.05~0.15	★ 100-180	★ 80-180	-	-
Stainless Steel	0.05~0.12	0.05~0.15	☆ 120-200	★ 120-220	-	-
Cast Iron	0.05~0.2	0.05~0.2	-	-	★ 100-220	☆ 80-150
Non-ferrous Metals	0.05~0.2	0.05~0.2	-	-	-	★ 100-300

★:1st Recommendation ☆:2nd Recommendation

·Drilling conditions should be calculated as one flute line. Step feed (0.5 ~ 0.1mm) is recommended.  
·Coolant is recommended when drilling stainless steel / cast iron.



### How to Use MEZ-G Effectively

#### Drilling

- Step feeding is recommended for good chip control. (Depth approx. 1mm)
- Drill depth should be 0.5DC or under. (DC : Drilling Dia.)
- Use compressed air during machining.

#### Ramping / Helical Milling

- Ramping angle is recommended to be 6° or under.
- Sinking depth per revolution when helical milling should be 1/2DC or under.
- Use compressed air during machining.

#### End Milling

- Tough edge insert is recommended for high load end milling. (High feed rate, large ap)
- Use a low cutting force insert to prevent chattering.

● : Std. Item

## Cutting Performance of MEZ-G

[ Workpiece Material: S50C ]

Cutting Dia.	Description	Overhang Length LPR (mm)			Cutting Dia.	Description	Overhang Length LPR (mm)			Shape
ø16	MEZ16-S16G	31	[~61]	(Not Recommended)	ø32	MEZ32-S32G	50	[~80]	(Not Recommended)	
	MEZ16-S16-140HG	-	~61	[~91]		MEZ32-S32-180HG	-	80	[~110]	
	MEZ16-S16-190G	-	61	~91		MEZ32-S32-230G	-	90	~110	
ø20	MEZ20-S20G	33	[~63]	(Not Recommended)	ø39	MEZ40-S32G	55	[~85]	[~115]	
	MEZ20-S20-150HG	-	~63	[~93]		-	-	-	-	
	MEZ20-S20-200G	-	63	~93		MEZ40-S32-240G	55	~85	~115	
ø25	MEZ25-S25G	40	[~70]	(Not Recommended)	ø49	MEZ50-S42G	70	[~100]	[~130]	
	MEZ25-S25-170HG	-	70	[~100]		-	-	-	-	
	MEZ25-S25-220G	-	80	~100		MEZ50-S42-250G	70	~100	~130	

When using in [ ] dimension, be careful that the chucking length to the shank may get too short.

## Shouldering / Slotting

Description	Shouldering (Cutting width $a_e = DC/2$ ) Note)  Part $a_e = DC/4$	Slotting Ramping and Helical Milling
	MEZ16-S16G	
MEZ20-S20G		
MEZ25-S25G		
MEZ32-S32G		
MEZ40-S32G		
MEZ50-S42G		

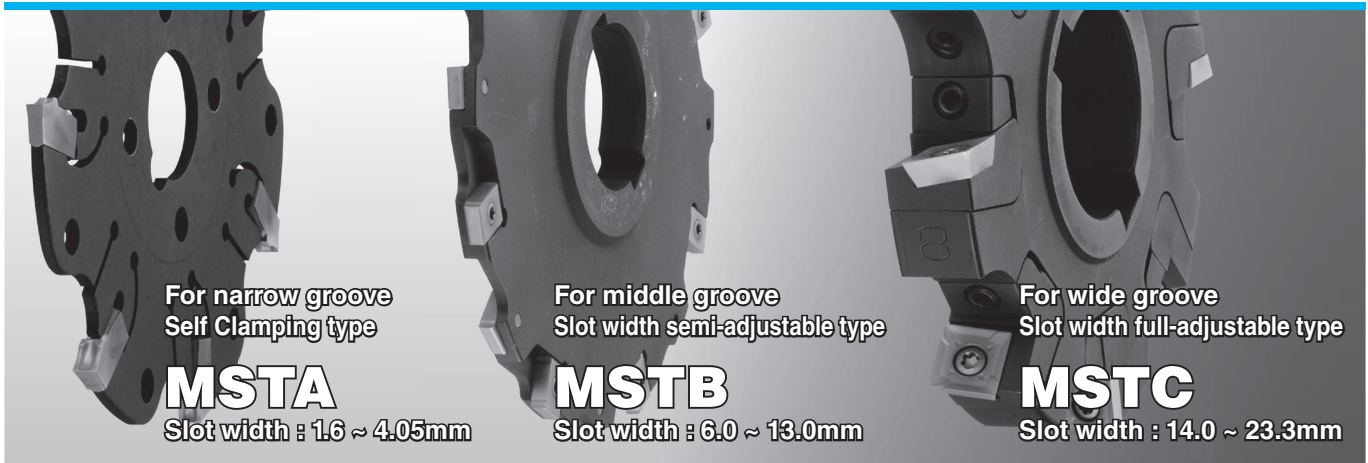
## Drilling

Drilling (Standard / Long Head / Long Shank)																
<p>Shape of the bottom of the drilled hole (ø16 ~ ø49)</p> <p>ø16 ~ ø32</p> <table border="1"> <tr> <td>Cutting Dia.</td> <td>ø16</td> <td>ø20</td> <td>ø25</td> <td>ø32</td> </tr> <tr> <td>a (mm)</td> <td>0.30</td> <td>0.33</td> <td>0.38</td> <td>0.45</td> </tr> </table> <p>ø39, ø49</p> <table border="1"> <tr> <td>Cutting Dia.</td> <td>ø39</td> <td>ø49</td> </tr> <tr> <td>a (mm)</td> <td>0.68</td> <td>0.74</td> </tr> </table>	Cutting Dia.	ø16	ø20	ø25	ø32	a (mm)	0.30	0.33	0.38	0.45	Cutting Dia.	ø39	ø49	a (mm)	0.68	0.74
Cutting Dia.	ø16	ø20	ø25	ø32												
a (mm)	0.30	0.33	0.38	0.45												
Cutting Dia.	ø39	ø49														
a (mm)	0.68	0.74														

Insert Grades  
Turnable  
Indexable Inserts  
CNC & PC Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

# Slot Mill MST



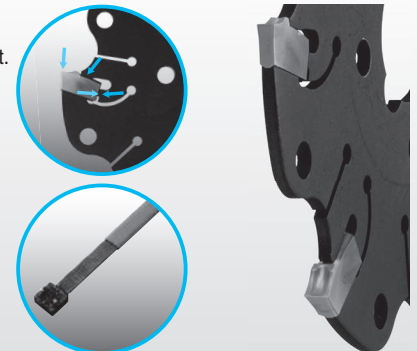
Full range from 1.6mm to 23.3mm in 3 types

## Full lineup of MST Series Slot Mills

Type	Applicable Inserts	Features	Slot width (mm)															
			1.6	2.2 (2.25)	3.05	4.05	6	8	10	13	14	16	18	20	22	24		
MSTA	SLT..	1.6 ~ 4.05mm fixed	●	●	●	●												
MSTB	LNEU12..	6 ~ 13mm Semi-Adjustable					▶			* Adjustable in 0.5mm increments between 6mm and 13mm with the combination of inserts								
MSTC	SP..10T3..	14 ~ 18mm Full-Adjustable									▶		* Adjustable between 14mm and 18mm					
	SD..1204...	18 ~ 23.3mm Full-Adjustable												▶			* Adjustable between 18mm and 23.3mm	

## Slot Mill MSTA (Slot width 1.6, 2.2(2.25), 3.05, 4.05mm)

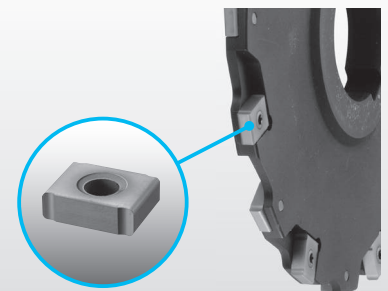
- Self-clamping type Slot Mill**  
 MSTA Slot Mills have simple self-clamping system to allow for easy attachment by just installing the insert.
- High Rigidity Clamping System**  
 Owing to the high rigidity clamping system - with an end - stopper, the toolholder enable high operability and stable slotting by maintaining an accurate edge position.
- Double-Prism Clamping System**  
 High replacement precision with the double-prism clamping system
- Easy replacement**  
 The replacement of inserts is easy and quick by using special wrench.



Wrench is not attached. Please purchase it separately.

## Slot Mill MSTB (Slot width 6.0 ~ 13.0mm)

- Up-right type / semi-adjustable slot width**
- Easy and secure screw holding**  
 Inserts can be attached to the MSTB Slot Mills very easily by using clamp screws.
- Economical Inserts with 4 Cutting Edges**
- Applicable to a variety of slotting by choosing different inserts.**  
 By changing the thickness of inserts, it's a applicable to various slotting widths up to max 13mm in 0.5mm increments.



M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

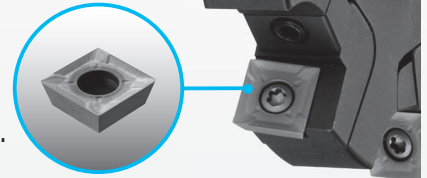
Ball-nose  
Radius

Others



## Slot Mill MSTC (Slot width 14.0 ~ 23.3mm)

- Lay-down type / full-adjustable slot width
- Applicable to various slotting needs. Slotting widths : 14.0mm to 23.3mm.  
Cutter Dia. : from 100mm to 160mm
- Smooth slotting width adjustment is possible owing to unique cam style adjustment mechanism.
- Economical 4-edge Insert
- A wide range of corner-R is suitable for various work.
- Owing to the wiper edge insert, an excellent surface finish can be expected.
- Owing to numerous insert geometries and grades, they are applicable for various types of workpiece machining.



### Features of Insert Grades

Insert Shape			
Symbol	SB	SD	SE
Rake Angle			
Shape			

#### CA0835

- TiN+TiCN+Al<sub>2</sub>O<sub>3</sub> based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Nodular Cast Iron.
- For middle to high speed machining.

#### PR0725

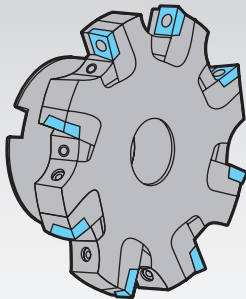
- TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron.
- For middle speed machining.

#### PR0110

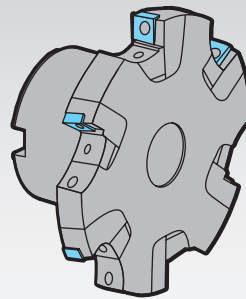
- TiB<sub>2</sub> based PVD Coated Carbide
- For Non-ferrous Metals such as Aluminum Alloys (Si<10%) and Titanium Alloys.
- For high speed machining.

### With Boss

Right-hand

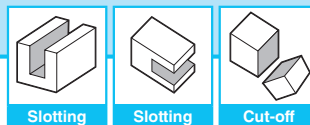


Left-hand



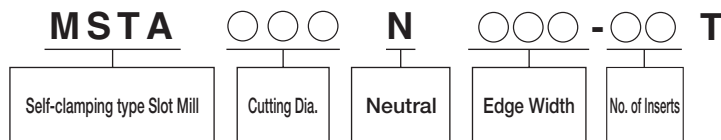
Insert Grades	A
Turning Indexable Inserts	B
CBN & PCBN Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T

# Slot Mill MSTA (Self-clamping type)

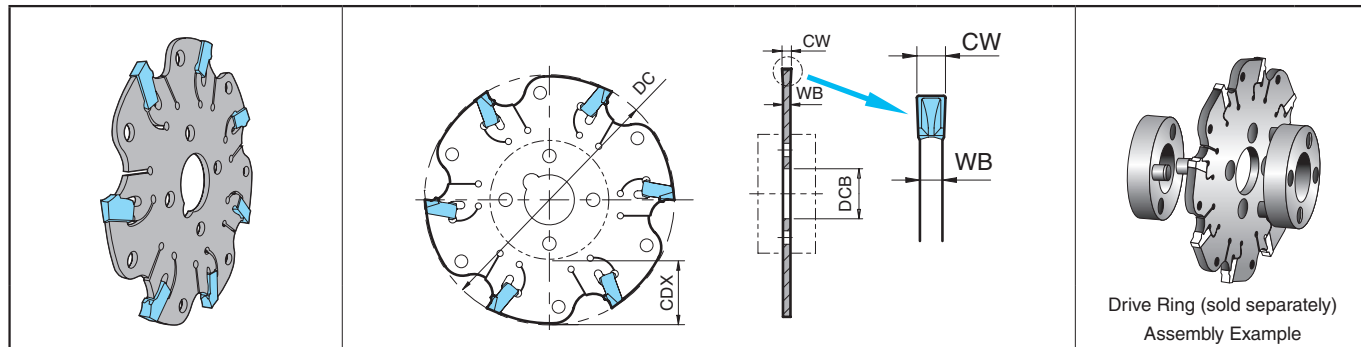


## Identification System

### MSTA Slot Mill



### MSTA (Metric)



### Toolholder Dimensions

Description	Stock	Edge Width	Slot Depth	No. of Inserts	Dimension (mm)			Weight (kg)	Applicable Inserts ● M138	Max. Revolution (min <sup>-1</sup> )	Spare Parts	Recommended Cutting Conditions	Applicable Arbor
					DC	DCB (H7)	WB				Wrench		
MSTA 63N16-5T 80N16-7T 100N16-9T 125N16-11T	●	1.6	15	5	63	16	1.3	0.03	SLT16...	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately)	M139	M159
			21	7	80					4,000			
			27	9	100					3,200			
			35	11	125					2,600			
MSTA 63N22-5T 80N22-7T 100N22-9T 125N22-11T 160N22-14T	●	2.2 (2.25)	15	5	63	16	1.8	0.03	SLT22...	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately)	M139	M159
			21	7	80					4,000			
			27	9	100					3,200			
			35	11	125					2,600			
			40	14	160					2,000			
MSTA 63N30-4T 80N30-6T 100N30-9T 125N30-11T 160N30-14T	●	3.05	15	4	63	16	2.4	0.05	SLT30...	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately)	M139	M159
			21	6	80					4,000			
			27	9	100					3,200			
			35	11	125					2,600			
			40	14	160					2,000			
MSTA 63N40-4T 80N40-6T 100N40-9T 125N40-11T 160N40-14T	●	4.05	15	4	63	16	3.4	0.06	SLT40...	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately)	M139	M159
			21	6	80					4,000			
			27	9	100					3,200			
			35	11	125					2,600			
			40	14	160					2,000			

Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singularly. Please purchase two drive rings per one MSTA slot mill.  
2. Do not exceed the max. revolution.  
3. Do not operate cutting on reverse revolution.  
4. Wrench (MS-FRW1) is not attached. Please purchase it separately.

### Drive Ring (For Metric)

Shape	Description	Stock	Dimension (mm)					Drawing	Applicable Toolholders			
			DCB	DIOUT	WB	KWW	DCON					
	DR16-32A	●	16	32	8	4.1	3	Fig. 2	MSTA 63N16-5T 63N22-5T			
	DR16-32B	●					4		MSTA 63N30-4T 63N40-4T			
	DR16-38	●	38	10	6.1	5	4	Fig. 1	MSTA 80N○○-○T			
	DR22-46	●	22						46	6.1	5	Fig. 3
DR32-55	●	32	55						8.1	6	MSTA 125N○○-○○T	
	DR40-80	●	40	80	12	10.1	12	Fig. 3	MSTA 160N○○-○○T			

M

Milling

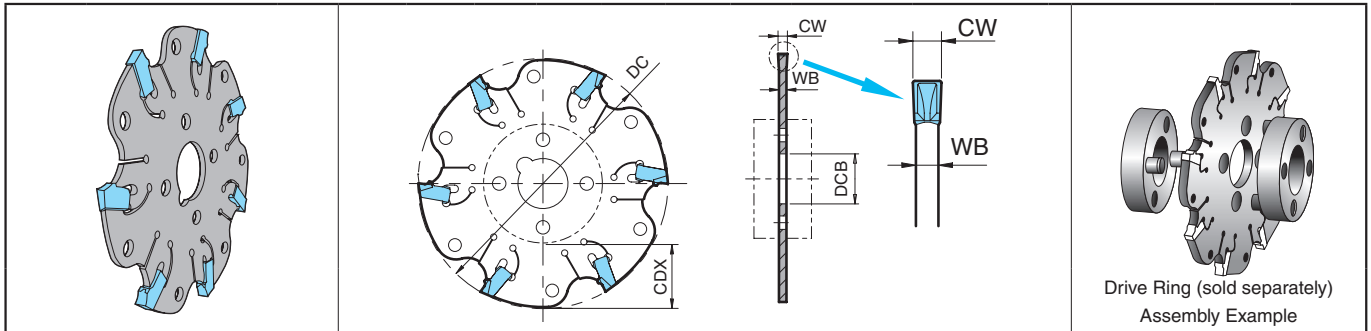
- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Wrenches and drive rings are sold in 1 piece boxes

M136

● : Std. Item

## MSTA (inch spec)



### Toolholder Dimensions

Description	Stock	Edge Width CW (inch)	Slot Depth CDX (inch)	No. of Inserts	Dimension (inch)			Weight (kg)	Applicable Inserts ● M138	Max. Revolution (min <sup>-1</sup> )	Spare Parts	Recommended Cutting Conditions	Applicable Arbor
					DC	DCB (H7)	WB				Wrench		
MSTA 02N063-5T 03N063-7T 04N063-9T 05N063-11T	○	.063 (1.6mm)		5	2.500 (63.5mm)	.625 (15.875mm)	.051 (1.3mm)	0.03	SLT16...	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately)	M139	M159
	○			7	3.000 (76.2mm)	.625 (15.875mm)		0.04		4,000			
	○			9	4.000 (101.6mm)	1.000 (25.4mm)		0.07		3,200			
	○			11	5.000 (127mm)	1.250 (31.75mm)		0.1		2,600			
MSTA 03N089-7T 04N089-9T 06N089-14T	○	.089 (2.25mm)		7	3.000 (76.2mm)	.625 (15.875mm)	.071 (1.8mm)	0.05	SLT22...	4,000			
	○			9	4.000 (101.6mm)	1.000 (25.4mm)		0.08		3,200			
	○			14	6.000 (152.4mm)	1.250 (31.75mm)		0.3		2,000			
MSTA 02N126-4T 03N126-6T 04N126-9T 05N126-11T 06N126-14T	○	.120 (3.05mm)		4	2.500 (63.5mm)	.625 (15.875mm)	.095 (2.4mm)	0.05	SLT30...	5,100			
	○			6	3.000 (76.2mm)	.625 (15.875mm)		0.08		4,000			
	○			9	4.000 (101.6mm)	1.000 (25.4mm)		0.13		3,200			
	○			11	5.000 (127mm)	1.250 (31.75mm)		0.2		2,600			
	○			14	6.000 (152.4mm)	1.250 (31.75mm)		0.35		2,000			
MSTA 03N164-6T 04N164-9T 05N164-11T	○	.160 (4.05mm)		6	3.000 (76.2mm)	.625 (15.875mm)	.134 (3.4mm)	0.1	SLT40...	4,000			
	○			9	4.000 (101.6mm)	1.000 (25.4mm)		0.15		3,200			
	○			11	5.000 (127mm)	1.250 (31.75mm)		0.25		2,600			

Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singularly. Please purchase two drive rings per one MSTA slot mill.  
 2. Do not exceed the max. revolution.  
 3. Do not operate cutting on reverse revolution.  
 4. Wrench (MS-FRW1) is not attached. Please purchase it separately.

### Drive Ring (for Inch spec)

Shape	Description	Stock	Dimension (inch)					Drawing	Applicable Toolholders
			DCB	DIOUT	WB	KWW	DCON		
	DR0625-1250A	○					.158 (4mm)	Fig. 1	MSTA 02N126-4T
	DR0625-1250B	○	.625 (15.875mm)	1.250 (31.75mm)	.315 (8mm)	.130 (3.3mm)		Fig. 2	MSTA 02N063-5T
	DR0625-1250C	○					.120 (3mm)		MSTA 03N○○○-○T
	DR1000-1875	○	1.000 (25.4mm)	1.875 (47.625mm)		.256 (6.5mm)	.200 (5mm)	Fig. 3	MSTA 04N○○○-○T
	DR1250-2250	○	1.250 (31.75mm)	2.250 (57.15mm)		.319 (8.1mm)	.240 (6mm)		MSTA 05N○○○-○T
	DR1250-3125	○	1.250 (31.75mm)	3.125 (79.375mm)	.472 (12mm)	.319 (8.1mm)	.472 (12mm)		MSTA 06N○○○-○T

○ : Check Availability

Wrenches and drive rings are sold in 1 piece boxes

# Slot Mill SLT type Insert

## Inserts Identification System

<b>SLT</b>		<b>16 - 15</b>		<b>S</b>	<b>KB</b>				
(1)		(2)	(3)	(4)	(5)				
(1) Insert Symbol		(2) Edge Width		(3) Corner-R(RE)		(4) Edge Preparation		(5) Chipbreaker Symbol	
Symbol	Edge Width	Symbol	Corner-R (RE)	Symbol	Cutting Edge Spec.	Symbol	Rake Angle		
16	1.6mm	15	0.15mm	S	Chamfered + R-honed	KB	5°		
22	2.2(2.25)mm	20	0.2mm	KD		15°			
30	3.05mm								
40	4.05mm								

## SLT

Insert	Description	Dimension (mm)		Rake Angle	CVD Coated Carbide	PVD Coated Carbide	See Page for Applicable Toolholders
		CW	RE		GAN	CA0835	
	<b>SLT 16-15SKB</b>	1.6 <sup>+0</sup> <sub>-0.1</sub>	0.15	5°	●	●	<b>M136</b> <b>M137</b>
	<b>22-20SKB</b>	2.2 <sup>+0.08</sup> <sub>-0.05</sub>	0.2		●	●	
	<b>30-20SKB</b>	3.05 <sup>+0.15</sup> <sub>-0</sub>			●	●	
	<b>40-20SKB</b>	4.05 <sup>+0.15</sup> <sub>-0</sub>	●		●		
	<b>SLT 16-15SKD</b>	1.6 <sup>+0</sup> <sub>-0.1</sub>	0.15	15°	●	●	
	<b>22-20SKD</b>	2.25 <sup>+0.15</sup> <sub>-0</sub>	0.2		●	●	
	<b>30-20SKD</b>	3.05 <sup>+0.15</sup> <sub>-0</sub>			●	●	
	<b>40-20SKD</b>	4.05 <sup>+0.15</sup> <sub>-0</sub>	●		●		

### Selection of chipbreaker

KB Chipbreaker ... General purpose chipbreaker for Steel and Cast Iron  
 KD Chipbreaker ... Low cutting force chipbreaker for Stainless Steel

## Features of Insert Grades

### CA0835

- TiN+TiCN+Al<sub>2</sub>O<sub>3</sub> based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron
- For middle to high speed machining

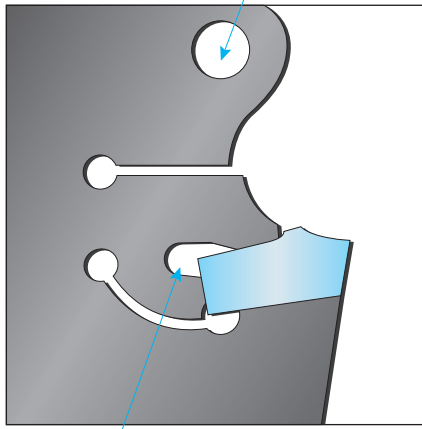
### PR0735

- TiN base PVD Coated Carbide
- For Stainless Steel, Heat-resistant Alloys, etc.
- For low to middle speed machining

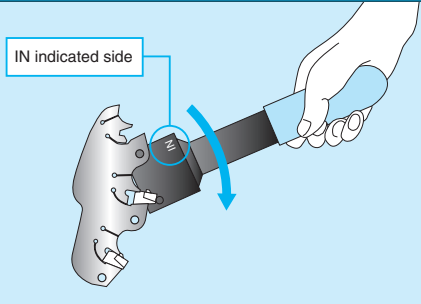
Inserts are sold in  
10 piece boxes

● : Std. Item

## Set up

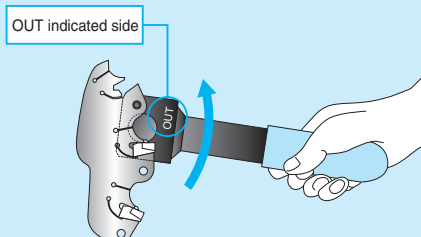


How to attach inserts



1. Put insert inside the slot mill.
2. Insert one of the pins on the wrench (on IN indicated side) into the wrench support hole.
3. Using the other pin, push the front relief surface of the insert.
4. Rotate the wrench until insert's back end makes contact with slot mill.

How to detach inserts



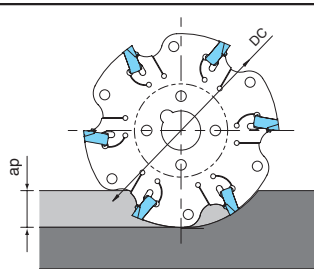
1. Insert one of the pins on the wrench (on OUT indicated side) into the wrench support hole, and insert other pin into the insert releasing hole.
2. Insert can be uninstalled by rotating the wrench counterclockwise. (A magnet is installed on OUT indicated side.)

Note) Use appropriate wrench for set up.

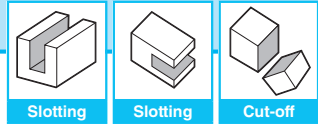
### Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grades(Cutting Speed Vc: m/min)		fz (mm/t)				Remarks	
			CVD Coated Carbide	PVD Coated Carbide	Edge Width (mm)					
			CA0835	PR0735	1.6	2.2(2.25)	3.05	4.05		
Low Carbon Steel	SS400 S10C ~ S25C	125	250~310	200~250	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	Coolant	
Carbon Steel	S30C ~ S58C (Annealed)	190	160~190	130~160	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20		
	S30C ~ S58C (Heat treated)	250	140~180	110~150	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20		
Alloy Steel	Annealed	180	140~180	110~150	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20		
	Heat treated	275	120~160	100~130	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18		
High Carbon Alloy	SKD11, SKD61, etc.	280	100~140	80~120	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18		
Stainless Steel	Austenitic related	220	150~190	80~120	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18		
	Martensitic related	300	140~180	60~80	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18		
Gray Cast Iron	FC250 ~ FC350	260	160~200	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20		Dry
Nodular Cast Iron	FCD400 ~ FCD500	160	130~160	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20		
		FCD600 ~ FCD800	250	110~140	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	

Note) 1. Use down-cut machining.  
 2. If ap is 1/10 or under of Cutter Dia.(DC), it is possible to increase feed per tooth (fz) by 40%.

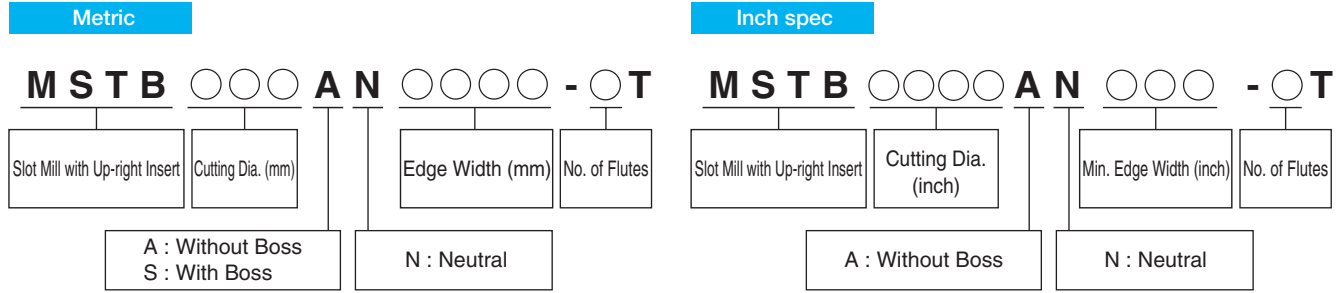


# Slot Mill MSTB

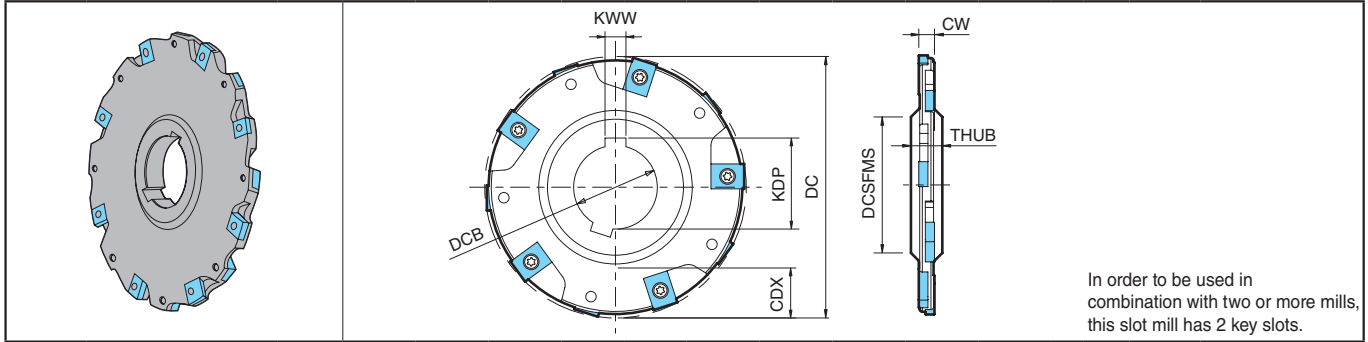


## Identification System

### MSTB Slot Mill



## Without Boss



### Toolholder Dimensions (Metric)

Description	Stock	Edge Width (mm)		Slot Depth (mm)	No. of Inserts	No. of Edge Lines	Dimension (mm)					Weight (kg)	Max. Revolution (min <sup>-1</sup> )	
		CW (min.)	CW (max.)				CDX (mm)	DC	DCB (H7)	DCSFMS	THUB			KDP
MSTB 80AN0607-4T	●	6	7	15	8	4	80	27	44	12	29.8	7	0.3	9,240
100AN0607-5T	●			21	10	5	100	32	52		34.8	8	0.4	8,270
125AN0607-6T	●			28	12	6	125	40	63		43.5	10	0.7	7,390
160AN0607-8T	●			45.5	16	8	160	40	63		43.5	10	1.1	6,540
MSTB 80AN0809-4T	●	8	9	16	8	4	80	27	44	12	29.8	7	0.4	9,240
100AN0809-5T	●			22	10	5	100	32	52		34.8	8	0.5	8,270
160AN0809-8T	●			45.5	16	8	160	40	63		43.5	10	1.3	6,540
MSTB 125AN1011-4T	●	10	11	30	12	4	125	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

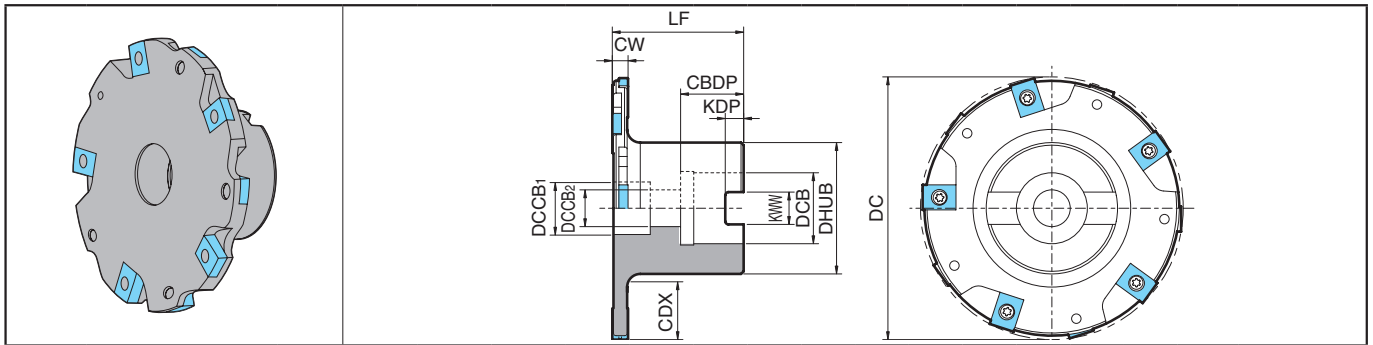
### Toolholder Dimensions (inch spec)

Description	Stock	Edge Width (inch)		Slot Depth (inch)	No. of Inserts	No. of Edge Lines	Dimension (inch)					Weight (kg)	Max. Revolution (min <sup>-1</sup> )	
		CW (min.)	CW (max.)				CDX (inch)	DC	DCB (H7)	DCSFMS	THUB			KDP
MSTB 3000AN250-4T	○	.250 (6.35mm)	.289 (7.34mm)	.625 (15.875mm)	8	4	3.000 (76.2mm)	1.000 (25.4mm)	1.500 (38.1mm)	.500 (12.7mm)	1.106 (28.1mm)	.250 (6.35mm)	0.3	9,470
4000AN250-5T	○			.935 (23.8mm)	10	5	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.3	8,200
5000AN250-6T	○			1.435 (36.4mm)	12	6	5.000 (127mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.7	7,300
6000AN250-8T	○			1.750 (44.45mm)	16	8	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.0	6,700
MSTB 4000AN312-5T	○	.312 (7.92mm)	.351 (8.91mm)	.966 (24.5mm)	10	5	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)	.500 (12.7mm)	1.386 (35.2mm)	.312 (7.92mm)	0.5	7,400
5000AN312-6T	○			1.466 (37.2mm)	12	6	5.000 (127mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.8	6,600
6000AN312-8T	○			1.781 (45.2mm)	16	8	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.1	6,000
MSTB 4000AN375-3T	○	.375 (9.525mm)	.414 (10.52mm)	1.000 (25.4mm)	9	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)	.500 (12.7mm)	1.386 (35.2mm)	.312 (7.92mm)	0.5	7,400
5000AN375-4T	○			1.500 (38.1mm)	12	4	5.000 (127mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.8	6,600
6000AN375-5T	○	.500 (12.7mm)	.539 (13.69mm)	1.812 (46.0mm)	15	5	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)	.500 (12.7mm)	1.665 (42.3mm)	.375 (9.52mm)	1.3	6,000
MSTB 4000AN500-3T	○			1.060 (26.9mm)	9	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.6	4,900
5000AN500-4T	○	.500 (12.7mm)	.539 (13.69mm)	1.560 (39.6mm)	12	4	5.000 (127mm)	1.250 (31.75mm)	1.880 (47.8mm)	.500 (12.7mm)	1.386 (35.2mm)	.312 (7.92mm)	1.1	4,400
6000AN500-5T	○			1.875 (47.6mm)	15	5	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.7	4,000

● : Std. Item  
○ : Check Availability



## With Boss



### Toolholder Dimensions (Metric)

Description	Stock	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)								Weight (kg)	Max. Revolution (min <sup>-1</sup> )	
		CW (min.)	CW (max.)				CDX (mm)	DC	DCB (H7)	DHUB	LF (min.)	CBDP	KDP	KWW			DCCB <sub>1</sub>
MSTB 80SN0607-4T	●	6	7	16	8	4	80	22	40	50	23	6.3	10.4	18	12	0.7	9,240
	●			21	10	5	100	27	50		24	7	12.4	20	14	1.0	8,270
	●			41	16	8	160	40	70		28	9	16.4	33	22	1.9	6,540
MSTB 80SN0809-4T	●	8	9	16	8	4	80	22	40	50	23	6.3	10.4	18	12	0.8	9,240
	●			21	10	5	100	27	50		24	7	12.4	20	14	1.2	8,270
	●			41	16	8	160									2.2	6,540
MSTB 125SN1011-4T	●	10	11	26	12	4	125	40	70	50	28	9	16.4	33	22	2.0	7,390
	●			43	15	5	160									2.5	6,540

Note) LF (min.) dimension shows in case of minimum of edge width (CW).

## Spare Parts and Applicable Inserts

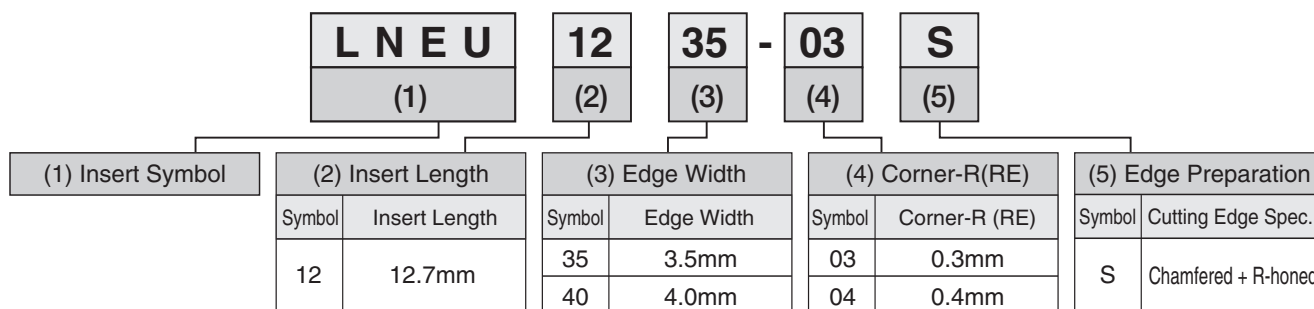
### Spare Parts

Description		Spare Parts				Applicable Inserts	Recommended Cutting Conditions	Applicable Arbor	
		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt				
Metric	Without Boss	MSTB ○○○AN0607-○T	SE-40050TRN	TT-15	P-37	-	LN12... M142, M143	M144	M159
		○○○AN0809-○T	SE-40068TR						
		○○○AN1011-○T	SE-40090TR						
		160AN1213-5T	SE-40090TR						
	With Boss	MSTB 80SN0607-4T	SE-40050TRN	TT-15	P-37	-			
		100SN0607-5T							
		160SN0607-8T							
		MSTB 80SN0809-4T	SE-40068TR						
		100SN0809-5T							
160SN0809-8T	SE-40068TR								
MSTB ○○○SN1011-○T	SE-40068TR	HH10X35							
Inch spec	Without Boss	MSTB ○○○○AN250-○T	SE-40055TR	TT-15	P-37	-			
		○○○○AN312-○T	SE-40068TR						
		○○○○AN375-○T	SE-40068TR						
		○○○○AN500-○T	SE-40090TR						
			SE-40090TR						

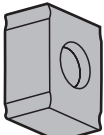
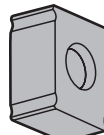
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

# Slot Mill LN Insert

## Inserts Identification System



## LN

Description	L	W1	Classification of usage ● : 1st Choice ○ : 2nd Choice	Dimension (mm)		PVD Coated Carbide	Applicable Clamp Screw	See Page for Applicable Toolholders	See Page for Recommended Cutting Conditions	
				S	D1					
<b>LNEU12</b>	12.7	9.52	P Carbon Steel / Alloy Steel ● M Stainless Steel ● K Cast Iron ○ N Non-ferrous Metals S Heat-resistant Alloys ● Titanium Alloys ○							
Insert	Description		Usable edges	Dimension (mm)		PR0725				
 Honed	<b>LNEU 1235-03-4</b> 1240-08-4 1245-04 1245-08 1250-04 1250-08 1255-04 1255-08 1260-04		4	3.5	4.4	0.3	●	SE-40050TRN	M140 M141	M144
	1245-04S 1245-08S 1250-04S 1250-08S		4	4.5	4.2	0.4 0.8	● ●	SE-40068TR		
	1245-04S 1245-08S 1250-04S 1250-08S		4	5.0	4.2	0.4 0.8	● ●	SE-40080TR		
	1245-04S 1245-08S 1250-04S 1250-08S		4	5.5	4.2	0.4 0.8	● ●	SE-40090TR		
	1245-04S 1245-08S 1250-04S 1250-08S		4	6.0	4.2	0.4	●	SE-40100TR		
	1245-04S 1245-08S 1250-04S 1250-08S		4	3.5	4.4	0.3	●	SE-40050TRN		
	1245-04S 1245-08S 1250-04S 1250-08S		4	4.0	4.4	0.3	●	SE-40055TR		
 Tough Edge	<b>LNEU 1235-03S-4</b> 1240-03S-4 1245-04S 1245-08S 1250-04S 1250-08S		4	4.5	4.2	0.4 0.8	● ●	SE-40068TR		
	1245-04S 1245-08S 1250-04S 1250-08S		4	5.0	4.2	0.4 0.8	● ●	SE-40080TR		

Notes) 1. Please select the applicable clamp screw depending on each insert description.  
 2. See page **M143** for insert description and applicable clamp screw depending on edge width.

## Features of Insert Grades

### ● PR0725

- TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron
- For middle speed machining

Inserts are sold in 10 piece boxes

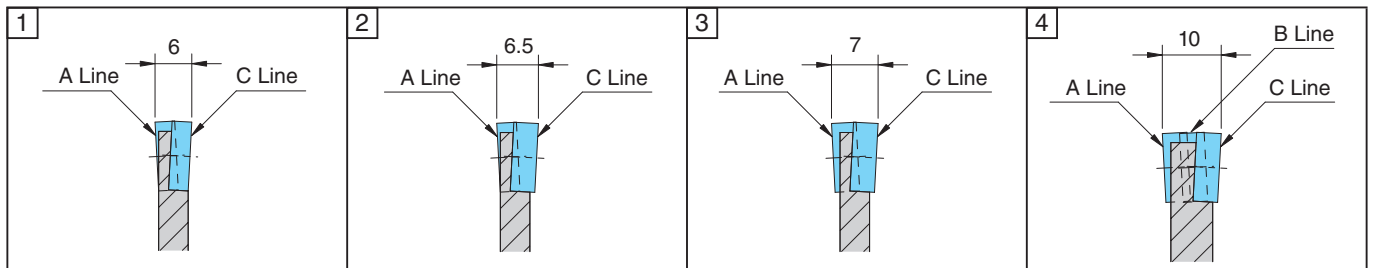
● : Std. Item

## Combination of Applicable Inserts

Description	Clamp Screw (Standard attachment parts)	Edge Width		A Line		B Line		C Line		Wrench for Clamp Screw	Tightening Torque (N·m)		
		mm	inch (mm)	Applicable Inserts	Clamp Screw	Applicable Inserts	Clamp Screw	Applicable Inserts	Clamp Screw				
Metric	MSTB ○○○AN0607-○T ○○○SN0607-○T	SE-40050TRN	6	-	LNEU1235..	SE-40050TRN	-	-	LNEU1235..	SE-40050TRN	TT-15	3	
			6.5	-	LNEU1240..	SE-40055TR			LNEU1240..	SE-40055TR			
			7	-	LNEU1240..	SE-40055TR			LNEU1240..	SE-40055TR			
	MSTB ○○○AN0809-○T ○○○SN0809-○T	SE-40068TR	8	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR			
			8.5	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR			
	MSTB ○○○AN1011-○T ○○○SN1011-○T	SE-40068TR	9	-	LNEU1250..	SE-40080TR			LNEU1250..	SE-40080TR			
			10	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR			
	MSTB ○○○AN1213-○T	SE-40090TR	10.5	-	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR			
			11	-	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR			
	Inch spec	MSTB ○○○○AN250-○T	SE-40055TR	.250 (6.35mm)	-	LNEU1240..	SE-40055TR	-	-	LNEU1240..			SE-40055TR
				.270 (6.86mm)	-	LNEU1240..	SE-40055TR	-	-	LNEU1240..			SE-40055TR
				.289 (7.34mm)	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..			SE-40068TR
.312 (7.92mm)				-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR			
MSTB ○○○○AN312-○T	SE-40068TR	.332 (8.43mm)	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR				
		.351 (8.91mm)	-	LNEU1250..	SE-40080TR	-	-	LNEU1250..	SE-40080TR				
MSTB ○○○○AN375-○T	SE-40068TR	.375 (9.525mm)	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR				
		.395 (10.33mm)	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR				
MSTB ○○○○AN500-○T	SE-40090TR	.414 (10.52mm)	-	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
		.500 (12.7mm)	-	LNEU1255... LNEU1260...	SE-40090TR SE-40100TR	LNEU1255... LNEU1260...	SE-40090TR SE-40100TR	LNEU1255... LNEU1260...	SE-40090TR SE-40100TR				

\* For clamp screw, above listed "Standard attachment parts" are attached. In case of necessity of another size of clamp screw by changing slotting width, please purchase separately.

## Slot width (edge width) adjustment



● The slot width (edge width) of MSTB slot mills is adjustable by a maximum of 1mm (.039") with the combination of inserts.

1. In the case of MSTB○○○AN0607-○T the width (W) is 6mm by installing LNEU1235 on both A line and C line.
2. By replacing C line only with LNEU1240 the width (W) is 6.5mm.
3. By replacing A line and C line with LNEU1240 the width (W) is 7mm.
4. If the slotting width (edge width) is 10mm (.375"), the B line (middle edge) is necessary.

\* Caution

- 1) There is no description such as "A line," "B line," and "C line" on the actual slot mill. These are only for explanation of the combination of insert.
- 2) Use proper clamp screws for applicable inserts on the basis of the above chart.
- 3) Please do not use any slot mills, that have a difference of width of more than 1mm (.039").

## Bottom cutting shape of MSTB Slot Mill

Slot bottom shape will be (Fig. 1) convex shape.

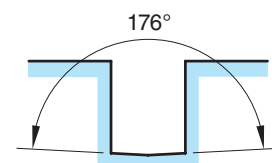


Fig. 1 Convex bottom shape

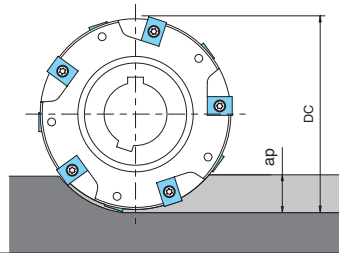
# Slot Mill MSTB

## ◆ Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc: m/min)		fz (mm/t)		Remarks
			PVD Coated Carbide		Insert Thickness (mm)		
			PR0725		3.5~4.0	4.5~6.0	
Low Carbon Steel	SS400 S10C ~ S25C	125	170~210		0.07~0.20	0.10~0.22	Dry
Carbon Steel	S30C ~ S58C (Annealed)	190	100~140		0.07~0.20	0.10~0.22	
	S30C ~ S58C (Heat treated)	250	90~120		0.07~0.20	0.10~0.22	
Alloy Steel	Annealed	180	90~120		0.07~0.20	0.10~0.22	
	Heat treated	275	80~110		0.05~0.18	0.08~0.20	
High Carbon Alloy	SKD11, SKD61, etc.	280	70~ 90		0.05~0.18	0.08~0.20	
Stainless Steel	Austenitic related	220	110~140		0.05~0.18	0.08~0.20	Coolant
	Martensitic related	300	100~120		0.05~0.18	0.08~0.20	
Heat-resistant Alloys	Ni-base heat-resistant alloys	350	15~ 30		0.05~0.18	0.08~0.20	
Titanium Alloys	Ti-6Al-4V, etc.	270	20~50		0.05~0.18	0.08~0.20	
Gray Cast Iron	FC250 ~ FC350	260	110~130		0.07~0.22	0.10~0.25	Dry
Nodular Cast Iron	FCD400 ~ FCD500	160	80~100		0.07~0.22	0.10~0.25	
	FCD600 ~ FCD800	250	70~ 90		0.07~0.22	0.10~0.25	

Note) 1. Use down-cut machining.

2. If  $a_p$  is 1/10 or under of Cutter Dia.(DC), it is possible to increase feed per tooth (fz) by 40%.



M

Milling

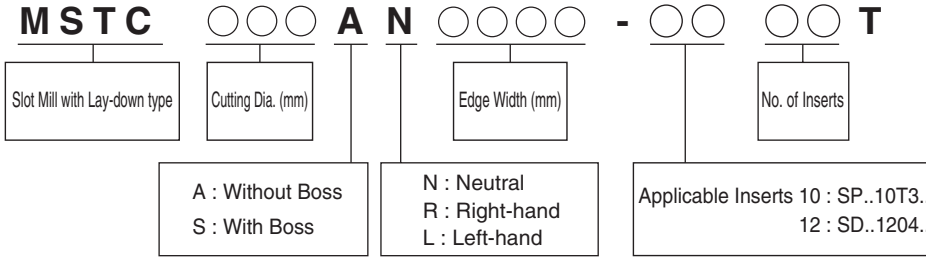
Insert
Lead Angle 45°~20°
Lead Angle 15°
Lead Angle 0°/2°
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

# Slot Mill MSTC

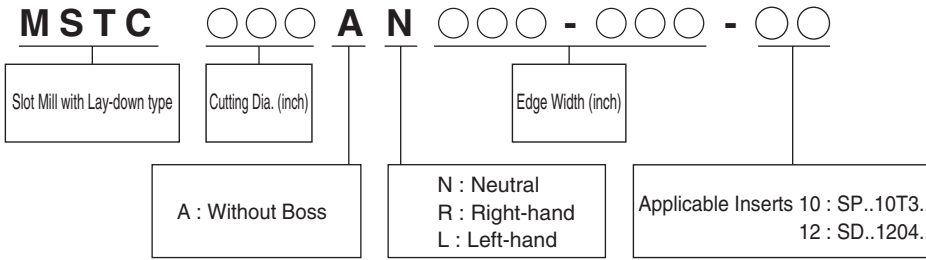
## Identification System

### MSTC Slot Mill

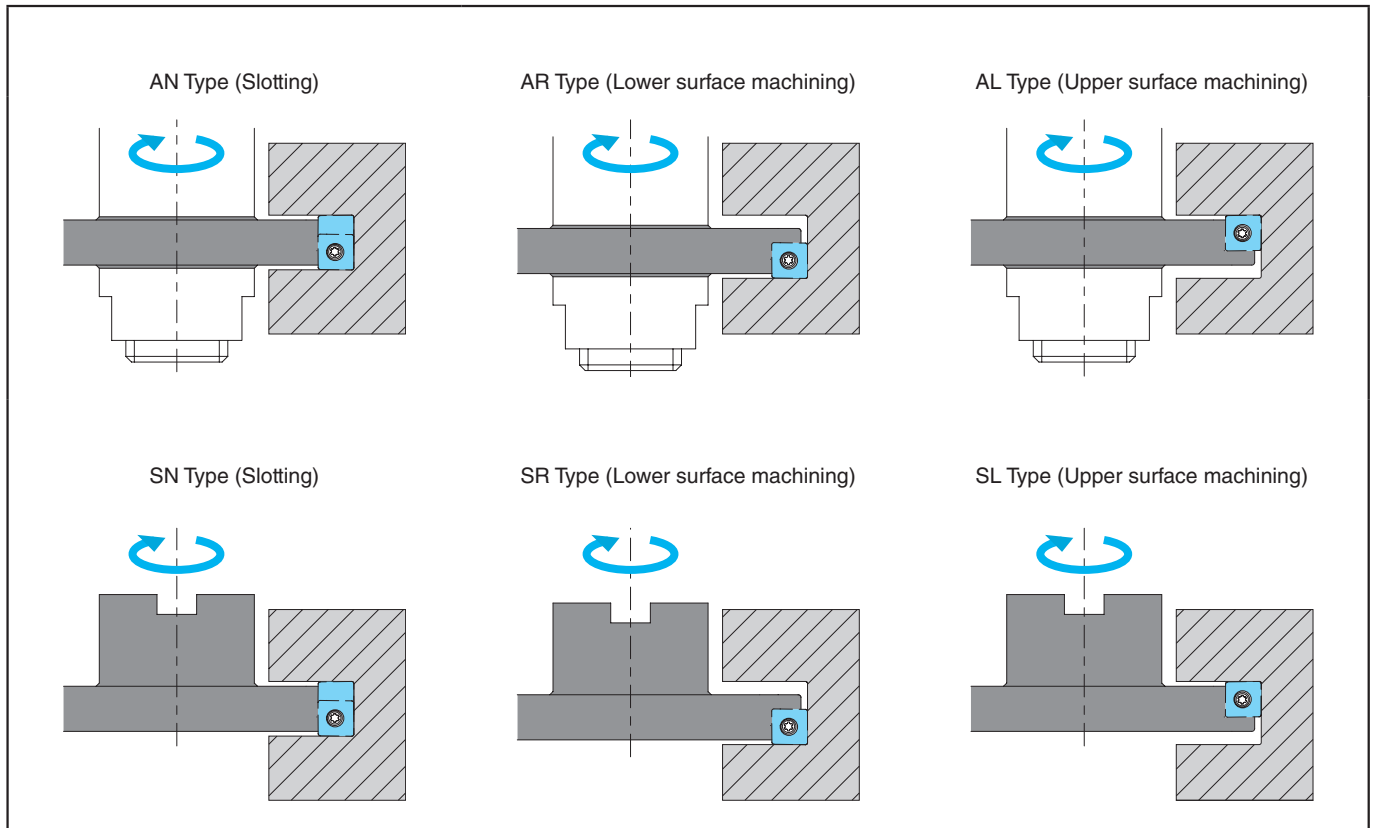
#### Metric



#### Inch spec

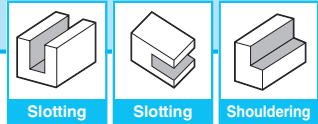


## Cutting Direction of MSTC Slot Mill



Insert Grades	A
Turning	B
Indexable Inserts	C
CBN & PCBN Tools	D
External	E
Small Parts Machining	F
Boring	G
Grooving	H
Cut-off	J
Threading	K
Drilling	L
Solid Tools	M
Milling	N
Tools for Turning Mill	P
Spare Parts	R
Technical Information	T
Index	

# Slot Mill

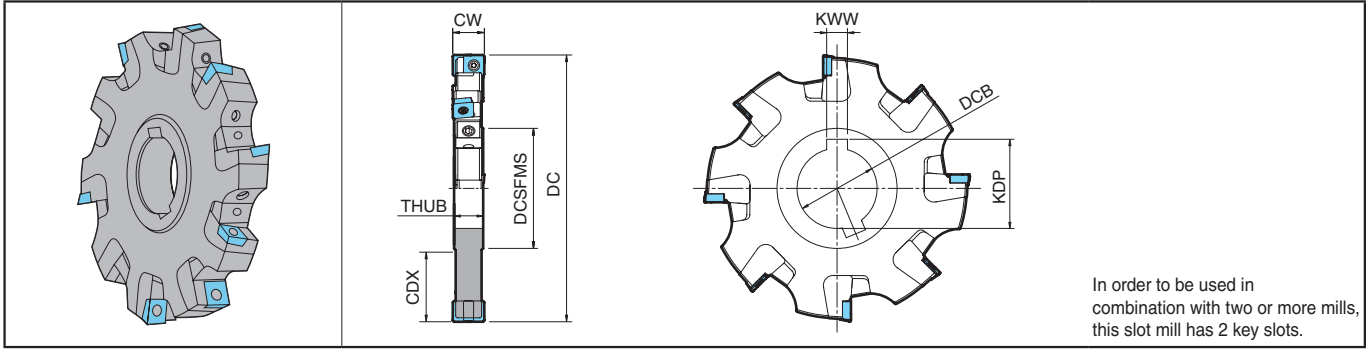


Slotting

Slotting

Shouldering

## Without Boss



In order to be used in combination with two or more mills, this slot mill has 2 key slots.

### Toolholder Dimensions (Metric)

Description	Stock	Edge Width (mm)		Slot Depth CDX (mm)	No. of Inserts	No. of Edge Lines	Dimension (mm)						Weight (kg)	Max. Revolution (min <sup>-1</sup> )
		CW (min.)	CW (max.)				DC	DCB (H7)	DCSFMS	THUB	KDP	KWW		
MSTC 100AN1416-10-3T	●	14	16	25.9	6	3	100	32	46.8	13.9	34.8	8	0.5	17,250
125AN1416-10-4T	●			34.4	8	4	125	40	54.8					
160AN1416-10-5T	●			51.9	10	5	160							
MSTC 125AN1618-10-4T	●	16	18	34.4	8	4	125			43.5	10			
160AN1618-10-5T	●			51.9	10	5	160							
MSTC 125AN1820-12-4T	●	18	20.7	34	8	4	125	43.5	10			15.9	1.0	15,450
160AN1820-12-5T	●			51.5	10	5	160							
MSTC 125AN2123-12-4T	●	21	23.3	34	8	4	125			43.5	10			
160AN2123-12-5T	●			51.5	10	5	160							
MSTC 125AN2123-12-4T	●	21	23.3	34	8	4	125	43.5	10			20.8	1.2	10,350
160AN2123-12-5T	●			51.5	10	5	160							

### Toolholder Dimensions (inch spec)

Description	Stock	Edge Width (inch)		Slot Depth CDX (inch)	No. of Inserts	No. of Edge Lines	Dimension (inch)						Weight (kg)	Max. Revolution (min <sup>-1</sup> )
		CW (min.)	CW (max.)				DC	DCB (H7)	DCSFMS	THUB	KDP	KWW		
MSTC 400AN551-630-10	○	.551 (14.0mm)	.630 (16.0mm)	1.030 (26.1mm)	6	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
500AN551-630-10	○			1.345 (34.1mm)	8	4	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)					
600AN551-630-10	○			1.845 (46.8mm)	10	5	6.000 (152.4mm)							
MSTC 500AN630-709-10	○	.630 (16.0mm)	.709 (18.0mm)	1.345 (34.1mm)	8	4	5.000 (127.0mm)			1.500 (38.1mm)	2.250 (57.15mm)	.624 (15.85mm)	1.665 (42.3mm)	.375 (9.52mm)
600AN630-709-10	○			1.845 (46.8mm)	10	5	6.000 (152.4mm)							
MSTC 500AN709-813-12	○	.709 (18.0mm)	.813 (20.6mm)	1.331 (33.8mm)	8	4	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)					
600AN709-813-12	○			1.831 (46.5mm)	10	5	6.000 (152.4mm)							
MSTC 500AN813-917-12	○	.813 (20.6mm)	.917 (23.2mm)	1.331 (33.8mm)	8	4	5.000 (127.0mm)			1.500 (38.1mm)	2.250 (57.15mm)	.820 (20.8mm)	1.665 (42.3mm)	.375 (9.52mm)
600AN813-917-12	○			1.831 (46.5mm)	10	5	6.000 (152.4mm)							

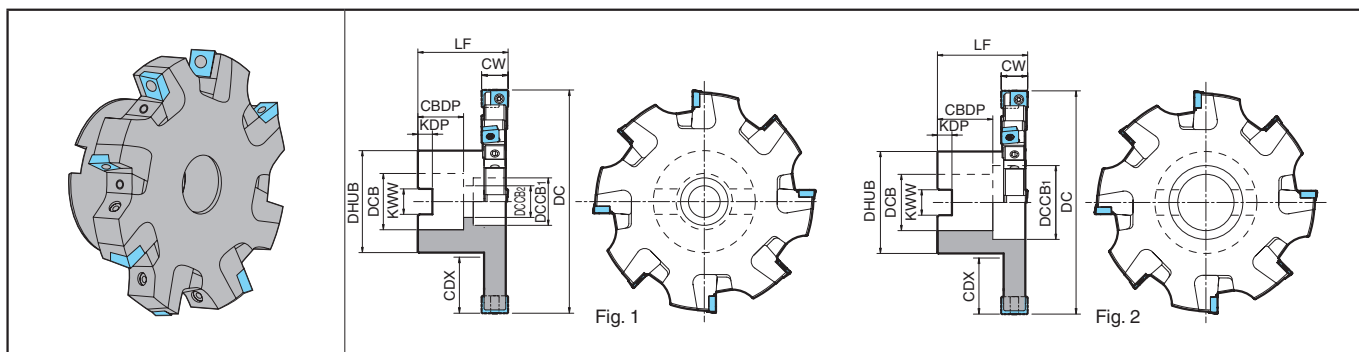
M  
Milling

- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Std. Item  
○ : Check Availability



## With Boss



### Toolholder Dimensions (Metric)

Description	Stock	Edge Width (mm)		Slot Depth (mm)	No. of Inserts	No. of Edge Lines	Dimension (mm)								Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )								
		CW (min.)	CW (max.)				DC	DCB (H7)	DHUB	LF (min.)	CBDP	KDP	KWW	DCCB <sub>1</sub>				DCCB <sub>2</sub>							
MSTC 100SN1416-10-3T 125SN1416-10-4T 160SN1416-10-5T	●	14	16	24.4	6	3	100	27	48	50.8	24	7	12.4	20	14	Fig. 1	1.0	17,250							
	31.9			8	4	125	32	58	26										8	14.4	27	18	Fig. 2	1.6	15,450
	43.4			10	5	160	40	70	30										9	16.4	56	-			
MSTC 125SN1618-10-4T 160SN1618-10-5T	●	16	18	31.9	8	4	125	32	58	50.8	26	8	14.4	27	18	Fig. 1	1.7	15,450							
	43.4			10	5	160	40	70	30										9	16.4	56	-	Fig. 2	2.3	13,650
MSTC 125SN1820-12-4T 160SN1820-12-5T	●	18	20.7	31.9	8	4	125	32	58	51.0	26	8	14.4	27	18	Fig. 1	1.6	10,350							
	43.4			10	5	160	40	70	30										9	16.4	56	-	Fig. 2	2.3	9,150
MSTC 125SN2123-12-4T 160SN2123-12-5T	●	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							
	43.4			10	5	160	40	70	30										9	16.4	56	-	Fig. 2	2.6	9,150

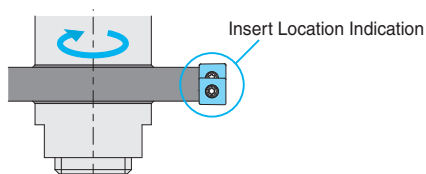
Note) LF (min.) dimension shows in case of minimum of edge width (CW).

Recommended Cutting Conditions **M156**

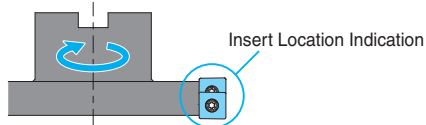
## Applicable Insert Installation Method (common to Metric / Inch spec)

When installing handed inserts, it is necessary to equip same number of right-hand and left-hand inserts as shown in "No. of Edge Lines" respectively. Please install as show in the figure below.

### MSTC...AN... (Without Boss)



### MSTC...SN... (With Boss)



Toolholder Description	Insert Location Indication	Applicable Inserts <b>M154-M155</b>	
		Handed	Neutral
MSTC...AN...10.. MSTC...SN...10..		SP..10T3...L...	SP..10T3...N...
		SP..10T3...R...	
MSTC...AN...12.. MSTC...SN...12..		SD..1204...L...	SD..1204...N...
		SD..1204...R...	

## Spare Parts (common to Metric / Inch spec)

· See page M152

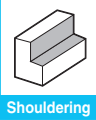
## Slot width (edge width) adjustment

· See page M156-M158

## Applicable Arbor

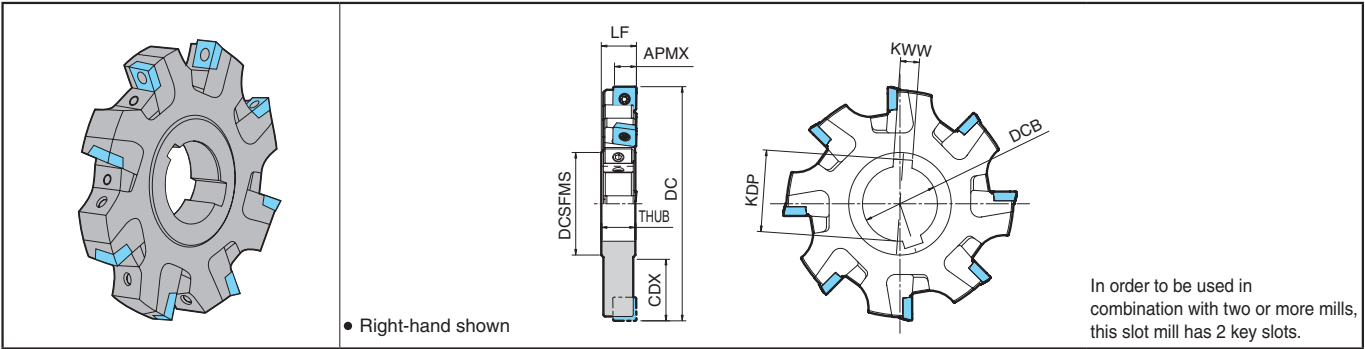
· See page M159

# Half Side Slot Mill



Shouldering

## Without Boss Right-hand



### Toolholder Dimensions (Metric)

Description	Stock	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min <sup>-1</sup> )
			DC	DCB (H7)	DCSFMS	THUB	LF		CDX	APMX (max.)	KDP	KWW		
							(min.)	(max.)						
MSTC 100AR1416-10-6T	○	6	100	32	46.8				25.9		34.8	8	0.5	17,250
125AR1416-10-8T	○	8	125			13.9	13.9	14.9	34.4	9.1			0.8	15,450
160AR1416-10-10T	○	10	160						51.9				1.5	13,650
MSTC 125AR1618-10-8T	○	8	125			15.9	15.2	16.2	34.4				1.0	15,450
160AR1618-10-10T	○	10	160	40	54.8				51.9		43.5	10	1.8	13,650
MSTC 125AR1820-12-8T	○	8	125			18.2	18.1	19.4	34.0				1.0	10,350
160AR1820-12-10T	○	10	160						51.5	11.7			1.8	9,150
MSTC 125AR2123-12-8T	○	8	125			20.8	20.7	22.0	34.0				1.2	10,350
160AR2123-12-10T	○	10	160						51.5				2.1	9,150

### Toolholder Dimensions (inch spec)

Description	Stock	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min <sup>-1</sup> )
			DC	DCB (H7)	DCSFMS	THUB	LF		CDX	APMX (max.)	KDP	KWW		
							(min.)	(max.)						
MSTC 400AR551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)				1.030 (26.1mm)		1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
500AR551-630-10	○	8	5.000 (127.0mm)			.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	1.345 (34.1mm)				0.9	15,300
600AR551-630-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)	.359 (9.1mm)			1.4	14,000
MSTC 500AR630-709-10	○	8	5.000 (127.0mm)			.624 (15.85mm)	.627 (15.93mm)	.667 (16.94mm)	1.345 (34.1mm)				1.1	15,300
600AR630-709-10	○	10	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.15mm)				1.845 (46.8mm)		1.665 (42.3mm)	.375 (9.52mm)	1.6	14,000
MSTC 500AR709-813-12	○	8	5.000 (127.0mm)			.716 (18.2mm)	.712 (18.1mm)	.764 (19.4mm)	1.331 (33.8mm)				1.1	10,300
600AR709-813-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)	.461 (11.7mm)			1.7	9,400
MSTC 500AR813-917-12	○	8	5.000 (127.0mm)			.820 (20.8mm)	.816 (20.7mm)	.868 (22.04mm)	1.331 (33.8mm)				1.3	10,300
600AR813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				2.0	9,400

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

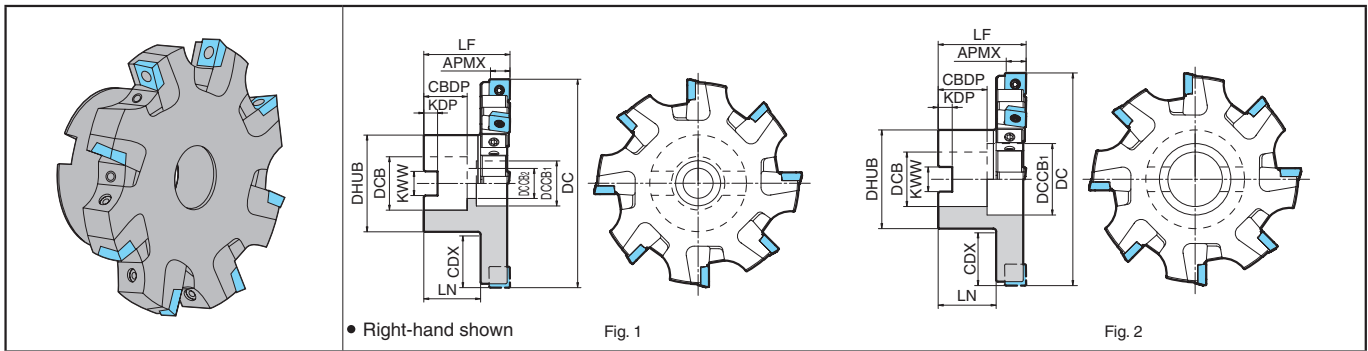
Slot Mill

Ball-nose  
Radius

Others

○ : Check Availability

## With Boss Right-hand



### Toolholder Dimensions (Metric)

Description	Stock	No. of Inserts	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )
			DC	DCB (H7)	DHUB	LN	LF (min.) (max.)		CDX	APMX (max.)	CBDB	KDP	KWW	DCCB <sub>1</sub>	DCCB <sub>2</sub>			
MSTC 100SR1416-10-6T	○	6	100	27	48	37.7	50.8	51.8	24.4	9.1	24	7	12.4	20	14	Fig. 1	1.0	17,250
	○	8	125	32	58				31.9		26	8	14.4	27	18		1.6	15,450
	○	10	160	40	70				43.4		30	9	16.4	56	-		Fig. 2	2.0
MSTC 125SR1618-10-8T	○	8	125	32	58	35.7	51.0	52.3	31.9	11.7	26	8	14.4	27	18	Fig. 1	1.7	15,450
	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	13,650
MSTC 125SR1820-12-8T	○	8	125	32	58	34.0	51.0	52.3	31.9	11.7	26	8	14.4	27	18	Fig. 1	1.6	10,350
	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	9,150
MSTC 125SR2123-12-8T	○	8	125	32	58	31.4	51.0	52.3	31.9	11.7	26	8	14.4	27	18	Fig. 1	1.7	10,350
	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.6	9,150

### Applicable Inserts (common to Metric / Inch spec)

Toolholder Description	Applicable Inserts <b>M154-M155</b>	
	Handed	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 **M156**

### Spare Parts (common to Metric / Inch spec)

• See page M153

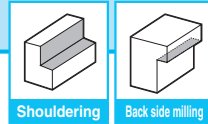
### Slot width (edge width) adjustment

• See page M156-M158

### Applicable Arbor

• See page M159

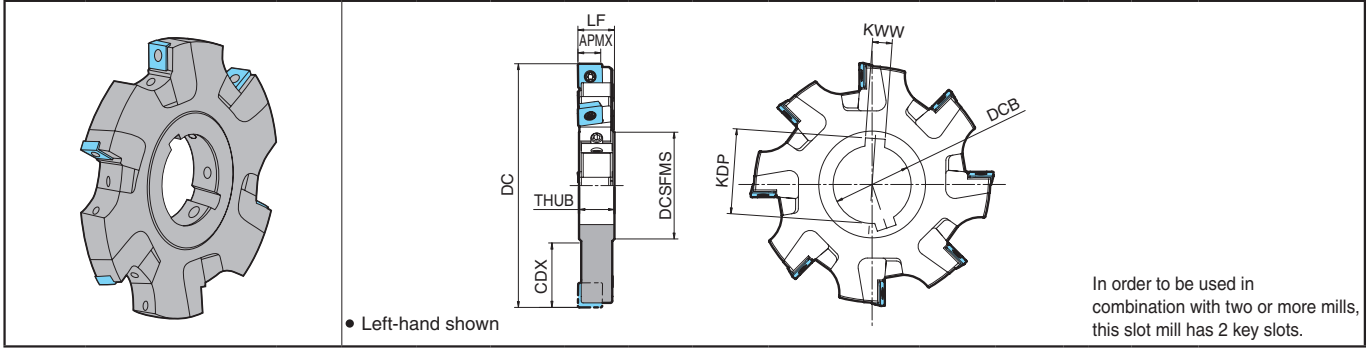
# Half Side Slot Mill



Shouldering

Back side milling

## Without Boss Left-hand



### Toolholder Dimensions (Metric)

Description	Stock	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min <sup>-1</sup> )		
			DC	DCB (H7)	DCSFMS	THUB	LF		CDX	APMX (max.)	KDP	KWW				
							(min.)	(max.)								
MSTC 100AL1416-10-6T	○	6	100	32	46.8				25.9		34.8	8	0.5	17,250		
125AL1416-10-8T	○	8	125	40	54.8	13.9	13.9	14.9	34.4	9.1	43.5	10	0.8	15,450		
160AL1416-10-10T	○	10	160						51.9						1.5	13,650
MSTC 125AL1618-10-8T	○	8	125						34.4							
160AL1618-10-10T	○	10	160			51.9	1.8	13,650								
MSTC 125AL1820-12-8T	○	8	125			15.9			15.2	16.2			34.0	11.7	1.0	10,350
160AL1820-12-10T	○	10	160			18.2	18.1	19.4	51.5	1.8			9,150			
MSTC 125AL2123-12-8T	○	8	125			20.8	20.7	22.0	34.0					1.2	10,350	
160AL2123-12-10T	○	10	160						51.5	2.1			9,150			

### Toolholder Dimensions (inch spec)

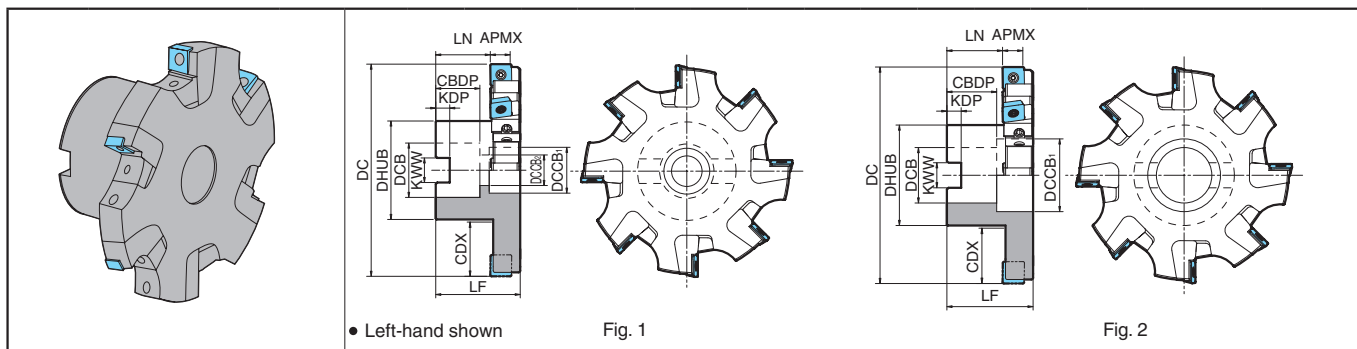
Description	Stock	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min <sup>-1</sup> )		
			DC	DCB (H7)	DCSFMS	THUB	LF		CDX	APMX (max.)	KDP	KWW				
							(min.)	(max.)								
MSTC 400AL551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)				1.030 (26.1mm)		1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100		
500AL551-630-10	○	8	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)	.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	1.345 (34.1mm)	.359 (9.1mm)	1.665 (42.3mm)	.375 (9.52mm)	0.9	15,300		
600AL551-630-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)						1.1	15,300
MSTC 500AL630-709-10	○	8	5.000 (127.0mm)						1.345 (34.1mm)							
600AL630-709-10	○	10	6.000 (152.4mm)			1.845 (46.8mm)	1.1	10,300								
MSTC 500AL709-813-12	○	8	5.000 (127.0mm)			.624 (15.85mm)			.627 (15.93mm)	.667 (16.94mm)			1.331 (33.8mm)	.461 (11.7mm)	1.7	9,400
600AL709-813-12	○	10	6.000 (152.4mm)			.716 (18.2mm)	.712 (18.1mm)	.764 (19.4mm)	1.831 (46.5mm)	1.3			10,300			
MSTC 500AL813-917-12	○	8	5.000 (127.0mm)			.820 (20.8mm)	.816 (20.7mm)	.868 (22.04mm)	1.331 (33.8mm)					1.3	10,300	
600AL813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)	2.0			9,400			

M  
Milling

- Insert
- Lead Angle 45°-20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

○ : Check Availability

## With Boss Left-hand



### Toolholder Dimensions (Metric)

Description	Stock	No. of Inserts	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )
			DC	DCB (H7)	DHUB	LF	LN		CDX	APMX (max.)	CBDP	KDP	KWW	DCCB <sub>1</sub>	DCCB <sub>2</sub>			
MSTC 100SL1416-10-6T	○	6	100	27	48	50	35.8	36.8	24.4	9.1	24	7	12.4	20	14	Fig. 1	1.0	17,250
	○	8	125	32	58				31.9		26	8	14.4	27	18		1.6	15,450
	○	10	160	40	70		43.4	30	9		16.4	56	-	Fig. 2	2.0	13,650		
MSTC 125SL1618-10-8T	○	8	125	32	58		33.8	34.8	31.9	11.7	26	8	14.4	27	18	Fig. 1	1.7	15,450
	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	13,650
MSTC 125SL1820-12-8T	○	8	125	32	58		31.7	33.0	31.9		26	8	14.4	27	18	Fig. 1	1.6	10,350
	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	9,150
MSTC 125SL2123-12-8T	○	8	125	32	58		29.1	30.4	31.9		26	8	14.4	27	18	Fig. 1	1.7	10,350
	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.6	9,150

### Applicable Inserts (common to Metric / Inch spec)

Toolholder Description	Applicable Inserts <b>M154-M155</b>	
	Handed	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 **M156**

### Spare Parts (common to Metric / Inch spec)

· See page M153

### Slot width (edge width) adjustment

· See page M156-M158


### Applicable Arbor

· See page M159



# Slot Mill

## Spare Parts (common to Metric / Inch spec)

Description		Spare Parts														
		Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting bolt				
		Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw						
Without Boss	Metric	MSTC 100AN1416-10-3T 125AN1416-10-4T 160AN1416-10-5T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18 W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	-			
		MSTC 125AN1618-10-4T 160AN1618-10-5T	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20										
		MSTC 125AN1820-12-4T 160AN1820-12-5T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15					
		MSTC 125AN2123-12-4T 160AN2123-12-5T	C90SD2023-12R	C90SD2023-12L	WC-20											
		MSTC 400AN551-630-10 500AN551-630-10 600AN551-630-10	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18 W6X20	AP-1416	SE-3070TRP		LW-2.5	DTP-9					
	MSTC 500AN630-709-10 600AN630-709-10	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20											
	MSTC 500AN709-813-12 600AN709-813-12	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	LW-3	DTP-15							
	MSTC 500AN813-917-12 600AN813-917-12	C90SD2023-12R	C90SD2023-12L	WC-20												
	With Boss	Metric	MSTC 100SN1416-10-3T 125SN1416-10-4T 160SN1416-10-5T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5			DTP-9	P-37	HH12X35
			MSTC 125SN1618-10-4T 160SN1618-10-5T	C90SP1618-10R	C90SP1618-10L	WC-16										HH16X35
MSTC 125SN1820-12-4T 160SN1820-12-5T			C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP	LW-3		DTP-15	HH16X35				
MSTC 125SN2123-12-4T 160SN2123-12-5T			C90SD2023-12R	C90SD2023-12L	WC-20							HH16X35				

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

## Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (N·m)	5-6	1.5	4

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius


Others





# Half Side Slot Mill

## Spare Parts (common to Metric / Inch spec)

Description			Spare Parts									Anti-seize Compound	Mounting bolt				
			Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench								
			Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw						
Without Boss	Metric	MSTC 100AR1416-10-6T 125AR1416-10-8T 160AR1416-10-10T	C90SP1416-10R	-	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	-				
		W6X20															
		MSTC 125AR1618-10-8T 160AR1618-10-10T			C90SP1618-10R	-	WC-16	W6X20		AP-1820	SB-3590TRP			LW-3	DTP-15		
		W6X20															
		MSTC 125AR1820-12-8T 160AR1820-12-10T			C90SD1820-12R	-	WC-18	W6X20		AP-1820	SB-3590TRP			LW-3	DTP-15		
		W6X20															
		MSTC 125AR2123-12-8T 160AR2123-12-10T			C90SD2023-12R	-	WC-20	W6X20		AP-1416	SE-3070TRP			LW-2.5	DTP-9		
		W6X20															
		MSTC 100AL1416-10-6T 125AL1416-10-8T 160AL1416-10-10T			C90SP1416-10L	-	WC-14	W6X18		AP-1820	SB-3590TRP			LW-3	DTP-15		
		W6X20															
		MSTC 125AL1618-10-8T 160AL1618-10-10T					C90SP1618-10L	-		WC-16	W6X20			AP-1820	SB-3590TRP	LW-3	DTP-15
		W6X20															
	MSTC 125AL1820-12-8T 160AL1820-12-10T	C90SD1820-12L	-	WC-18			W6X20	AP-1416	SE-3070TRP	LW-2.5	DTP-9						
	W6X20																
	MSTC 125AL2123-12-8T 160AL2123-12-10T	C90SD2023-12L	-	WC-20			W6X20	AP-1820	SB-3590TRP	LW-3	DTP-15						
	W6X20																
	Inch spec	MSTC 400AR551-630-10 500AR551-630-10 600AR551-630-10	C90SP1416-10R	-			WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L			LW-2.5	DTP-9		
		W6X20															
		MSTC 500AR630-709-10 600AR630-709-10					C90SP1618-10R	-	WC-16	W6X20				AP-1820	SB-3590TRP	LW-3	DTP-15
		W6X20															
		MSTC 500AR709-813-12 600AR709-813-12			C90SD1820-12R	-	WC-18	W6X20	AP-1416	SE-3070TRP				LW-2.5	DTP-9		
		W6X20															
		MSTC 500AR813-917-12 600AR813-917-12			C90SD2023-12R	-	WC-20	W6X20	AP-1820	SB-3590TRP				LW-3	DTP-15		
		W6X20															
MSTC 400AL551-630-10 500AL551-630-10 600AL551-630-10		C90SP1416-10L			-	WC-14	W6X18	AP-1820	SB-3590TRP	LW-3		DTP-15					
W6X20																	
MSTC 500AL630-709-10 600AL630-709-10						C90SP1618-10L	-	WC-16	W6X20	AP-1416		SE-3070TRP	LW-2.5	DTP-9			
W6X20																	
MSTC 500AL709-813-12 600AL709-813-12	C90SD1820-12L		-	WC-18		W6X20	AP-1820	SB-3590TRP	LW-3	DTP-15							
W6X20																	
MSTC 500AL813-917-12 600AL813-917-12	C90SD2023-12L		-	WC-20		W6X20	AP-1416	SE-3070TRP	LW-2.5	DTP-9							
W6X20																	
With Boss	Metric		MSTC 100SR1416-10-6T 125SR1416-10-8T 160SR1416-10-10T	C90SP1416-10R		-	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	HH12X35		
			HH16X35														
			MSTC 125SR1618-10-8T 160SR1618-10-10T				C90SP1618-10R	-	WC-16	W6X20		AP-1820	SB-3590TRP		LW-3	DTP-15	HH16X35
			HH16X35														
		MSTC 125SR1820-12-8T 160SR1820-12-10T	C90SD1820-12R		-		WC-18	W6X20	AP-1416	SE-3070TRP		LW-2.5	DTP-9		HH16X35		
		HH16X35															
		MSTC 125SR2123-12-8T 160SR2123-12-10T	C90SD2023-12R		-		WC-20	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		HH16X35		
		HH16X35															
		MSTC 100SL1416-10-6T 125SL1416-10-8T 160SL1416-10-10T	C90SP1416-10L		-		WC-14	W6X20	AP-1416	SE-3070TRP		LW-2.5	DTP-9		HH12X35		
		HH16X35															
		MSTC 125SL1618-10-8T 160SL1618-10-10T					C90SP1618-10L	-	WC-16	W6X20		AP-1820	SB-3590TRP		LW-3	DTP-15	HH16X35
		HH16X35															
MSTC 125SL1820-12-8T 160SL1820-12-10T	C90SD1820-12L	-		WC-18		W6X20	AP-1416	SE-3070TRP	LW-2.5	DTP-9	HH16X35						
HH16X35																	
MSTC 125SL2123-12-8T 160SL2123-12-10T	C90SD2023-12L	-		WC-20		W6X20	AP-1820	SB-3590TRP	LW-3	DTP-15	HH16X35						
HH16X35																	

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

## Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (N · m)	5~6	1.5	4

Insert Grades  
Turnable  
Indexable Inserts  
CNC & PC Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Turning Mill  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

# Slot Mill MSTC

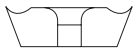
## Inserts Identification System

Symbol	Shape	Tolerance			Symbol	Corner-R (RE)	Symbol	Hand of Tool		
		Corner Height	Thickness	I.C. Size						
S	Square	C	±0.013mm	±0.025mm	±0.025mm	16	1.6mm	N	Neutral	
		E	±0.025mm					L	Left-hand	
(1) Shape		(3) Tolerance			(5) Edge Length		(7) Corner-R(RE)		(9) Hand of Tool	

S	P	C	T	10	T3	08	E	R	SD	(10) Chipbreaker Symbol	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Symbol	Rake Angle

(2) Relief Angle		(4) Hole / Chipbreaker		(6) Thickness		(8) Edge Preparation	
Symbol	Relief Angle	Symbol	Shape	Symbol	Thickness	Symbol	Cutting Edge Spec.
D	15°	T	 Single-sided chipbreaker, with hole	T3	3.97mm	E	Honed
P	11°			04	4.76mm	F	Sharp Edge
						S	Chamfered + R-honed


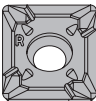
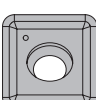

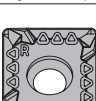

SB	5°	SD	15°	SE	20°
----	----	----	-----	----	-----

## SP..10T3

### Applicable Inserts

Description	IC	S	D1
SP..10T3	10.0	3.97	3.4

Classification of usage ● : 1st Choice ○ : 2nd Choice	P	Carbon Steel / Alloy Steel	●	●		
	M	Stainless Steel	○	●		
	K	Cast Iron	○	●		
	N	Non-ferrous Metals			●	
	S	Heat-resistant Alloys			●	
		Titanium Alloys			●	○

Insert	Description	Usable edges	Dimension (mm)		CVD Coated Carbide			PVD Coated Carbide	
			RE	BS (Wiper Edge)	CA0835	PR0725	PR0110		
 Handed Insert shows Right-hand	SPCT 10T316EN-SD	4	1.6	-			●		
 With Wiper Edge	SPCT 10T308E <sup>R</sup> /L-SD		0.8	2.5			●		
	10T312E <sup>R</sup> /L-SD		1.2	1.8			●		
 Sharp Edge	SPCT 10T316FN-SE		1.6	-				●	
 Sharp Edge / With Wiper Edge	SPCT 10T308F <sup>R</sup> /L-SE		0.8	2.7				●	
	10T312F <sup>R</sup> /L-SE		1.2	2.2				●	
 With Wiper Edge	SPET 10T308E <sup>R</sup> /L-SB		0.8	2.7	●		●		
 Tough Edge / With Wiper Edge	SPET 10T308S <sup>R</sup> /L-SB		0.8	2.7	●		●		

Inserts are sold in 10 piece boxes

● : Std. Item

# SD..1204

## Applicable Inserts

Description	IC	S	D1
SD..1204	12.7	4.76	4.4

Classification of usage ● : 1st Choice ○ : 2nd Choice	P	Carbon Steel / Alloy Steel	●	●	
	M	Stainless Steel	○	●	
	K	Cast Iron	○	●	
	N	Non-ferrous Metals			●
	S	Heat-resistant Alloys Titanium Alloys		●	○

Insert  Handed Insert shows Right-hand	Description	Usable edges	Dimension (mm)		CVD Coated Carbide CA0835	PVD Coated Carbide	
			RE	BS (Wiper Edge)		PR0725	PR0110
	<b>SDCT 120416EN-SD</b>	4	1.6	-		●	
	<b>SDCT 120408E<sup>R/L</sup>-SD</b>		0.8	2.5		●	
	<b>SDCT 120412E<sup>R/L</sup>-SD</b>		1.2	1.8		●	
	<b>SDCT 120416FN-SE</b>		1.6	-			●
	<b>SDCT 120408F<sup>R/L</sup>-SE</b>		0.8	2.7			●
	<b>SDCT 120412F<sup>R/L</sup>-SE</b>		1.2	1.9			●
	<b>SDET 120408E<sup>R/L</sup>-SB</b>		0.8	2.5	●	●	
	<b>SDET 120412E<sup>R/L</sup>-SB</b>		1.2	1.8	●	●	
	<b>SDET 120416SN-SB</b>	1.6	-	●	●		
	<b>SDET 120408S<sup>R/L</sup>-SB</b>	0.8	2.5	●	●		

## Features of Insert Grades

- **CA0835**
  - TiN+TiCN+Al<sub>2</sub>O<sub>3</sub> based CVD Coated Carbide
  - For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron
  - For middle to high speed machining
- **PR0725**
  - TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
  - For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron
  - For middle speed machining
- **PR0110**
  - TiB<sub>2</sub> based PVD Coated Carbide
  - For Non-ferrous Metals such as Aluminum Alloys (Si<10%) and titanium Alloys
  - For high speed machining

● : Std. Item

Inserts are sold in 10 piece boxes

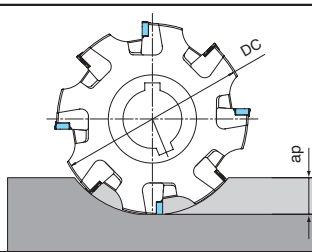
Insert Grades  
A  
Turnings  
B  
Indexable Inserts  
C  
CNC & PCO Tools  
D  
External  
E  
Small Parts  
F  
Boring  
G  
Grooving  
H  
Cut-off  
J  
Threading  
K  
Drilling  
L  
Solid Tools  
M  
Milling  
N  
Tools for Turning Mill  
P  
Spare Parts  
R  
Technical Information  
T  
Index

# Slot Mill MSTC

## ◆ Recommended Cutting Conditions

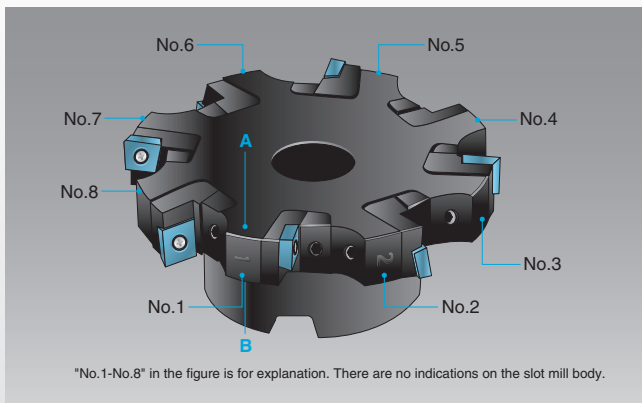
Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc: m/min)			fz (mm/t)				Remarks
			CVD Coated Carbide	PVD Coated Carbide		Chipbreaker				
			CA0835	PR0725	PR0110	EN-SD ER-SD EL-SD	ER-SB EL-SB	SN-SB SR-SB SL-SB	FN-SE FR-SE FL-SE	
Low Carbon Steel	SS400 S10C ~ S25C	125	250~310	170~210	-	0.07~0.20	0.10~0.22	0.15~0.3	-	Dry
Carbon Steel	S30C ~ S58C (Annealed)	190	160~190	100~140	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
	S30C ~ S58C (Heat treated)	250	140~180	90~120	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
Alloy Steel	Annealed	180	140~180	90~120	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
	Heat treated	275	120~160	80~110	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
High Carbon Alloy	SKD11, SKD61, etc.	280	110~130	70~90	-	0.05~0.18	0.08~0.20	0.12~0.25	-	Coolant
Stainless Steel	Austenitic related	220	160~200	110~140	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
	Martensitic related	300	150~180	100~120	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Heat-resistant Alloys	Ni-base heat-resistant alloys	350	-	15~30	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Titanium Alloys	Ti-6Al-4V, etc.	270	-	20~50	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Gray Cast Iron	FC250 ~ FC350	260	160~200	110~130	-	0.07~0.22	0.10~0.25	0.15~0.35	-	Dry
Nodular Cast Iron	FCD400 ~ FCD500	160	130~160	80~100	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
	FCD600 ~ FCD800	250	110~140	70~90	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
Non-ferrous Metals	AC4A, A7050, etc.	-	-	-	750~950	-	-	-	0.07~0.20	Coolant

- Note) 1. Use down-cut machining.  
 2. If ap is 1/10 or under of Cutter Dia.(DC), it is possible to increase feed per tooth (fz) by 40%.



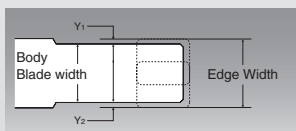
## Slot width (edge width) adjustment of MSTC Slot Mill

### Slot width (edge width) measurement and adjustment



- Set up the slot mill on length measuring equipment such as tool presettlers.
- Choose any one of the edges as a reference position. (No.1)
- Measure the blade width of the slot mill body at position No.1. (between point A and B in the figure)
- Move the length measuring equipment to the insert corner part and measure the step ( $Y_1$ ) between the point A and the insert No.1.
- Using the same procedure, measure ( $Y_2$ ) dimension based on point B.
 
$$\text{Edge Width} = \text{Blade Width} + Y_1 + Y_2$$
- Place the point A of the slot mill body near the position No.1 to "0 (zero)" of the length measuring equipment.
- Adjust the edge position of the inserts in odd numbered positions (No. 3, 5, 7) to "0 (zero)" with the length measuring equipment.
- Adjust the edge position of the inserts in even numbered positions (No. 2, 4, 6, 8) to the required edge width.

For steps (7) and (8), see "In the case of changing the slot width (edge width)" on next page.

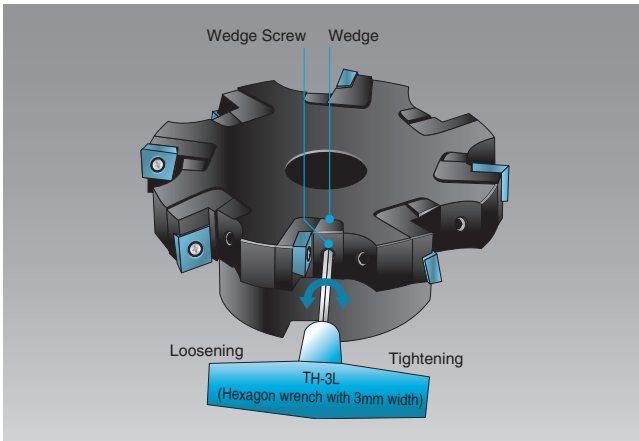


M

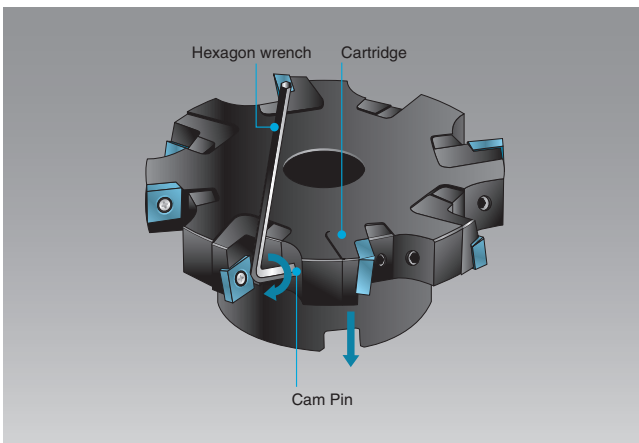
Milling

Insert  
 Lead Angle  
 45°-20°  
 Lead Angle  
 15°  
 Lead Angle  
 0°/2°  
 High Feed  
 Cutter  
 Multi-  
 Function  
 Slot Mill  
 Ball-nose  
 Radius  
 Others

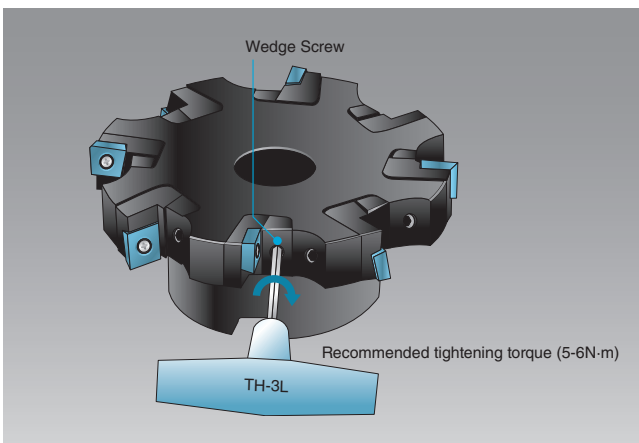
## In the case of changing the slot width (edge width)



- (1) Set up the slot mill on length measuring equipment such as tool presettlers.
- (2) Insert a Hexagon wrench with 3mm width (TH-3L) into the Wedge Screw.
- (3) Turn TH-3L counterclockwise to loosen the Wedge.
- (4) Turn TH-3L clockwise by the torque of 1 N·m to tighten the Wedge lightly and make the Wedge contact the Cartridge and the Slot Mill Body. In doing so, some resistance occurs against the Cartridge.

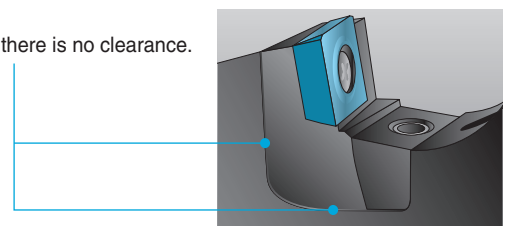


- (5) Insert a Hexagon wrench (LW-2.5 or LW-3) into the Cam Pin on the back of the Cartridge.
- (6) Turn the wrench and adjust the position of the Cartridge.
- (7) To secure the adjustment, back-turn the Cam Pin and make sure that it does not touch the groove surface of the back of the Cartridge.
- (8) Remove the Hexagon wrench from the Cam Pin.



- (9) Insert TH-3L into the Wedge Screw.
- (10) Tighten the Wedge Screw by the torque of 5-6N·m. (Use a torque wrench to get the correct torque.)
- (11) Make sure there is no clearance between the Cartridge and the Slot Mill body.

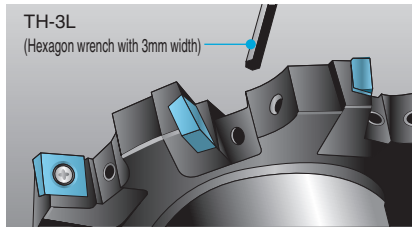
Make sure there is no clearance.



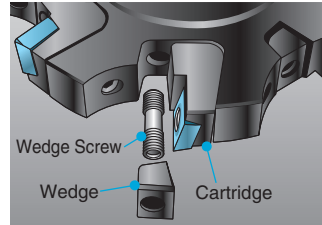
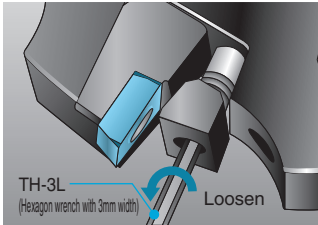
Insert Grades	A
Turnable Indexable Inserts	B
CBN & PCBN Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T

## Replacement of the Cartridge

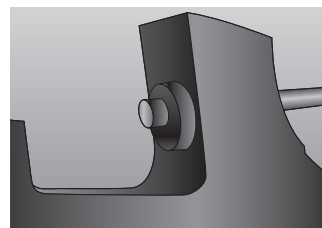
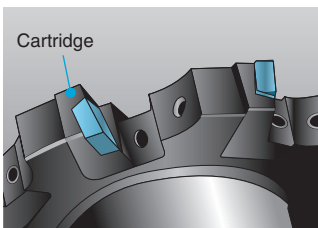
Follow the instruction below to replace the Cartridge.



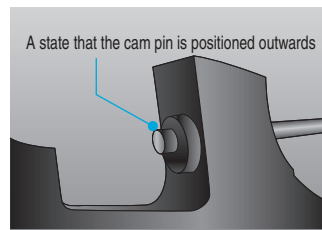
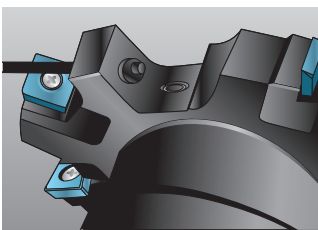
- (1) Insert Hexagon wrench with 3mm width (TH-3L) into the Wedge Screw.



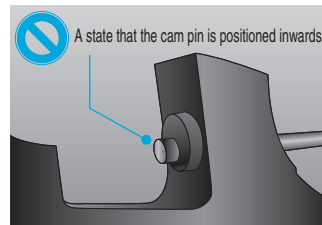
- (2) Loosen the Wedge Screw.  
(3) Remove the Wedge Screw and Wedge.



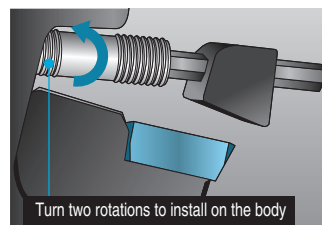
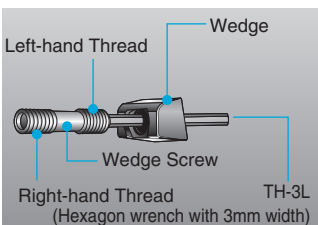
- (4) Remove the Cartridge.



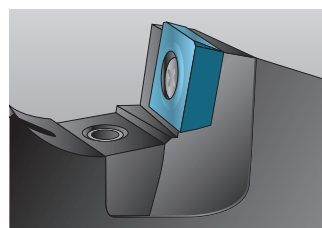
- (5) Before replacing the Cartridge, make sure that the Cam Pin is positioned radially-outwards.



- (6) If the Cam Pin is in the position shown in the left diagram, assembling the Cartridge is not possible.



- (7) Place the wedge so that its larger slant surface faces toward the Cartridge.  
(8) Turn the Wedge Screw two rotations to install the Wedge to the body.  
(9) When installing the Wedge Screw to the body, keep the Wedge from rotating and screw it in.  
(10) Tighten the Wedge Screw by the torque of 5-6N·m. Keep the Screw head and the Wedge even (prevent either of those from sticking out).



M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others



# Slot Mill Applicable Arbor

## BT Arbor

Type	See Page	Toolholder Description	Bore Dia. (DCB)	BT Arbor				
				BIG	MST	NIKKEN	SHOWA	NT TOOL
Without Boss	M136	MSTA 63N..	16			BT ○○ -SCA16..		BT ○○ -SCA16..
		80N..	16			BT ○○ -SCA16..		BT ○○ -SCA16..
		100N..	22			BT ○○ -SCA22..		BT ○○ -SCA22..
		125N..	32			BT ○○ -SCA32..		BT ○○ -SCA32..
		160N..	40			BT ○○ -SCA40..		BT ○○ -SCA40..
	M137	MSTA 02N..	.625 (15.875)			BT ○○ -SCA15.875..	BT ○○ -SCA15.875..	BT ○○ -SCA15.875..
		03N..	.625 (15.875)			BT ○○ -SCA15.875..	BT ○○ -SCA15.875..	BT ○○ -SCA15.875..
		04N..	1.000 (25.4)	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..
		05N..	1.250 (31.75)	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..
		06N..	1.250 (31.75)	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..
		MSTB 80AN..	27			BT ○○ -SCA27..		BT ○○ -SCA27..
	M140	MSTB 100AN..	32			BT ○○ -SCA32..		BT ○○ -SCA32..
		MSTB 125AN..	40			BT ○○ -SCA40..		BT ○○ -SCA40..
		MSTB 160AN..	40			BT ○○ -SCA40..		BT ○○ -SCA40..
		MSTB 3000AN..	1.000 (25.4)	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..	BT ○○ -SCA25.4..
		MSTB 4000AN..	1.250 (31.75)	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..
		MSTB 5000AN..	1.250 (31.75)	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..
		MSTB 6000AN..	1.500 (38.1)	BT ○○ -SCA38.1..		BT ○○ -SCA38.1..	BT ○○ -SCA38.1..	BT ○○ -SCA38.1..
	M146 M148 M150	MSTC 100A ○ ..	32			BT ○○ -SCA32..		BT ○○ -SCA32..
		MSTC 125A ○ ..	40			BT ○○ -SCA40..		BT ○○ -SCA40..
		MSTC 160A ○ ..	40			BT ○○ -SCA40..		BT ○○ -SCA40..
		MSTC 400A ○ ..	1.250 (31.75)	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..	BT ○○ -SCA31.75..
		MSTC 500A ○ ..	1.500 (38.1)	BT ○○ -SCA38.1..		BT ○○ -SCA38.1..	BT ○○ -SCA38.1..	BT ○○ -SCA38.1..
		MSTC 600A ○ ..	1.500 (38.1)	BT ○○ -SCA38.1..		BT ○○ -SCA38.1..	BT ○○ -SCA38.1..	BT ○○ -SCA38.1..
With Boss	M141	MSTB 80SN..	22	BBT ○○ -FMC22..		BT ○○ -FMC22..	BT ○○ -FMC22..	BT ○○ -FMC22..
		MSTB 100SN..	27	BBT ○○ -FMC27..		BT ○○ -FMC27..	BT ○○ -FMC27..	BT ○○ -FMC27..
		MSTB 125SN..	40	BBT ○○ -FMB40..		BT ○○ -FMB40..	BT ○○ -FMB40..	BT ○○ -FMB40..
		MSTB 160SN..	40	BBT ○○ -FMB40..		BT ○○ -FMB40..	BT ○○ -FMB40..	BT ○○ -FMB40..
		MSTC 100S ○ ..	27	BBT ○○ -FMC27..		BT ○○ -FMC27..	BT ○○ -FMC27..	BT ○○ -FMC27..
	M147 M149 M151	MSTC 125S ○ ..	32	BBT ○○ -FMC32..		BT ○○ -FMC32..	BT ○○ -FMC32..	BT ○○ -FMC32..
		MSTC 160S ○ ..	40	BBT ○○ -FMB40..		BT ○○ -FMB40..	BT ○○ -FMB40..	BT ○○ -FMB40..

## Straight Shank

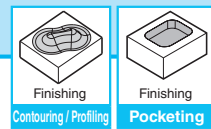
Type	See Page	Toolholder Description	Bore Dia. (DCB)	Straight Shank				
				BIG	MST	NIKKEN	SHOWA	NT TOOL
Without Boss	M136	MSTA 63N..	16					
		80N..	16					
		100N..	22					
		125N..	32					
		160N..	40					
	M137	MSTA 02N..	.625 (15.875)				ST ○○ -SCA15.875..	
		03N..	.625 (15.875)				ST ○○ -SCA15.875..	
		04N..	1.000 (25.4)		S ○○ -SCA25.4..	K ○○ -SCA25.4..	ST ○○ -SCA25.4..	
		05N..	1.250 (31.75)				ST ○○ -SCA31.75..	
		06N..	1.250 (31.75)				ST ○○ -SCA31.75..	
		MSTB 80AN..	27					
	M140	MSTB 100AN..	32					
		MSTB 125AN..	40					
		MSTB 160AN..	40					
		MSTB 3000AN..	1.000 (25.4)		S ○○ -SCA25.4..	K ○○ -SCA25.4..	ST ○○ -SCA25.4..	
		MSTB 4000AN..	1.250 (31.75)				ST ○○ -SCA31.75..	
		MSTB 5000AN..	1.250 (31.75)				ST ○○ -SCA31.75..	
		MSTB 6000AN..	1.500 (38.1)				ST ○○ -SCA38.1..	
	M146 M148 M150	MSTC 100A ○ ..	32					
		MSTC 125A ○ ..	40					
		MSTC 160A ○ ..	40					
		MSTC 400A ○ ..	1.250 (31.75)				ST ○○ -SCA31.75..	
		MSTC 500A ○ ..	1.500 (38.1)				ST ○○ -SCA38.1..	
		MSTC 600A ○ ..	1.500 (38.1)				ST ○○ -SCA38.1..	

This table is created, based on companies' catalogues and publications, and not officially approved by those companies.

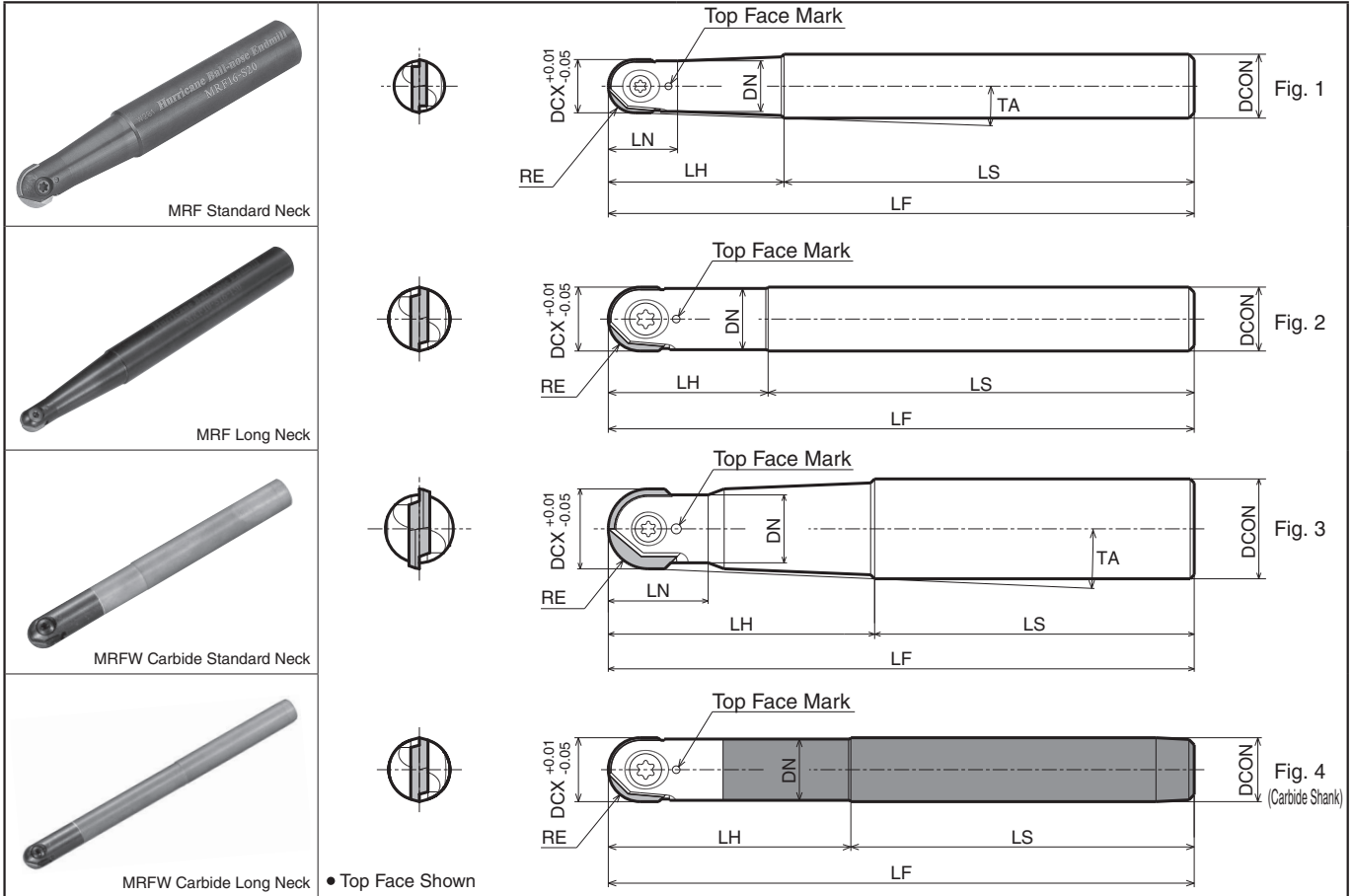
Insert Grades  
Indexable Inserts  
Turning  
CNC & PCO Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Spare Parts  
Technical  
Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

# Ball-nose End Mill



## MRF / MRFW (Carbide Shank)



### Toolholder Dimensions

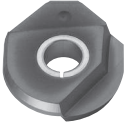
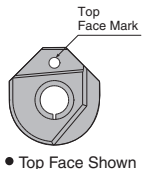
Description	Stock	No. of Inserts	Dimension (mm)								Drawing	Spare Parts			Applicable Inserts		
			RE	DCX	DCON	DN	LF	LN	LH	LS		TA	Clamp Screw	Wrench		Anti-seize Compound	
Standard Neck	MRF 08-S12	●	4	8		7.5	100	10	22	78	6°20'	Fig. 1	SC-30067	DT-8	P-37	RDFG08FR	
	MRF 10-S12	●	5	10	12	9.5	100	13	25	75	3°	Fig. 2	SC-35085	DT-10		RDFG10FR	
	MRF 12-S12	●	6	12		11.5	110	-	30		-	Fig. 2	SC-40100	DT-15		RDFG12FR	
	MRF 16-S20	●	8	16	20	14	130	20	50		80	2°50'	Fig. 1	SC-50130		DT-20	RDFG16FR
	MRF 20-S25	●	10	20	25	17	140	25	60			3°	Fig. 3	SC-60160		TT-25	RDFG20FR
MRF 25-S32	●	12.5	25	32	22	150	31	70			3°30'	Fig. 3	SC-60210	TT-30	RDFG25FR		
Long Neck	MRF 08-S12-130	●	4	8	12	7.5	130	10		80	2°30'	Fig. 1	SC-30067	DT-8	P-37	RDFG08FR	
	MRF 10-S16-150	●	5	10		9.5	150	15	50		3°50'		SC-35085	DT-10		RDFG10FR	
	MRF 12-S16-160	●	6	12	16	11.5	160	16	60	100	2°10'	Fig. 1	SC-40100	DT-15		RDFG12FR	
	MRF 16-S20-160	●	8	16	20	14	160	20	65	95	2°	Fig. 1	SC-50130	DT-20		RDFG16FR	
	MRF 20-S25-180	●	10	20	25	17	180	25	80	100	2°10'	Fig. 3	SC-60160	TT-25		RDFG20FR	
MRF 25-S32-200	●	12.5	25	32	22	200	31	90	110	2°40'	Fig. 3	SC-60210	TT-30	RDFG25FR			
Carbide Standard Neck	MRFW 08-S08	●	4	8	8	7.4	100	-	30	70	-	Fig. 4	SC-30067	DT-8	P-37	RDFG08FR	
	MRFW 10-S10	●	5	10	10	9.5	100	-	35	65	-		SC-35085	DT-10		RDFG10FR	
	MRFW 12-S12	●	6	12	12	11.5	110	-	45	65	-		SC-40100	DT-15		RDFG12FR	
Carbide Long Neck	MRFW 08-S08-130	●	4	8	8	7.4	130	-	65		-	Fig. 4	SC-30067	DT-8	P-37	RDFG08FR	
	MRFW 10-S10-140	●	5	10	10	9.5	140	-	75	65	-		SC-35085	DT-10		RDFG10FR	
	MRFW 12-S12-150	●	6	12	12	11.5	150	-	85		-		SC-40100	DT-15		RDFG12FR	

• TA (Toolholder's interference angle) is the angle formed by the tangential line from insert dia. to toolholder's shank dia.

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

● : Std. Item

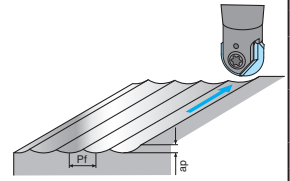
● Applicable Inserts

Insert		Description
		<b>RDFG 08FR</b> 10FR 12FR 16FR 20FR 25FR
● Top Face Shown		

· Check the Top Face Mark of both insert and toolholder.

● Recommended Depth of Cut

Description	Depth of Cut(mm)		Applications
	ap	Pf	
Standard Neck	MRF08-S12	0.2(Max0.3)	0.8
	MRF10-S12	0.2	1
	MRF12-S12	0.5	1.2
	MRF16-S20	0.5	1.6
	MRF20-S25	1	2
	MRF25-S32	1	2.5
Long Neck	MRF08-S12-130	0.2(Max0.3)	0.8
	MRF10-S12-150	0.2	1
	MRF12-S12-160	0.5	1.2
	MRF16-S20-160	0.5	1.6
	MRF20-S25-180	1	2
	MRF25-S32-200	1	2.5
Carbide Standard Neck	MRFW08-S08	0.2(Max0.3)	0.8
	MRFW10-S10	0.2	1
	MRFW12-S12	0.5	1.2
Carbide Long Neck	MRFW08-S08-130	0.2(Max0.3)	0.8
	MRFW10-S10-140	0.2	1
	MRFW12-S12-150	0.5	1.2



For ø8, Holder may be broken because of over load if ap exceeds 0.3mm.

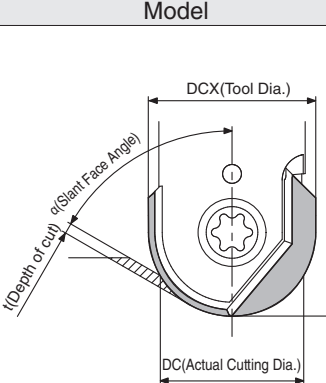
◆ Recommended Cutting Conditions (At Cutting Dia. øD)

Workpiece Material	Insert Grades	Vc (m/min)	fz (mm/t)	ø8		ø10		ø12	
				Vc(m/min) (n.min <sup>-1</sup> )	fz(mm/t) (Vf:mm/min)	Vc(m/min) (n.min <sup>-1</sup> )	fz(mm/t) (Vf:mm/min)	Vc(m/min) (n.min <sup>-1</sup> )	fz(mm/t) (Vf:mm/min)
Carbon Steel	PR915	100~200	0.1~0.3	150 (5,970)	0.2 (2,390)	150 (4,770)	0.2 (1,910)	150 (3,980)	0.2 (1,590)
Alloy Steel	PR915	80~180	0.1~0.3	130 (5,170)	0.2 (2,070)	130 (4,140)	0.2 (1,660)	130 (3,450)	0.2 (1,380)
Mold Steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Stainless Steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Cast Iron	PR915	100~200	0.2~0.4	150 (5,970)	0.3 (3,580)	150 (4,770)	0.3 (2,860)	150 (3,980)	0.3 (2,390)
Workpiece Material	Insert Grades	Vc (m/min)	fz (mm/t)	ø16		ø20		ø25	
				Vc(m/min) (n.min <sup>-1</sup> )	fz(mm/t) (Vf:mm/min)	Vc(m/min) (n.min <sup>-1</sup> )	fz(mm/t) (Vf:mm/min)	Vc(m/min) (n.min <sup>-1</sup> )	fz(mm/t) (Vf:mm/min)
Carbon Steel	PR915	100~200	0.1~0.3	150 (2,980)	0.2 (1,190)	150 (2,390)	0.2 (950)	150 (1,910)	0.2 (760)
Alloy Steel	PR915	80~180	0.1~0.3	130 (2,590)	0.2 (1,030)	130 (2,070)	0.2 (830)	130 (1,660)	0.2 (660)
Mold Steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Stainless Steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Cast Iron	PR915	100~200	0.2~0.4	150 (2,980)	0.3 (1,790)	150 (2,390)	0.3 (1,430)	150 (1,910)	0.3 (1,150)

◆ Actual Cutting Speed (Vd) Conversion Coefficient Table

Vd varies depending on ap and slant face angle.

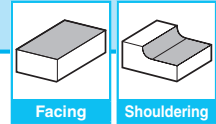
Vd can be obtained by dividing the conversion coefficient into the recommended cutting speed.

Model	Tool Dia. (DCX)		ø8		ø10		ø12	
	Depth of cut (t:mm)		0.1	0.2	0.1	0.2	0.2	0.5
	Slant Face Angle (α)	15°	1.00	1.00	1.00	1.00	1.00	1.00
		30°	1.05	1.02	1.05	1.03	1.04	1.01
		45°	1.18	1.12	1.20	1.14	1.16	1.07
		60°	1.47	1.34	1.51	1.38	1.42	1.24
		75°	2.15	1.82	2.24	1.92	2.02	1.60
		90°(Horizontal Plane)	4.48	3.22	5.06	3.57	3.92	2.50
	Tool Dia. (DCX)		ø16		ø20		ø25	
	Depth of cut (t:mm)		0.2	0.5	0.5	1	0.5	1
	Slant Face Angle (α)	15°	1.00	1.00	1.00	1.02	1.00	1.01
		30°	1.05	1.01	1.02	1.00	1.03	1.00
		45°	1.18	1.10	1.12	1.06	1.14	1.08
		60°	1.47	1.30	1.34	1.21	1.38	1.25
		75°	2.14	1.73	1.83	1.53	1.93	1.62
		90°(Horizontal Plane)	4.48	2.87	3.20	2.29	3.57	2.55

e.g.) Suppose tool dia. 8mm, ap=0.1mm, slant face angle 90°: The actual cutting speed Vd for carbon steel machining, when Vc is 150m/min at the biggest diameter, Vd can be obtained as Vd=150÷4.48=33.5m/min

Insert Grades  
Turnings  
Indexable Inserts  
CNC & PCD Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
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# MRW

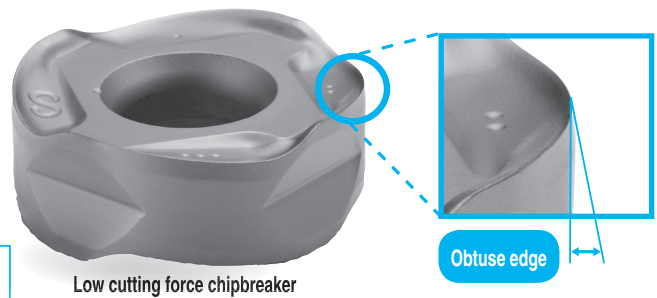
Economical and high efficiency  
New radius cutter with double-sided insert for various types of workpieces

**POINT.1** Economical Double-sided 8-edge Insert

**POINT.2** Combine sharpness and cutting edge strength

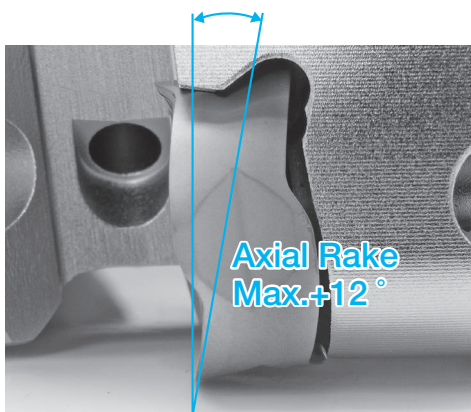
Obtuse edge increases cutting edge toughness

**POINT.3** Helical cutting edge design with maximum axial rake  $12^\circ$  reduced low cutting force equivalent to positive inserts

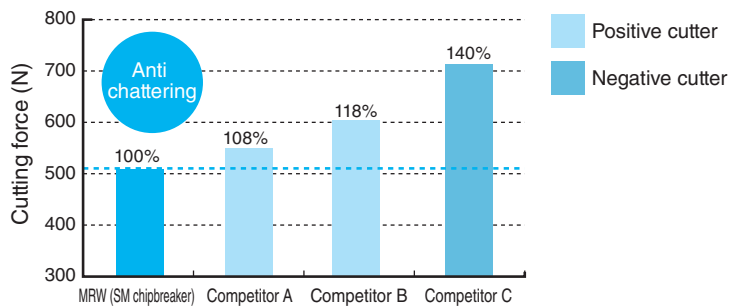


Low cutting force chipbreaker

Obtuse edge

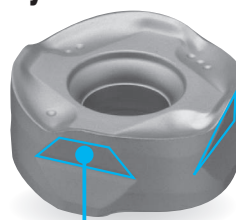


Axial Rake  
Max.  $+12^\circ$



<Cutting Conditions>  
 $V_c=120\text{m/min}$ ,  $a_{pxae}=1 \times 40\text{mm}$ ,  $f_z=0.2\text{mm/t}$   
SUS304, Cutter  $\alpha 50$

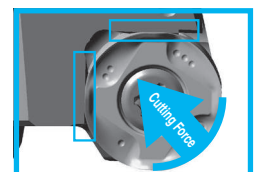
**POINT.4** Flat Lock Structure to hold insert firmly.  
Prevent insert rotation during machining and realizes stable machining



Wide and flat constraint surface

**Flat Lock Structure**

- Wide flat constraint surface
- Receives even cutting forces
- Controls insert rotation



M

Milling

Insert

Lead Angle  $45^\circ \sim 20^\circ$

Lead Angle  $15^\circ$

Lead Angle  $0^\circ/2^\circ$

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others



# Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

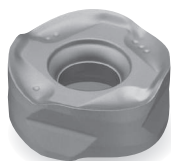
Workpiece Material		Applicable Insert Grades	Applicable Chipbreaker
P Carbon Steel / Alloy Steel / Mold Steel		PR1525	GM/SM/GH Chipbreaker
K Cast Iron		PR1510	GH/GM Chipbreaker
S Ni-base heat-resistant alloys	M Stainless Steel (Martensitic related)	CA6535	SM/GM Chipbreaker
S Ni-base heat-resistant alloys S Titanium Alloys	M Stainless Steel (Austenitic related) M Stainless Steel (Precipitation Hardening)	PR1535	SM/GM Chipbreaker

For Chipbreaker Selection and Recommended Cutting Conditions **M166**

**POINT.5**

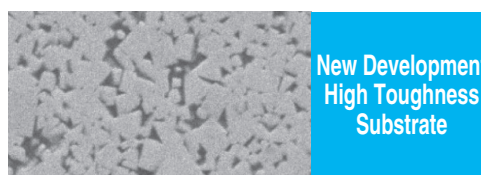
## New insert grade for difficult-to-cut material

**Controls sudden fracture and realizes stable machining**  
**Suitable for high efficiency machining**

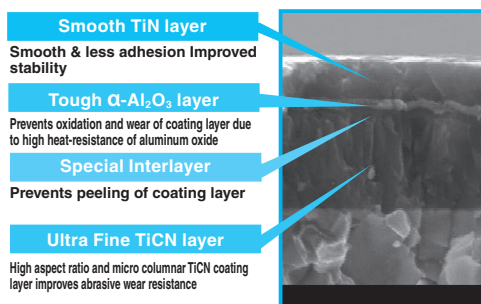


CA6535

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



New Development High Toughness Substrate



**Smooth TiN layer**  
Smooth & less adhesion Improved stability

**Tough  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> layer**  
Prevents oxidation and wear of coating layer due to high heat-resistance of aluminum oxide

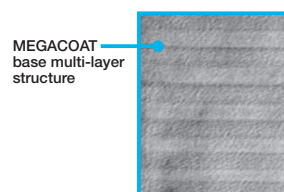
**Special Interlayer**  
Prevents peeling of coating layer

**Ultra Fine TiCN layer**  
High aspect ratio and micro columnar TiCN coating layer improves abrasive wear resistance



PR1535

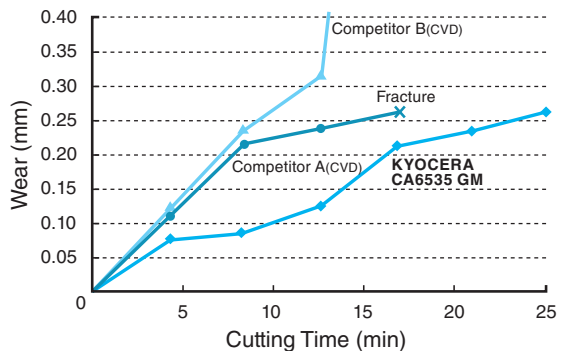
For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel  
Stable and longer tool life by special nano coating layer  
**MEGACOAT NANO**



MEGACOAT base multi-layer structure

## Tool Life Comparison (Internal evaluation)

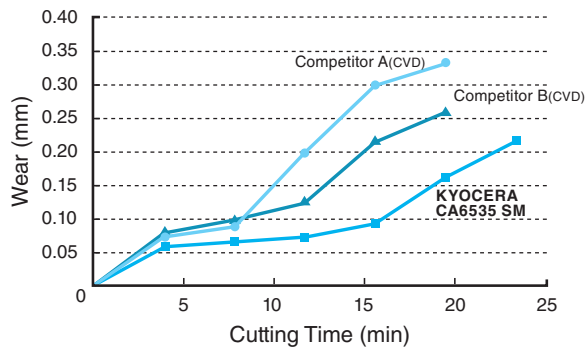
### • Ni-base heat-resistant alloys



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

1st Choice GM Chipbreaker

### • Stainless Steel (Martensitic related)



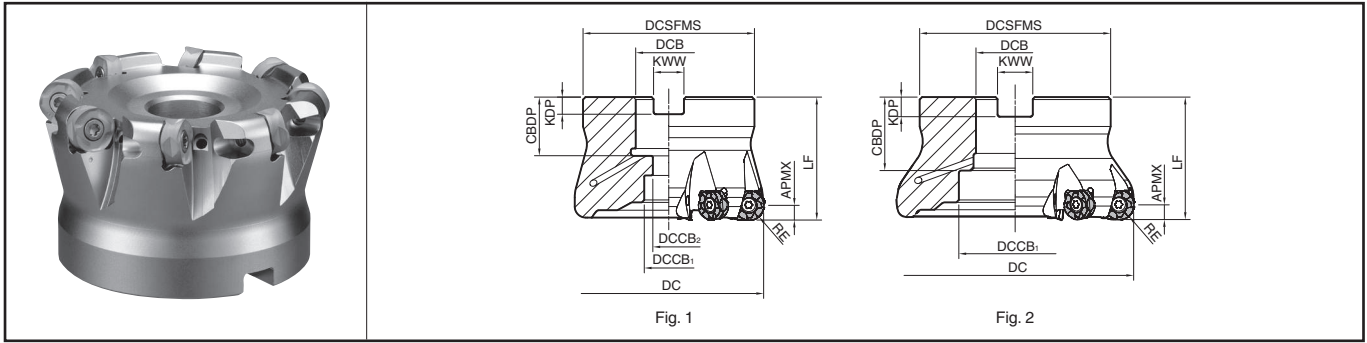
<Cutting Conditions> Vc=300m/min, ap=2.0mm, fz=0.2mm/t, Wet

1st Choice SM Chipbreaker

Insert Grades  
Turnable  
CNC & PC Tools  
External  
Small Parts  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for Turning Mill  
Spare Parts  
Technical Information  
Index

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
R  
T

## MRW Face Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )							
			RE	DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	A.R.	R.R.											
Metric	MRW 050R-12-5T-M	●	5	6	50	48	22	18	11	40	21	6.3	10.4	6.0	+12°	-15.5°	Yes	Fig. 1	0.3	16,000						
	050R-12-6T-M	●	6																0.3							
	063R-12-6T-M	●	6		63	60	19	11	40	21	6.3	10.4	6.0						+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						6.0		+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	-	30		8					14.4	
	100R-12-9T-M	●	9		1.4																					
	Metric	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						8.0	+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	-	30	8	14.4	8.0						+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
125R-16-10T-M		●	10			2.5																				
Bore Dia. Inch spec	MRW 080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	6.0	+12°	-15.5°	Yes	Fig. 1	1.2	12,000						
	080R-12-8T	●	8																1.1							
	100R-12-7T	●	7		100	78	31.75	46	-	34	8	12.7	6.0						+12°		-15.5°	Yes	Fig. 2	1.5	10,600	
	100R-12-9T	●	9																					1.4		
	Bore Dia. Inch spec	MRW 080R-16-6T	●	6	8	80	70	25.4	20	13	50	27	6	9.5	8.0	+11°	-16.5°	Yes	Fig. 1	1.1	11,000					
		080R-16-7T	●	7																1.1						
		100R-16-6T	●	6		100	78	31.75	46	-	34	8	12.7	8.0						+11°	-16.5°	Yes	Fig. 2	1.4	9,600	
		100R-16-8T	●	8																				1.4		
		125R-16-8T	●	8																				125		89
		125R-16-10T	●	10		2.6																				

### Max. Revolution

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

- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
- APMX is Maximum ap. For more details, see page [M166](#) below.

### Spare Parts and Applicable Inserts

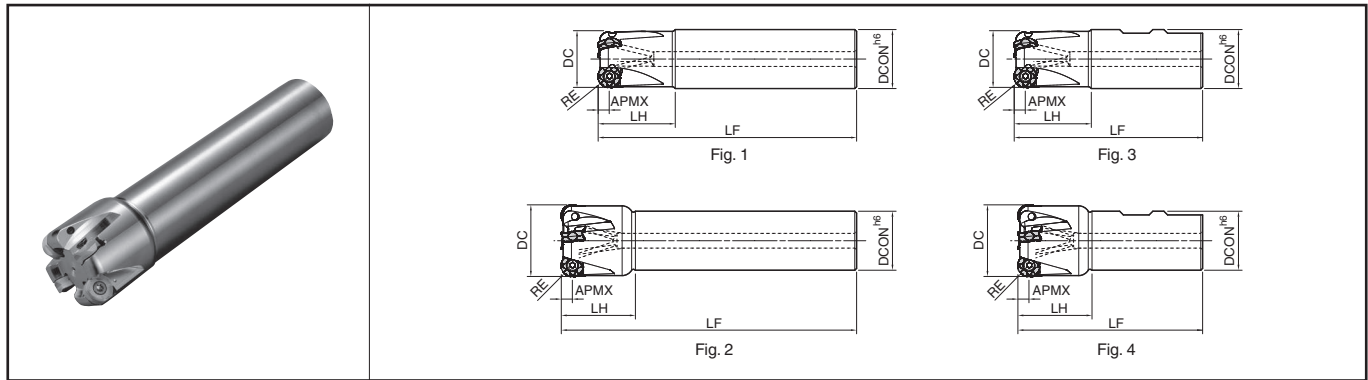
Description	Spare Parts				Applicable Inserts <a href="#">M16</a>			
	Clamp Screw	Wrench		Anti-seize Compound	Mounting bolt	General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW 050R-12... 063R-12... 080R-12... 100R-12...	SB-4085TRP	DTPM-15		P-37	HH10X30	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended tightening torque for Insert Clamp 3.5N·m		HH12X35					
			-					
MRW 063R-16... 080R-16... 100R-16... 125R-16...	SB-50140TRP	TTP-20		P-37	HH10X30	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended tightening torque for Insert Clamp 4.5N·m		HH12X35					
			-					

Recommended Cutting Conditions [M166](#)

● : Std. Item



## MRW End Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Rake Angle		Coolant Hole	Drawing	Max. Revolution (min <sup>-1</sup> )		
			RE	DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.						
Straight Shank	MRW	32-S32-12-3T	●	3	6	32	32	140	40	6.0	+12°	-20°	Yes	Fig. 1	22,000	
		40-S32-12-4T	●	4		40	32	160				-16.5°			Fig. 2	18,800
		50-S42-12-5T	●	5		50	42	170				-15.5°				16,000
	MRW	40-S32-16-3T	●	3	8	40	32	160	40	8.0	+11°	-18°	Yes	Fig. 2	17,200	
		50-S42-16-4T	●	4		50	42	170				-16.5°			14,800	
		63-S42-16-5T	●	5		63	42	170				50			12,800	
Long Shank	MRW	32-S32-12-2T-200	●	2	6	32	32	200	40	6.0	+12°	-20°	Yes	Fig. 1	22,000	
		40-S32-12-3T-200	●	3		40	32	200				-16.5°			Fig. 2	18,800
		50-S42-12-4T-300	●	4		50	42	300				-15.5°				16,000
	MRW	40-S32-16-2T-200	●	2	8	40	32	200	40	8.0	+11°	-18°	Yes	Fig. 2	17,200	
		50-S42-16-3T-300	●	3		50	42	300				-16.5°			14,800	
		63-S42-16-4T-300	●	4		63	42	300				50			12,800	
Weldon	MRW	32-W32-12-3T	●	3	6	32	32	102	40	6.0	+12°	-20°	Yes	Fig. 3	22,000	
		40-W32-12-4T	●	4		40	32	100				-16.5°			Fig. 4	18,800
		50-W40-12-5T	●	5		50	40	110				-15.5°				16,000
	MRW	40-W32-16-3T	●	3	8	40	32	100	40	8.0	+11°	-18°	Yes	Fig. 4	17,200	
		50-W40-16-4T	●	4		50	40	110				-16.5°			14,800	
		63-W40-16-5T	●	5		63	40	120				50			12,800	

#### Max. Revolution

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

- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
- APMX is Maximum ap. For more details, see page [M166](#) below.

### Spare Parts and Applicable Inserts

Description	Spare Parts				Applicable Inserts <a href="#">M16</a>		
	Clamp Screw	Wrench		Anti-seize Compound			
<b>MRW ...-12...</b>	SB-4085TRP	DTPM-15		P-37	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended tightening torque for Insert Clamp 3.5N·m						
<b>MRW ...-16...</b>	SB-50140TRP	TTP-20		P-37	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended tightening torque for Insert Clamp 4.5N·m						

Recommended Cutting Conditions [M166](#)

● : Std. Item

## ◆ Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz : mm/t)			Recommended Insert Grades (Cutting Speed Vc: m/min)			
	* Recommended feed rate (Reference value) for ROMU12 type : ap=3mm / for ROMU16 type : ap=4mm			MEGACOAT NANO			CVD Coated Carbide
	GM	SM	GH	PR1535	PR1525	PR1510	CA6535
Carbon Steel	★ 0.1- <b>0.2</b> -0.3	☆ 0.06- <b>0.15</b> -0.2	☆ 0.15- <b>0.3</b> -0.35	☆ 120- <b>180</b> -250	★ 120- <b>180</b> -250	-	-
Alloy Steel	★ 0.1- <b>0.2</b> -0.3	☆ 0.06- <b>0.15</b> -0.2	☆ 0.15- <b>0.3</b> -0.35	☆ 100- <b>160</b> -220	★ 100- <b>160</b> -220	-	-
Mold Steel	★ 0.1- <b>0.15</b> -0.25	☆ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.3	☆ 80- <b>140</b> -180	★ 80- <b>140</b> -180	-	-
Stainless Steel (Austenitic related)	☆ 0.1- <b>0.15</b> -0.2	★ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.25	★ 100- <b>160</b> -200	☆ 100- <b>160</b> -200	-	-
Stainless Steel (Martensitic related)	☆ 0.1- <b>0.15</b> -0.2	★ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.25	☆ 150- <b>200</b> -250	-	-	★ 180- <b>240</b> -300
Stainless Steel (Precipitation Hardening)	★ 0.1- <b>0.15</b> -0.2	☆ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.25	★ 90- <b>120</b> -150	-	-	-
Gray Cast Iron	★ 0.1- <b>0.2</b> -0.3	-	☆ 0.15- <b>0.3</b> -0.35	-	-	★ 120- <b>180</b> -250	-
Nodular Cast Iron	★ 0.1- <b>0.15</b> -0.25	-	☆ 0.15- <b>0.2</b> -0.3	-	-	★ 100- <b>150</b> -200	-
Ni-base heat-resistant alloys	★ 0.1- <b>0.12</b> -0.15	☆ 0.06- <b>0.1</b> -0.15	☆ 0.12- <b>0.15</b> -0.2	☆ 20- <b>30</b> -50	-	-	★ 20- <b>30</b> -50
Titanium Alloys	☆ 0.1- <b>0.12</b> -0.15	★ 0.06- <b>0.1</b> -0.15	-	★ 40- <b>60</b> -80	-	☆ 30- <b>50</b> -70	-

\* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ★:1st Recommendation ☆:2nd Recommendation  
 \* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.  
 \* Recommended feed rate is the reference value when ap is RE/2 (3mm for ROMU12, 4mm for ROMU16).  
 For lower ap than the above conditions, the conversion factor in the following table is recommended.

Insert	ap (recommended)	Max. ap	Conversion factor for feed per tooth fz				
			ap=0.5mm	ap=1mm	ap=2mm	ap=3mm	ap=4mm
ROMU12 type	3mm or less	6mm	2.1	1.5	1.1	1.0 (Standard)	-
ROMU16 type	4mm or less	8mm	2.4	1.7	1.3	1.1	1.0 (Standard)

\* Example (ROMU12 type, Carbon Steel, GM chipbreaker, ap=1mm)

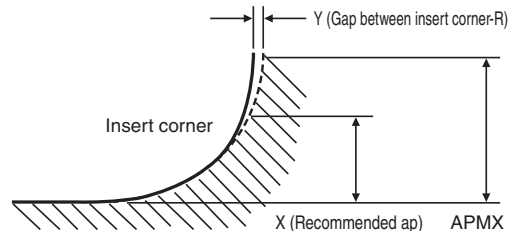
$$\begin{array}{|c|} \hline \mathbf{fz=0.2mm/t} \\ \hline \text{(Reference value for carbon steel and GM chipbreaker)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \mathbf{1.5} \\ \hline \text{(Conversion factor for ROMU12 type, ap=1mm)} \\ \hline \end{array}
 =
 \begin{array}{|c|} \hline \mathbf{fz=0.3mm/t} \\ \hline \text{(Recommended feed rate)} \\ \hline \end{array}$$

\* Recommended ap : 3mm or less for ROMU12, 4mm or less for ROMU16  
 Except the case that ap temporarily surpass the recommended ap, machining under the recommended ap is recommended.

### Corner-R shape during processing

Corner-R shape during processing with MRW (Ref. to the right figure)

Insert	APMX	X	Y
ROMU12 type	6mm	3mm	0.1mm
ROMU16 type	8mm	4mm	0.1mm



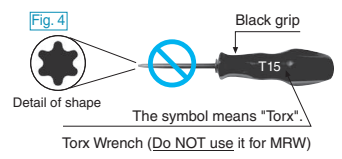
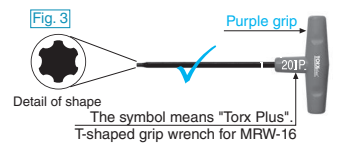
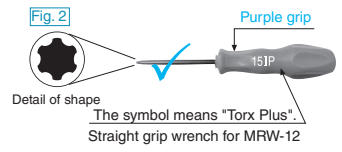
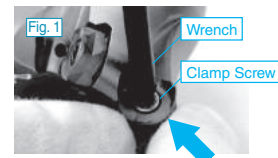
\* When machining with larger ap than recommended ap (X), there is a gap (Y) between the workpiece corner and insert corner-RE).  
 \* The above figure is estimation. There would be ±0.2mm variation depending on the cutting conditions.

## How to mount an insert

- Be sure to remove dust and chips from the insert mounting pocket.
- Clamp screw
  - Apply anti-seize compound on portion of taper and thread of clamp screw.
  - Attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
- Wrenches and clamp screws are "Torx Plus".
  - Fig. 2 wrench is for MRW-12. (Straight grip)
  - Fig. 3 wrench is for MRW-16. (T-shaped grip)

Please 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.
- When tightening the screw, make sure that the wrench is parallel to the screw.  
Recommended tightening torque, see page **M164** , **M165**
- After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.



## Case Studies

### 12Cr Steel

· Turbine Blade · Vc=270m/min · fz=0.278mm/t  
· ap=0.5-1.0mm ae=max.35mm · Dry  
· MRW050R-12-6T-M(6 inserts) · ROMU1204M0ER-SM(CA6535)

<b>CA6535</b>	<b>Stable machining</b>
Competitor A (Positive Cutter)	<b>Unstable machining with large noise</b>

MRW improved machining efficiency by 1.2 times with same tool life compared with Competitor A.  
MRW has cost advantage due to double-sided inserts.

(User Evaluation)

### 12Cr Steel

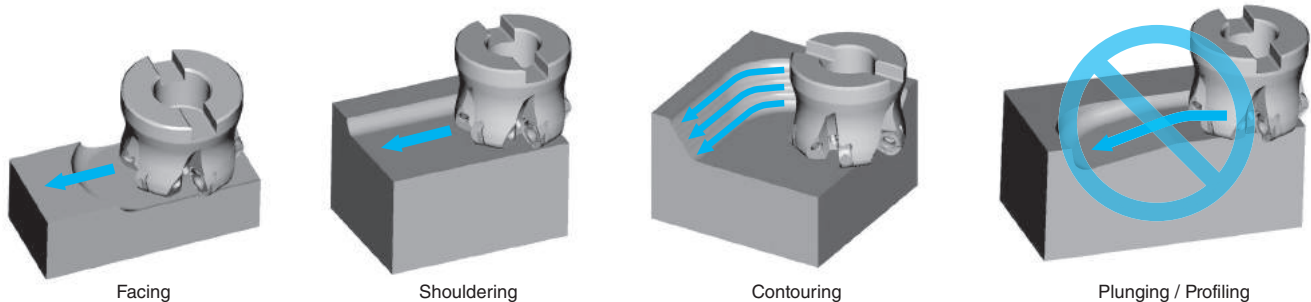
· Turbine Blade · Vc=250m/min · fz=0.16mm/t  
· ap=2.0mm ae=5-30mm · Wet  
· MRW050R-12-5T-M(5 inserts) · ROMU1204M0ER-SM(CA6535)

<b>CA6535</b>	<b>Stable, available for further machining</b>
Competitor B (Positive Cutter)	<b>Unstable machining with large noise</b>

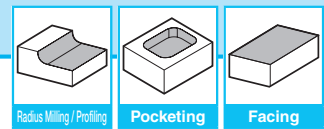
MRW showed less damage on the cutting edge and reduced machining noise.  
MRW has equal or longer tool life and cost advantage due to double sided inserts.

(User Evaluation)

## Applications



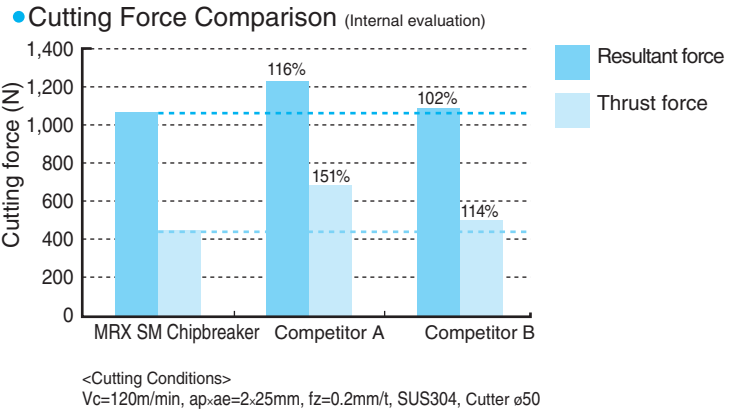
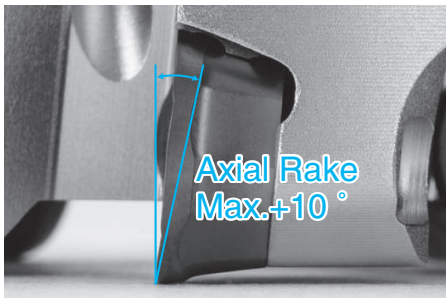
\* MRW type is not available for 3D machining such as Plunging and Profiling.



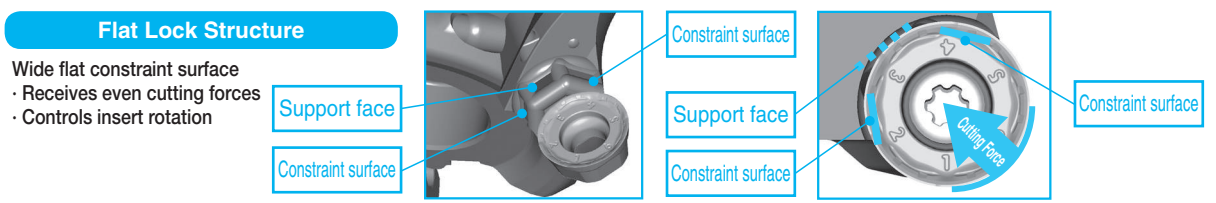
# MRX

Excellent cutting performance with low cutting force design  
High efficiency radius cutter

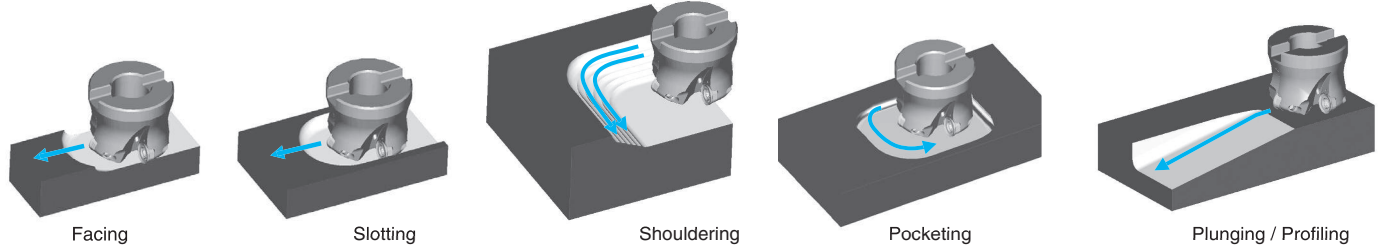
**POINT.1** Low cutting force with helical cutting-edge design



**POINT.2** Flat Lock Structure to hold insert firmly  
Prevent insert rotation during machining and realizes stable machining



**POINT.3** Various applications



**POINT.4** New insert grades CA6535 / PR1535 for difficult-to-cut material are available  
Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

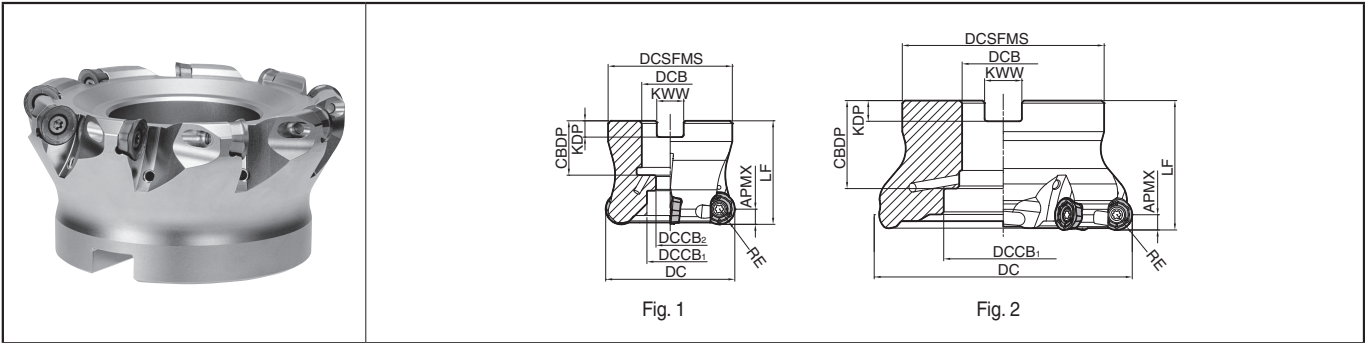
**Cost-effective M class inserts are available**

M

Milling

Insert
Lead Angle 45°~20°
Lead Angle 15°
Lead Angle 0°/2°
High Feed Cutter
Multi-Function
Slot Mill
Ball-nose Radius
Others

# MRX Face Mill



## Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min <sup>-1</sup> )	
			RE	DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW	APMX	A.R.	R.R.					
Metric	MRX 040R-10-5T-M	●	5	5	40	38	16	15	9	40	19	5.6	8.4	5	+10°	-5.5°	Yes	Fig. 1	0.2	20,000
	050R-10-6T-M	●	6		50	48	22	18	11		21	6.3	10.4						0.3	17,500
	063R-10-7T-M	●	7		63	60													0.6	15,000
	MRX 040R-12-4T-M	●	4	6	40	38	16	13.5	9	40	19	5.6	8.4	6	+10°	-5.5°		Fig. 1	0.2	21,000
	050R-12-4T-M	●	4		50	48	22	18	11		21	6.3	10.4						0.3	18,000
	050R-12-5T-M	●	5		63	60													0.3	18,000
	063R-12-5T-M	●	5	8	80	70	27	20	13	50	24	7	12.4	8	+10°	-5.5°		Fig. 1	0.6	15,500
	063R-12-6T-M	●	6																1.2	13,500
	080R-12-6T-M	●	6																1.1	13,500
	080R-12-8T-M	●	8	6	100	78	32	46	-	50	30	8	14.4	8	+10°	-5.5°		Fig. 2	1.4	12,000
	100R-12-7T-M	●	7																1.4	12,000
	100R-12-9T-M	●	9																2.6	9,000
	MRX 063R-16-4T-M	●	4	8	63	60	22	18	11	40	21	6.3	10.4	8	+10°	-5.5°		Fig. 1	0.5	13,500
	063R-16-5T-M	●	5																0.5	13,500
080R-16-5T-M	●	5	1.1														11,500			
080R-16-6T-M	●	6	6	100	78	32	46	-	50	30	8	14.4	8	+10°	-5.5°	Fig. 2	1.4	10,000		
100R-16-6T-M	●	6															1.4	10,000		
100R-16-7T-M	●	7															2.6	9,000		
125R-16-6T-M	●	6	8	125	89	40	55	-	63	33	9	16.4	8	+10°	-5.5°	Fig. 2	2.6	9,000		
125R-16-8T-M	●	8															2.6	9,000		
Bore Dia. Inch spec	MRX 080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	6	+10°	-5.5°	Yes	Fig. 1	1.2	13,500
	080R-12-8T	●	8																1.1	13,500
	100R-12-7T	●	7																1.5	12,000
	100R-12-9T	●	9	1.5	12,000															
	MRX 080R-16-5T	●	5	8	80	70	25.4	20	13	50	27	6	9.5	8	+10°	-5.5°		Fig. 1	1.1	11,500
	080R-16-6T	●	6																1.1	11,500
	100R-16-6T	●	6																1.4	10,000
	100R-16-7T	●	7	6	100	78	31.75	46	-	63	38	10	15.9	8	+10°	-5.5°		Fig. 2	1.4	10,000
	125R-16-6T	●	6																2.7	9,000
	125R-16-8T	●	8																2.7	9,000

## Spare Parts and Applicable Inserts

Description	Spare Parts				Applicable Inserts ● M16	
	Clamp Screw	Wrench		Anti-seize Compound		Mounting bolt
MRX 040R-10... 050R-10... 063R-10...	SB-3070TRP	DTPM-10	TTP	P-37	HH8X25 HH10X30	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH <sup>*1</sup>
MRX 040R-12... 050R-12... 063R-12... 080R-12... 100R-12...	SB-4090TRPN	DTPM-15	TTP	P-37	HH8X25 HH10X30 HH12X35 -	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH <sup>*2</sup>
MRX 063R-16... 080R-16... 100R-16... 125R-16...	SB-50120TRP	TTP-20	TTP	P-37	HH10X30 HH12X35 -	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH <sup>*3</sup>

- Max. Revolution  
When running the end mill and cutter at the maximum revolution, the insert or toolholder may be damaged by centrifugal force.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
- \*1... Not compatible with the conventional RPMT10T3M0.
- \*2... Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.
- \*3... Not compatible with the conventional RPMT1606M0-H.

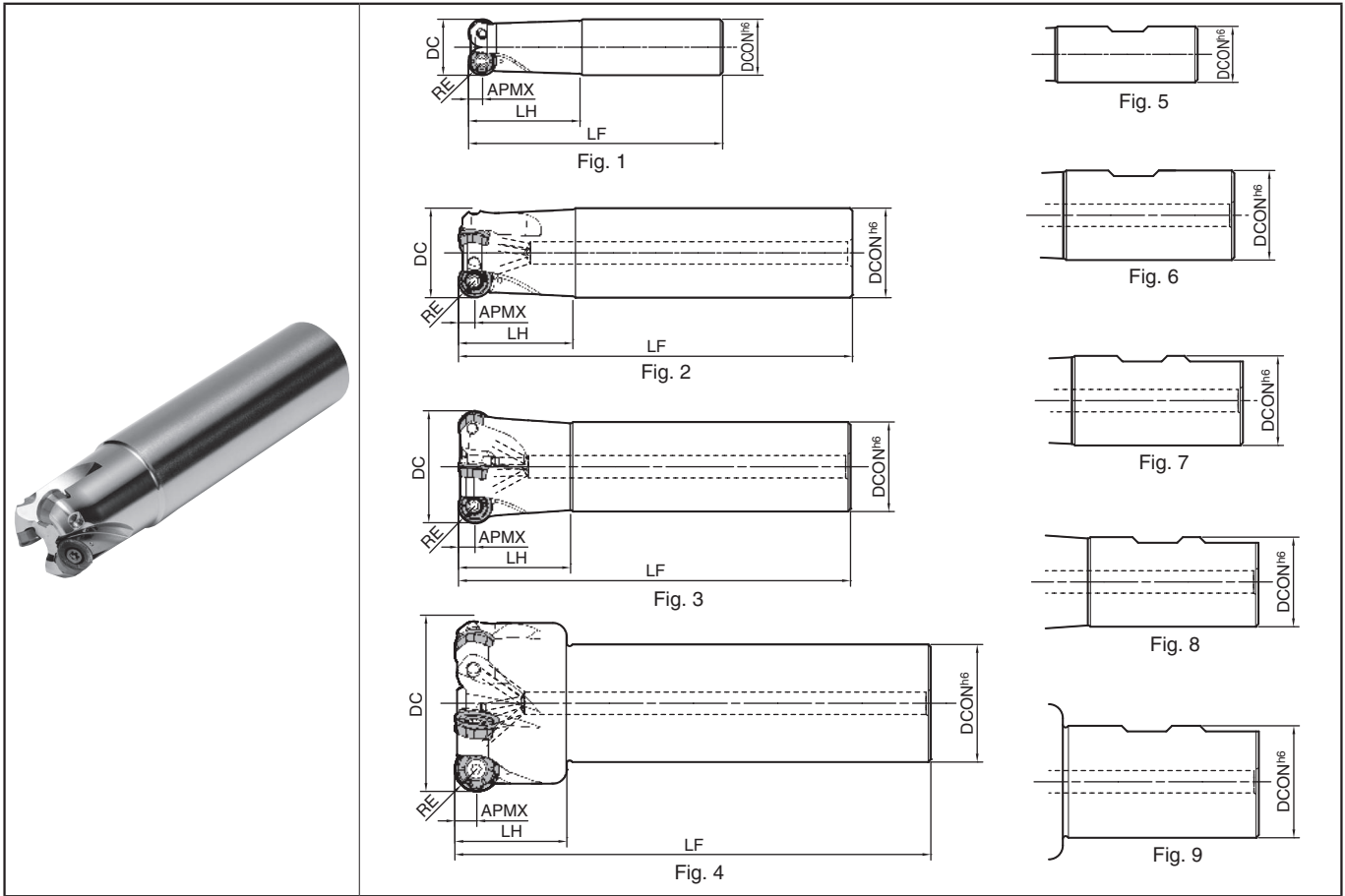
Recommended Cutting Conditions ● M172

● : Std. Item

Insert Grades  
Turnable  
Indexable Inserts  
CNC & CDD Tools  
External  
Small Parts  
Machining  
Boring  
Grooving  
Cut-off  
Threading  
Drilling  
Solid Tools  
Milling  
Tools for  
Spare Parts  
Technical  
Information  
Index



## MRX End Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Rake Angle		Coolant Hole	Drawing	Max. Revolution (min <sup>-1</sup> )
			RE	DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			
Straight Shank	MRX 16-S16-08-2T	●	4	16	16	110	40	4.0	+3°	-5.5°	No	Fig. 1	38,000
		●		20	20				120		+10°	32,000	
		●		25	25				120		Yes	Fig. 2	28,000
	MRX 20-S20-10-2T	●	5	20	20	140	40	5.0	+5°	-8°	No	Fig. 1	30,000
		●		25	25				28,000				
		●		32	32				Yes		Fig. 2	22,500	
	MRX 32-S32-12-3T	●	6	32	32	170	40	6.0	+10°	-5.5°	Yes	Fig. 3	24,500
		●		40	40				21,000				
		●		50	42				18,000				
	MRX 40-S32-16-2T	●	8	40	32	170	40	8.0	+10°	-5.5°	Yes	Fig. 4	18,000
		●		50	42				15,500				
		●		63	42				13,500				
Weldon	MRX 16-W16-08-2T	●	4	16	16	89	40	4.0	+3°	-5.5°	No	Fig. 5	38,000
		●		20	20				91		+10°	32,000	
		●		25	25				97		Yes	Fig. 6	28,000
	MRX 20-W20-10-2T	●	5	20	20	101	40	5.0	+5°	-8°	No	Fig. 7	30,000
		●		25	25				97		+10°	28,000	
		●		32	32				101		Yes	Fig. 7	22,500
	MRX 32-W32-12-3T	●	6	32	32	111	40	6.0	+10°	-5.5°	Yes	Fig. 8	24,500
		●		40	40				101				21,000
		●		50	40				111				18,000
	MRX 40-W32-16-2T	●	8	40	32	112	40	8.0	+10°	-5.5°	Yes	Fig. 9	18,000
		●		50	40				111				15,500
		●		63	40				112				13,500
Long Shank	MRX 16-S16-08-2T-180	●	4	16	16	160	70	4.0	+3°	-5.5°	No	Fig. 1	38,000
		●		20	20				180		+10°	32,000	
		●		25	25				180		Yes	Fig. 2	28,000
	MRX 20-S20-10-2T-180	●	5	20	20	200	80	5.0	+5°	-8°	No	Fig. 1	30,000
		●		25	25				180		+10°	28,000	
		●		32	32				200		Yes	Fig. 2	22,500
	MRX 32-S32-12-2T-200	●	6	32	32	300	40	6.0	+10°	-5.5°	Yes	Fig. 3	24,500
		●		40	40				200				21,000
		●		50	42				300				18,000
	MRX 40-S32-16-2T-200	●	8	40	32	200	40	8.0	+10°	-5.5°	Yes	Fig. 4	18,000
		●		50	42				15,500				
		●		63	42				300				13,500

• **Max. Revolution**

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

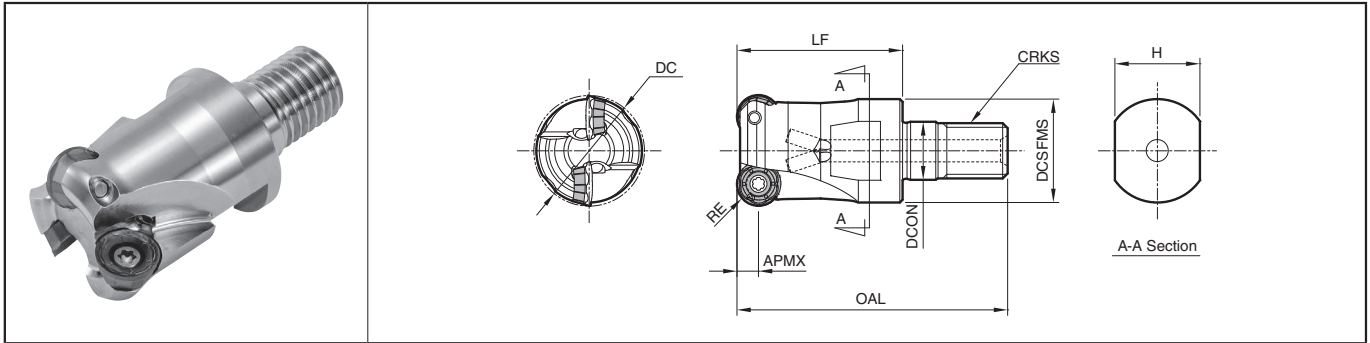
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item



# MRX Modular type

## MRX Head



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Rake Angle		Coolant Hole	Applicable Inserts	Max. Revolution (min <sup>-1</sup> )	
			RE	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R. (MAX.)				R.R.
<b>MRX 16-M08-08-2T</b>	●	2		16	14.7	8.5	43	25	M8xP1.25	12		+3°		No	RDMT08 RDGT08	38,000
<b>20-M10-08-2T</b>	●	2	4	20	18.7	10.5	49	30	M10xP1.5	15	4	+10°	-5.5°	Yes		32,000
<b>25-M12-08-4T</b>	●	4		25	23	12.5	57	35	M12xP1.75	19						28,000
<b>MRX 20-M10-10-2T</b>	●	2		20	18.7	10.5	49	30	M10xP1.5	15		+5°	-8°	No	RPMT10 RPGT10	30,000
<b>25-M12-10-3T</b>	●	3	5	25	23	12.5	57	35	M12xP1.75	19	5	+10°	-5.5°	Yes		28,000
<b>32-M16-10-4T</b>	●	4		32	30	17	63	40	M16xP2.0	24						22,500
<b>MRX 32-M16-12-3T</b>	●	3		32										Yes	RPMT12 RPGT12	24,500
<b>40-M16-12-4T</b>	●	4	6	40	30	17	63	40	M16xP2.0	24	6	+10°	-5.5°	Yes		21,000
<b>MRX 40-M16-16-2T</b>	●	2	8	40	30	17	63	40	M16xP2.0	24	8	+10°	-5.5°	Yes	RPMT16 RPGT16	18,000

➔ See Page M52 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

### Spare Parts and Applicable Inserts

Description	Clamp Screw	Wrench		Anti-seize Compound	Applicable Inserts ➔ M16
		DTPM	TTP		
<b>MRX ...-08...</b>	SB-2555TRP	DTPM-8	TTP	P-37	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM RDMT0803M0EN-GH <sup>*1</sup>
	Recommended tightening torque for Insert Clamp 1.2N·m				
<b>MRX ...-10...</b>	SB-3070TRP	DTPM-10	TTP	P-37	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH <sup>*2</sup>
	Recommended tightening torque for Insert Clamp 2.0N·m				
<b>MRX ...-12...</b>	SB-4090TRPN	DTPM-15	TTP	P-37	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH <sup>*3</sup>
	Recommended tightening torque for Insert Clamp 3.5N·m				
<b>MRX ...-16...</b>	SB-50120TRP	TTP-20	TTP	P-37	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH <sup>*4</sup>
	Recommended tightening torque for Insert Clamp 4.5N·m				

● Max. Revolution

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

● Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

\*1... Not compatible with the conventional RDMT08T2M0-H.

\*2... Not compatible with the conventional RPMT10T3M0.

\*3... Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.

\*4... Not compatible with the conventional RPMT1606M0-H.

Recommended Cutting Conditions ➔ M172

## ◆ Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz : mm/t)				Recommended Insert Grades (Cutting Speed Vc: m/min)			
	* RD**08 type: ap=2mm, RP**10 type: ap=2.5mm RP**12 type: ap=3mm, RP**16 type: ap=4mm				MEGACOAT NANO			CVD Coated Carbide
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	PR1535	PR1525	PR1510	CA6535
Carbon Steel	★ 0.1- <b>0.2</b> -0.3	☆ 0.1- <b>0.2</b> -0.3	☆ 0.06- <b>0.15</b> -0.2	☆ 0.15- <b>0.3</b> -0.35	☆ 120- <b>180</b> -250	★ 120- <b>180</b> -250	-	-
Alloy Steel	★ 0.1- <b>0.2</b> -0.3	☆ 0.1- <b>0.2</b> -0.3	☆ 0.06- <b>0.15</b> -0.2	☆ 0.15- <b>0.3</b> -0.35	☆ 100- <b>160</b> -220	★ 100- <b>160</b> -220	-	-
Mold Steel	★ 0.1- <b>0.15</b> -0.25	☆ 0.1- <b>0.15</b> -0.25	☆ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.3	☆ 80- <b>140</b> -180	★ 80- <b>140</b> -180	-	-
Stainless Steel (Austenitic related)	☆ 0.1- <b>0.15</b> -0.2	☆ 0.1- <b>0.15</b> -0.2	★ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.25	★ 100- <b>160</b> -200	☆ 100- <b>160</b> -200	-	-
Stainless Steel (Martensitic related)	☆ 0.1- <b>0.15</b> -0.2	☆ 0.1- <b>0.15</b> -0.2	★ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.25	☆ 150- <b>200</b> -250	-	-	★ 180- <b>240</b> -300
Stainless Steel (Precipitation Hardening)	☆ 0.1- <b>0.15</b> -0.2	★ 0.1- <b>0.15</b> -0.2	☆ 0.06- <b>0.12</b> -0.2	☆ 0.15- <b>0.2</b> -0.25	★ 90- <b>120</b> -150	-	-	-
Gray Cast Iron	★ 0.1- <b>0.2</b> -0.3	☆ 0.1- <b>0.2</b> -0.3	-	☆ 0.15- <b>0.3</b> -0.35	-	-	★ 120- <b>180</b> -250	-
Nodular Cast Iron	★ 0.1- <b>0.15</b> -0.25	☆ 0.1- <b>0.15</b> -0.25	-	☆ 0.15- <b>0.2</b> -0.3	-	-	★ 100- <b>150</b> -200	-
Ni-base heat-resistant alloys	☆ 0.1- <b>0.12</b> -0.15	★ 0.1- <b>0.12</b> -0.15	☆ 0.06- <b>0.1</b> -0.15	☆ 0.12- <b>0.15</b> -0.2	☆ 20- <b>30</b> -50	-	-	★ 20- <b>30</b> -50
Titanium Alloys	☆ 0.1- <b>0.12</b> -0.15	☆ 0.1- <b>0.12</b> -0.15	★ 0.06- <b>0.1</b> -0.15	-	★ 40- <b>60</b> -80	-	☆ 30- <b>50</b> -70	-

- \* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ★ : 1st Recommendation ☆ : 2nd Recommendation
- \* RDGT/RPGT are recommended for stainless steel, Ni-base heat-resistant alloys and titanium alloy.
- \* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- \* Recommended feed rate in the table is the reference value when ap is RE/2. (2mm for RD\*\*08 / 2.5mm for RP\*\*10 / 3mm for RP\*\*12 / 4mm for RP\*\*16)  
For other ap, calculate the recommended feed rate based on the conversion factor below.
- \* For MRX16-S16-08-2T(-160), MRX16-W08-2T, MRX20-S20-10-2T(-180) and MRX20-W20-10-2T, set the feed rate not higher than 50% of the recommended cutting conditions.

### ■ Conversion factor for feed per tooth by depth of cut (ap)

Insert	Max. ap	Conversion factor for feed per tooth fz									
		ap=0.5mm	ap=1mm	ap=1.5mm	ap=2mm	ap=2.5mm	ap=3mm	ap=4mm	ap=5mm	ap=6mm	ap=8mm
RD**08 type (GM/SM/GH chipbreaker)	4mm	1.7	1.3	1.1	1 (Standard)	0.9	0.8	0.8	-	-	-
RP**10 type (GM/SM/GH chipbreaker)	5mm	1.9	1.4	1.2	1 (Standard)	0.9	0.8	0.8	-	-	
RP**12 type (GM/SM/GH chipbreaker)	6mm	2.1	1.5	1.3	1.1	1 (Standard)	0.9	0.8	0.8	-	
RP**16 type (GM/SM/GH chipbreaker)	8mm	2.4	1.7	1.4	1.3	1.1	1.1 (Standard)	0.9	0.8	0.8	

· Example (RPMT12 type, Carbon Steel, GM chipbreaker, ap=1mm)

$$\begin{array}{|c|} \hline \mathbf{fz=0.2mm/t} \\ \hline \text{(Reference value for carbon steel and GM chipbreaker)} \\ \hline \end{array}
 \times
 \begin{array}{|c|} \hline \mathbf{1.5} \\ \hline \text{(Conversion factor for RP**12 type, ap=1mm)} \\ \hline \end{array}
 =
 \begin{array}{|c|} \hline \mathbf{fz=0.3mm/t} \\ \hline \text{(Recommended feed rate)} \\ \hline \end{array}$$

### ■ Recommended cutting conditions for Drilling / Ramping / Helical milling

Tool spec.	Max. ap	Drilling		Ramping		Helical Milling												
		Insert	Tool Dia.	Max. Cutting Depth Pd	Min. cutting length X for flat bottom surface	Max. ramping angle RMPX	tan RMPX	Cutting Length L at Max. Ramping Angle	Min. Cutting Dia. øDh1	Min. Cutting Dia. for flat bottom facing øDh2	Max. Cutting Dia. øDh3							
RD**08 type	4	16	0.7	9	8°	0.141	28	20	24	30								
											20	13	9°	0.158	25	26	32	38
RP**10 type	5	20	0.6	11	5°	0.087	57	26	30	38								
											25	16	10°	0.176	28	33	40	48
											40	31	4°	0.070	71	63	70	78
											63	54	2°	0.035	143	109	116	124
40	29	5°	0.087	68	59	68	78											
								50	39	4°	0.070	85	79	88	98			
63	52	2°	0.035	171	105	114	124											
								80	69	139	148	158						
100	89	1°	0.017	343	179	188	198											
								RP**16 type	8	40	3.4	25	11°	0.194	41	51	64	78
50	35	7°	0.123	65	71	84	98											
80	65	3°	0.052	152	131	144	158											
125	110	1°	0.017	458	221	234	248											

\* Above is the value considering the clearance 1mm between the tool body and the workpiece.

Unit : mm

M  
Milling  
Insert  
Lead Angle 45°-20°  
Lead Angle 15°  
Lead Angle 0°/2°  
High Feed Cutter  
Multi-Function  
Slot Mill  
Ball-nose Radius  
Others

## Guide for Drilling

### [Depth of Drilling]

Refer to Max. Cutting Depth (Pd) shown in the lower table of **M172**.

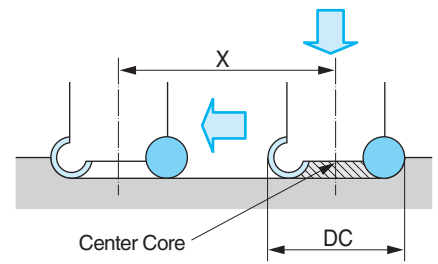
(Pd Shows the maximum plunge depth.)

### [When Traversing after Drilling]

(1) Reduce the table feed by 50% until the center core part (do not forget to grind) is completely cut off.

(The internal cutting edge's radial rake angle is large in the negative direction)

(2) The min. cutting length "X" for flat bottom surface is as follows **M172**.



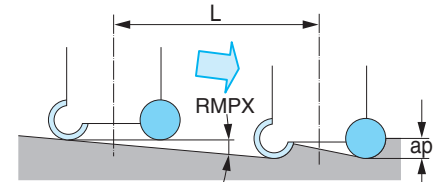
## Guide for Ramping (Slant Milling)

· Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.

· Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$



## Guide for Helical milling

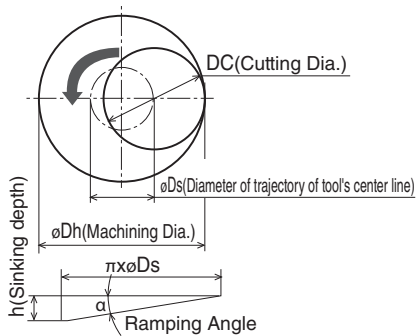
· Sinking depth (h) per revolution when helical milling should be Max. ap or under in the above cutting conditions.

· Ramping angle (with trajectory of the center line of tool) should be RMPX (Maximum ramping angle) or under in the above cutting conditions.

· Feed rate should be 70% or under of the above cutting conditions.

· Down-cut machining is recommended.

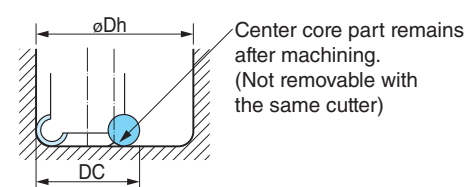
### Helical Milling Factors



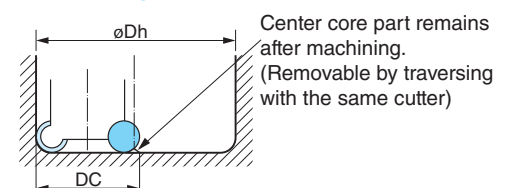
$\phi D_s$  (How to find diameter of trajectory of tool's center line)  
 $\phi D_s = \phi D_h - DC$

Formula for sinking depth (h)  
 $h = \pi \times \phi D_s \times \tan \alpha$   
(h should be ap or under)  
(alpha should be RMPX or under)

### [When cutting dia. $\phi Dh_1 \leq \phi Dh < \phi Dh_2$ ]



### [When cutting dia. $\phi Dh_2 \leq \phi Dh \leq \phi Dh_3$ ]



\*Please refer to M172 the list for  $\phi Dh_1 \sim Dh_3$ .

## Max. ap and usable edges

Usable edges	Insert Corner-R (mm)			
	R4	R5	R6	R8
3 edges	ap=2.0~4.0	ap=2.5~5.0	ap=3.0~6.0	ap=4.0~8.0
6 edges	ap=2.0 Less than	ap=2.5 Less than	ap=3.0 Less than	ap=4.0 Less than

## Case Studies

### SUS304

- Nozzle parts
- Vc = 113m/min
- fz = 0.14mm/t
- ap x ae = 1.0 x 65mm
- Dry
- MRX100R-12-9T-M (9 inserts)
- RPGT1204M0ER-SM (PR1535)

<b>PR1535</b>	450 pcs/edge
<b>Conventional</b>	100 pcs/edge

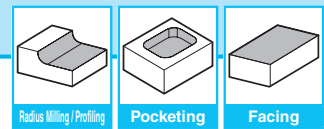
· High cost efficiency with 4.5 times longer tool life and 1.5 times more insert edges.  
· MRX prevented burr formation and improved surface finish.  
(User Evaluation)

### SKD61(47~49HRC)

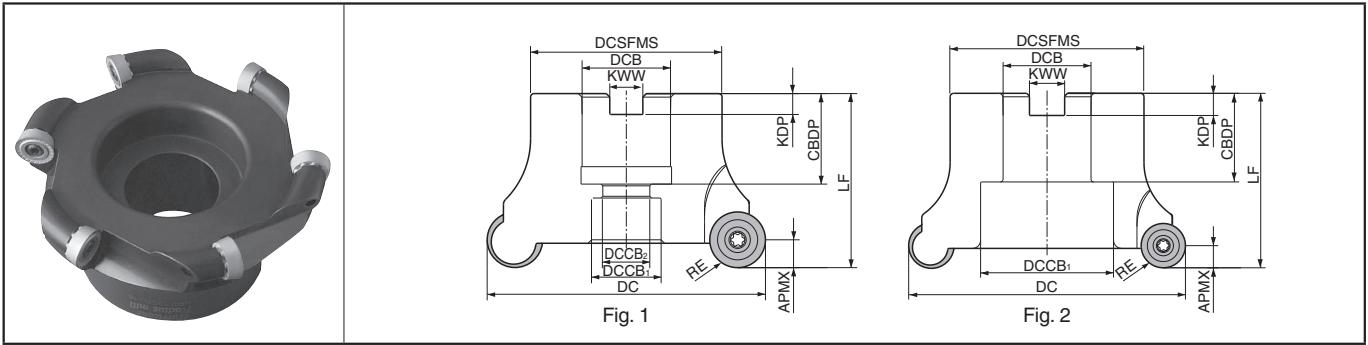
- Mold Part
- Vc = 125m/min
- fz = 0.25mm/t
- ap x ae = 1.0~2.0 x 10mm
- Dry
- MRX20-S20-08-2T (2 inserts)
- RDGT0803M0ER-GM (PR1525)

<b>PR1525</b>	2 pcs and more Stable tool life
<b>Conventional</b>	1 pc Unstable tool life

· Conventional tool machined only 1 pc of workpiece due to unstable tool life, but MRX doubled the tool life with stable machining.  
(User Evaluation)



## MRP Face Mill



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle		Drawing	Weight (kg)
			RE	DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW	APMX	A.R.	R.R.		
MRP 080R-20 100R-20	<input type="checkbox"/>	4	10	80	55	25.4	20	14	50	24	6.0	9.5	10.0	+5°	-3°	Fig. 1	0.8
	<input type="checkbox"/>	5		100	70	31.75	48	-	63	32	8.0	12.7				-5°	Fig. 2

Recommended Cutting Conditions **M175**

### Spare Parts

Description	Clamp Screw	Wrench	Applicable Inserts ● M21
	MRP 080R-20 100R-20		

· Mounting bolt (HH12X35) is included for MRP080R.

### Applicable Inserts

Description	Applicable Inserts ● M21
	MRP ...-20



**Top surface of insert**  
Low cutting force and good chip evacuation owing to chipbreaker design.  
“-H” type insert has a second cutting edge next to the first cutting adds edge strength.

Ratchet design prevents the insert's movement and holds the insert firmly in the insert pocket even during the heavy milling (Only RPMT)



**Bottom Face**

Insert Description	Land at Edge	Applications	Remarks
RPMT2006M0-H	Parallel Land 0.2mm Width	Tough Edge	Used for General Roughing

- Insert
- Lead Angle 45°~20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

## ◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)		
		MEGACOAT		Carbide
		PR1230	PR1210	KW10
Carbon Steel	~0.6	★ 120-250	-	-
Alloy Steel	~0.6	★ 100-220	-	-
Mold Steel	~0.5	★ 80-180	-	-
Stainless Steel	~0.4	★ 120-220	-	-
Cast Iron	~0.6	-	★ 100-220	☆ 80-150
Non-ferrous Metals	~0.6	-	-	★ 100-300

★ : 1st Recommendation ☆ : 2nd Recommendation

## ■ Guide for Ramping (Slant Milling)

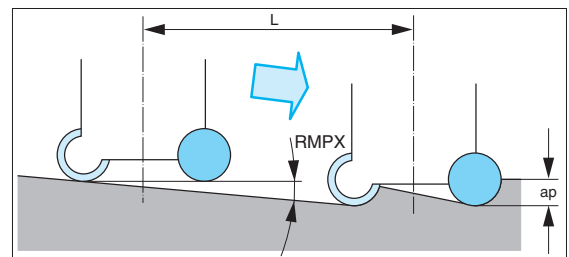
The transfer length "L" at the maximum slant angle RMPX in the ramping operation depends on the ap.

Toolholder Description	RMPX	tan RMPX
<b>MRP 080R-20</b>	8°	0.141
<b>100R-20</b>	6°	0.105

\* Above is the value considering the clearance 1mm between the tool body and the workpiece.

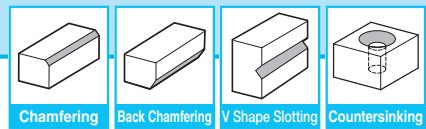
Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$

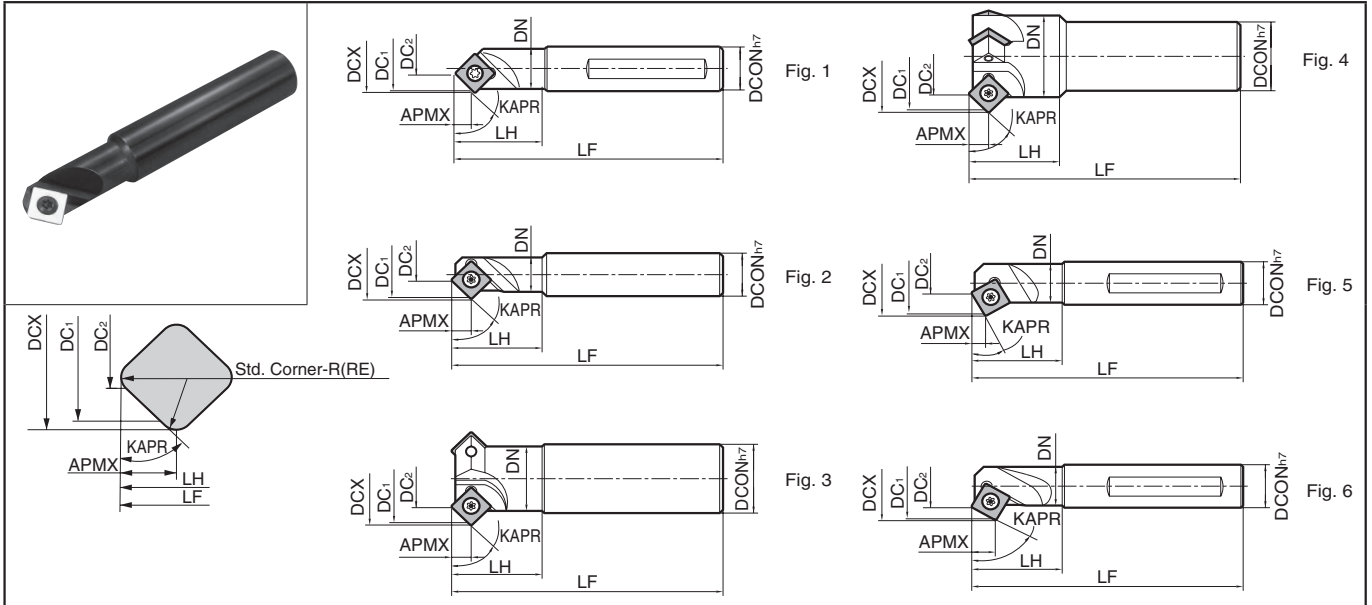


Insert Grades	A
Turning Indexable Inserts	B
CBN & PCBN Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	<b>M</b>
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T

# Chamfering End Mill



## MCSE



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Std. Corner-R(RE)	Angle	Rake Angle		Drawing	Spare Parts																			
			DCX	DC <sub>1</sub>	DC <sub>2</sub>	DCON	DN	LF	LH	APMX			KAPR	A.R.		R.R.	Clamp screw	Wrench																	
<b>MCSE</b> 104 106 115 227 336	●	1	16	15	4	16	15	85	31	6.5	0.4	45°	0°	Fig. 1	SB-3060TR	DT-10																			
			22	21	6	20	16	121	41	8.6							0.8	-4.5°	Fig. 2	SB-5090TR	LTW-20														
			31	30	15	20	18															32	30	38	-1°	Fig. 3	SB-5090TR	LTW-20							
			43	42	27	32	30																						32	30	38	+8°	Fig. 4	SB-5090TR	LTW-20
			52	51	36	32	30																												
<b>MCSE</b> 104-30D 108-30D 110-30D	●	1	19	18	4	16	15	85	31	4.7	0.4	30°	0°	Fig. 5	SB-3060TR	DT-10																			
			28	27	8	20	19	110	41	6.3							0.8	-2.5°	Fig. 5	SB-5090TR	LTW-20														
			30	28	10	20	18	120	40													10	0.8	0°	Fig. 6	SB-5090TR	LTW-20								
<b>MCSE</b> 108-60D 120-60D	●	1	19.5	19	8	20	19	110	41	10	0.8	60°	0°	-3.5°	Fig. 6	SB-5070TR	LTW-20																		
			31	30	20	20	18	120	40									10	0.8	0°	Fig. 6	SB-5090TR	LTW-20												

### Applicable Inserts

Description	Applicable Inserts M22		
	Insert	Insert	Insert
<b>MCSE</b> 104 104-30D	SDKW 09T204TN	SDKW 09T204FN	SDMT 09T204C
<b>MCSE</b> 106 115 227 336	SEKW 120304TN 120308TN	SEKW 120304FN 120308FN	SEMT 120304C
<b>MCSE</b> 108-30D 110-30D			
<b>MCSE</b> 108-60D 120-60D			

M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

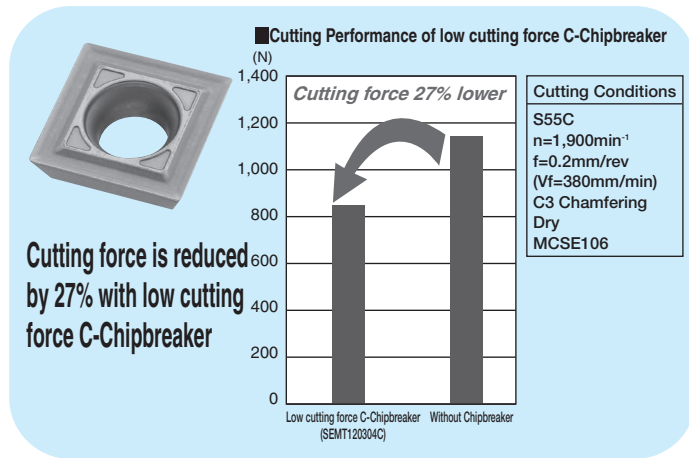
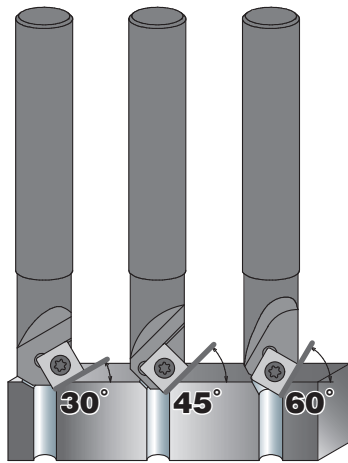
● : Std. Item



### ◆ Recommended Cutting Conditions

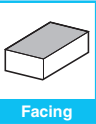
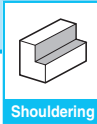
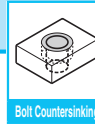
Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)		
			Cermet	MEGACOAT	Carbide
	DC <sub>2</sub> (ø4~ø20)	DC <sub>2</sub> (ø27~ø36)	TN100M	PR1225	KW10
Carbon Steel	0.05~0.25	0.2~0.4	★ 100~180	★ 120~250	-
Alloy Steel	0.05~0.25	0.2~0.4	★ 100~180	★ 100~220	-
Mold Steel	0.05~0.25	0.2~0.4	★ 100~150	★ 80~180	-
Stainless Steel	0.05~0.2	0.1~0.3	☆ 100~180	★ 120~220	-
Cast Iron	0.1~0.3	0.3~0.5	-	-	☆ 80~150
Non-ferrous Metals	0.1~0.3	0.3~0.5	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation



Insert Grades	A
Turning Indexable Inserts	B
CBN & PCBN Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
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Drilling	K
Solid Tools	L
Milling	M
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Spare Parts	P
Technical Information	R
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# Bolt Countersink End Mill

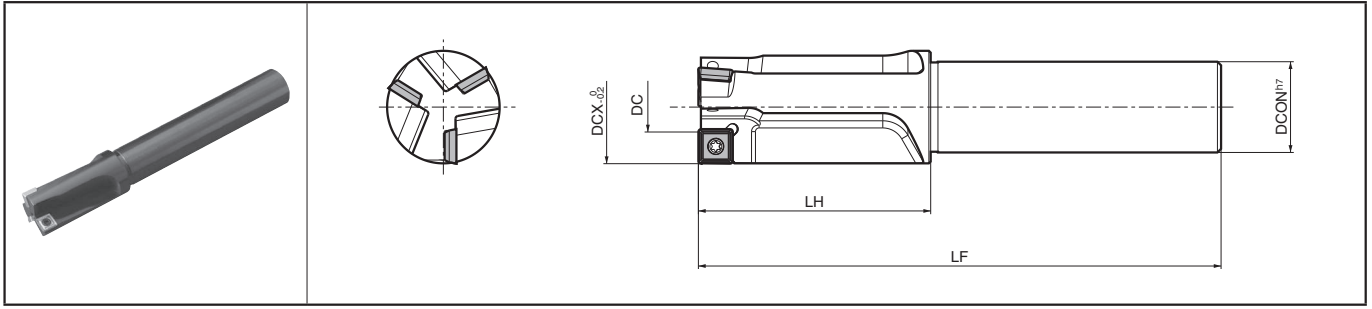


Bolt Countersinking

Shouldering

Facing

## MEF

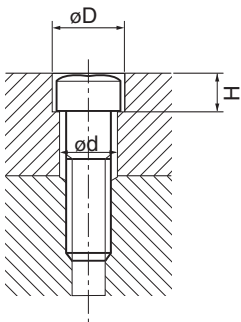


### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Std. Corner-R(RE)	Rake Angle		Objective Bolt Size	Spare Parts		Applicable Inserts M24	
			DCX	DC	DCON	LF	LH		A.R.	R.R.		Clamp Screw	Wrench		
<b>MEF 11-S10</b>	●	1	11	3.0	10	103	23	0.4	-13°	M6	SB-2250TR	DT-7	SPMT060204E-Z 060208E-Z		
<b>14-S12</b>	●	1	14	4.5	12	108	28			M8	SB-2260TR				
<b>17-S16</b>	●	2	17.5	7.3	16	115	35			M10					
<b>18-S16</b>	●	2	18	7.7		117	38			-					
<b>20-S16</b>	●	2	20	9.5	20	120	40			M12					
<b>22-S20</b>	●	2	22	11.4		124	44		-						
<b>23-S20</b>	●	2	23	12.4		126	46		M14						
<b>24-S20</b>	●	2	24	13.4		128	48		-						
<b>25-S20</b>	●	2	25	14.4	130	50	-		+5°	-12°	SB-3080TR			DT-10	SPMT090304E-Z 090308E-Z
<b>26-S25</b>	●	3	26	9.8	25	132	52								
<b>27-S25</b>	●	3	27	10.6		134	54	-							
<b>28-S25</b>	●	3	28	11.5		136	56	-							
<b>29-S25</b>	●	3	29	12.6	138	58	M18								
<b>30-S25</b>	●	3	30	13.5	140	60	-								
<b>32-S25</b>	●	3	32	15.5	144	64	M20								
<b>35-S32</b>	●	3	35	18.4	150	70	M22								
<b>39-S32</b>	●	3	39	22.5	158	78	M24								
<b>43-S32</b>	●	4	43	26.2	166	86	M27	-12°							
<b>48-S32</b>	●	4	48	31.3	176	96	M30								

· Although Corner-R(RE) pertains to MEF11-S10, DC=3.0mm.

### Bolt Countersink (Hexagon Socket Head Cap Screw)



Nominal Screw Size	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
øD (mm)	11	14	17.5	20	23	26	29	32	35	39	43	48
H (mm)	6.5	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5	29	32
ød (mm)	6.6	9	11	14	16	18	20	22	24	26	30	33
Applicable End Mill	MEF11	MEF14	MEF17	MEF20	MEF23	MEF26	MEF29	MEF32	MEF35	MEF39	MEF43	MEF48

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others

● : Std. Item

### ◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades(Cutting Speed Vc: m/min)		
		MEGACOAT		Carbide
		PR1225	PR1210	KW10
Carbon Steel	0.1~0.15	★ 120~220	-	-
Alloy Steel	0.1~0.15	★ 120~220	-	-
Mold Steel	0.05~0.1	★ 100~180	-	-
Stainless Steel	0.05~0.1	★ 80~180	-	-
Cast Iron	0.1~0.2	-	★ 100~220	☆ 80~120
Non-ferrous Metals	0.1~0.2	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

### ■ Points at Bolt Countersinking

#### (1) Carbon Steel

Increase the feed rate to **fz=0.1 ~ 0.15 (mm/t)** for preventing long chips at low feed rates.  
 Chip control is good when setting (**Vc=80m/min**) for **MEF11~MEF25**, and (**Vc=120m/min**) for **MEF26~MEF48**.

Toolholder Description	Cutting Speed Vc(m/min)	fz(mm/t)
<b>MEF11~MEF25</b>	80	0.1~0.15
<b>MEF26~MEF48</b>	120	0.1~0.15

#### (2) Sticky Materials

Step feed is recommended for good chip control Increase the feed rate to **fz=0.1 ~ 0.15 (mm/t)** for preventing long chips at low feed rate (**fz=0.05mm/t**).

Use cover to prevent accidents or injury by thick chips at higher feed rates.

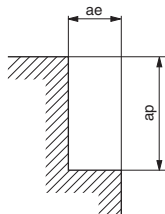
Toolholder Description	Cutting Speed Vc(m/min)	fz(mm/t)	Step Feed (mm)
<b>MEF11~MEF48</b>	80~150	0.1~0.15	0.5~1.5

#### (3) Stainless Steel

Use a lower Cutting Speed. High Cutting Speeds cause chattering.

### ■ Cutting Performance when Shouldering

**MEF Bolt Countersink End Mill** is also recommended of shouldering.



**Vc=80~120m/min**  
**S55C**  
**Dry**  
 Overhang Length : Same as LH in the dimension table

· When shouldering, both side edge and bottom edges function. Both edges wear at the same time depending on ap. The insert uses 2 edges instead of 4. (Fig. 1)

· MEF type's side edge is designed to have a slight clearance for the countersinking. Therefore, worked side wall is approx. 1° inclined against the vertical face. (Fig. 2)

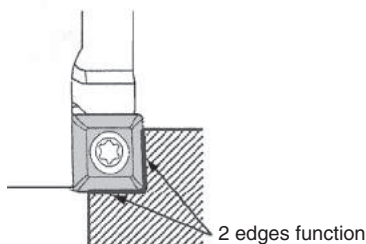


Fig. 1

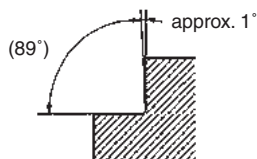
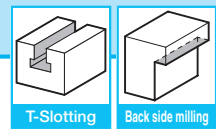


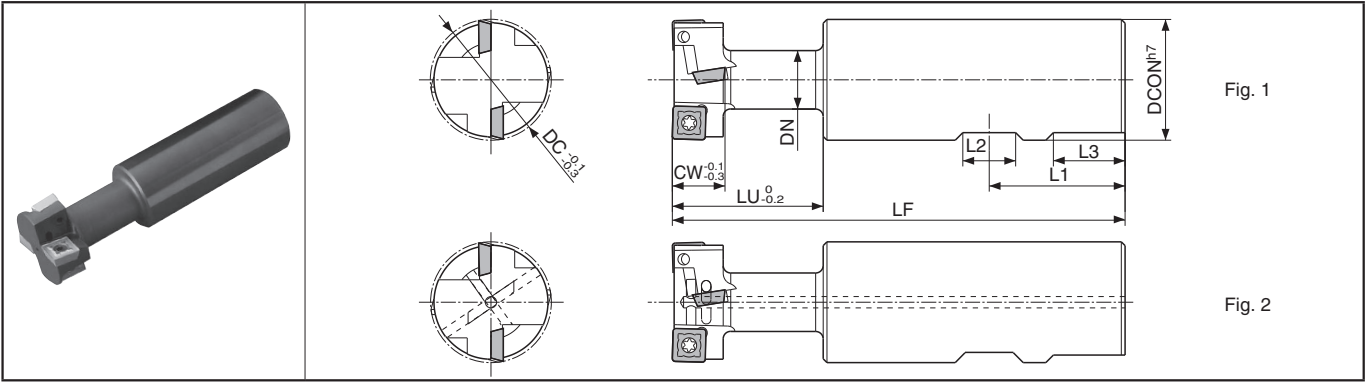
Fig. 2

Description	Cutting Range
<b>MEF11-S12</b> <b>MEF14-S12</b> <b>MEF17-S16</b> <b>MEF18-S16</b>	
<b>MEF20-S16</b> <b>MEF22-S20</b> <b>MEF25-S20</b>	
<b>MEF26-S25</b> <b>MEF32-S25</b> <b>MEF35-S32</b>	
<b>MEF39-S32</b> <b>MEF43-S32</b> <b>MEF48-S32</b>	

# T-Slot Mill METS



## METS



### Toolholder Dimensions

Description	Stock	No. of Inserts	No. of Flutes	Dimension (mm)									Rake Angle		Drawing	Spare Parts		Applicable Inserts M22
				DC	DCON	DN	CW	LF	LU	L1	L2	L3	A.R.	R.R.		Clamp Screw	Wrench	
<b>METS</b> 21-S25 25-S25 32-S32 40-S32 50-S32	●	2	1	21	25	10.5	9	109	29	32	12	17	+9°	-10°	Fig. 1	SB-2560TR	DT-8	SDMT060304E-K
	●	4	2	25		12.5	11	112	32									
	●			32	15.5	14	120	38	36	14	19	-12°	SB-3060TR	DT-10		SDMT080308E-K		
	●	4	2	40	20.5	18	130	50										
	●			50	26.5	22	140	60										
<b>METS</b> 21-S25-H 25-S25-H 32-S32-H 40-S32-H 50-S32-H	●	2	1	21	25	10.5	9	109	29	32	12	17	+9°	-10°	Fig. 2	SB-2560TR	DT-8	SDMT060304E-K
	●	4	2	25		12.5	11	112	32									
	●			32	15.5	14	120	38	36	14	19	-12°	SB-3060TR	DT-10		SDMT080308E-K		
	●	4	2	40	20.5	18	130	50										
	●			50	26.5	22	140	60										

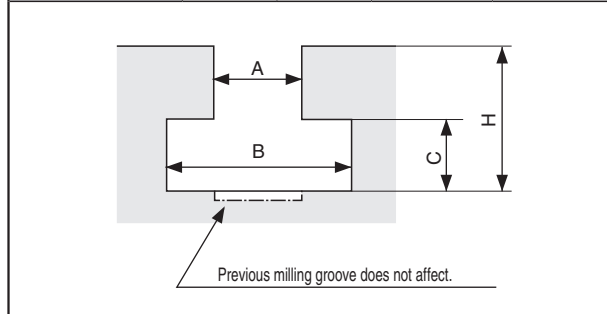
· METS...-H has air holes

### Applicable Inserts

Description	Applicable Inserts M22
<b>METS</b> 21-S25 21-S25-H 25-S25 25-S25-H	SDMT 060304E-K
<b>METS</b> 32-S32 32-S32-H	SDMT 080308E-K
<b>METS</b> 40-S32 40-S32-H 50-S32 50-S32-H	SDMT 120408E-K

### JIS Standard of T-Slot (Extracted from B0952) (Unit : mm)

A (Nominal Size)	B	C	H	
			Max.	Min.
12	19 <sup>+2</sup> <sub>0</sub>	8 <sup>+1</sup> <sub>0</sub>	25	20
14	23 <sup>+2</sup> <sub>0</sub>	9 <sup>+2</sup> <sub>0</sub>	28	23
18	30 <sup>+2</sup> <sub>0</sub>	12 <sup>+2</sup> <sub>0</sub>	36	30
22	37 <sup>+3</sup> <sub>0</sub>	16 <sup>+2</sup> <sub>0</sub>	45	38
28	46 <sup>+4</sup> <sub>0</sub>	20 <sup>+2</sup> <sub>0</sub>	56	48



M

Milling

Insert

Lead Angle 45°-20°

Lead Angle 15°

Lead Angle 0°/2°

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

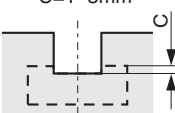
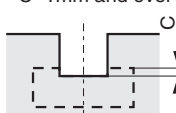
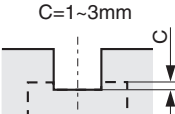
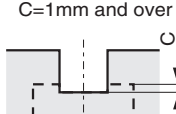
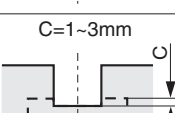
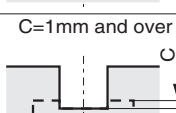
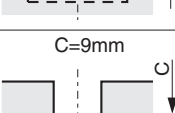
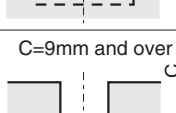
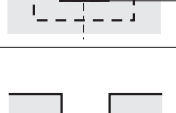
Others

● : Std. Item

## ◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)		
		MEGACOAT		Carbide
		PR1230	PR1210	KW10
Carbon Steel	0.1~0.15	★ 100~200	-	-
Alloy Steel	0.08~0.12	★ 100~200	-	-
Mold Steel	0.05~0.1	★ 80~150	-	-
Cast Iron	0.1~0.15	-	★ 100~200	☆ 80~120
Non-ferrous Metals	0.1~0.15	-	-	★ 100~300

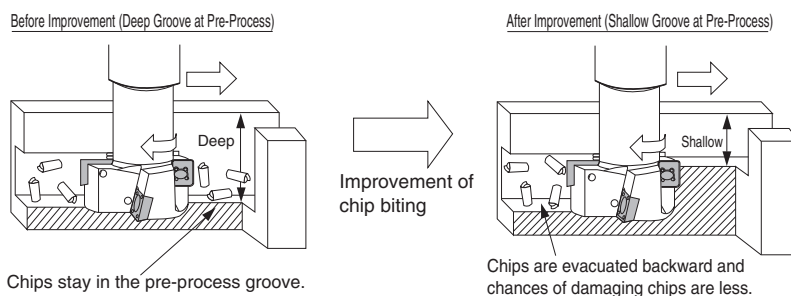
★ : 1st Recommendation ☆ : 2nd Recommendation

Description (T-Slot Nominal Size)	Steel			Cast Iron		
	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering
<b>METS21-S25(-H)</b> (Nominal Size 12)	C=1~3mm 	Vc= 120 fz= 0.1  (n= 1,820) (Vf= 182)	Vc= 60 fz= 0.15  (n= 920) (Vf= 137)	C=1mm and over 	Vc= 120 fz= 0.12  (n= 1,820) (Vf= 218)	Vc= 80 fz= 0.15  (n= 1,210) (Vf= 182)
<b>METS25-S25(-H)</b> (Nominal Size 14)	C=1~3mm 	Vc= 120 fz= 0.1  (n= 1,530) (Vf= 306)	Vc= 60 fz= 0.15  (n= 760) (Vf= 228)	C=1mm and over 	Vc= 120 fz= 0.12  (n= 1,530) (Vf= 367)	Vc= 80 fz= 0.15  (n= 1,020) (Vf= 306)
<b>METS32-S32(-H)</b> (Nominal Size 18)	C=1~3mm 	Vc= 100 fz= 0.1  (n= 1,000) (Vf= 200)	Vc= 60 fz= 0.15  (n= 600) (Vf= 180)	C=1mm and over 	Vc= 120 fz= 0.12  (n= 1,190) (Vf= 286)	Vc= 80 fz= 0.15  (n= 800) (Vf= 240)
<b>METS40-S32(-H)</b> (Nominal Size 22)	C=9mm 	Vc= 80 fz= 0.15  Chattering is likely when set to shallower than C=9mm.	Vz= 60 fz= 0.15  (n= 480) (Vf= 144)	C=9mm and over 	Vc= 120 fz= 0.15  (n= 960) (Vf= 228)	Vc= 80 fz= 0.15  (n= 640) (Vf= 192)
<b>METS50-S32(-H)</b> (Nominal Size 28)	Not recommended for steel because of chattering				Vc= 120 fz= 0.15  (n= 760) (Vf= 228)	Vc= 80 fz= 0.15  (n= 510) (Vf= 153)

[Cutting Speed : Vc(m/min), Revolution : n(min<sup>-1</sup>), Feed Rate fz(mm/t), Table Feed Vf(mm/min)]

· Chattering is likely when fz is less than fz=0.1mm/t. Keep feed rate between fz=0.1 ~ 0.15mm/t.  
For cast iron machining, the bigger the C-dimension becomes, the less chattering occurs.

## ■ How to prevent damaging chips when steel machining



Make pre-process groove shallower to prevent the tool damage from chips.  
Use compressed air to aid in chip evacuation.

High Efficiency Milling Cutter for Finishing Aluminum

## MFAH

Low Cutting Force Minimizes Burrs and Chipping for High Quality Machining

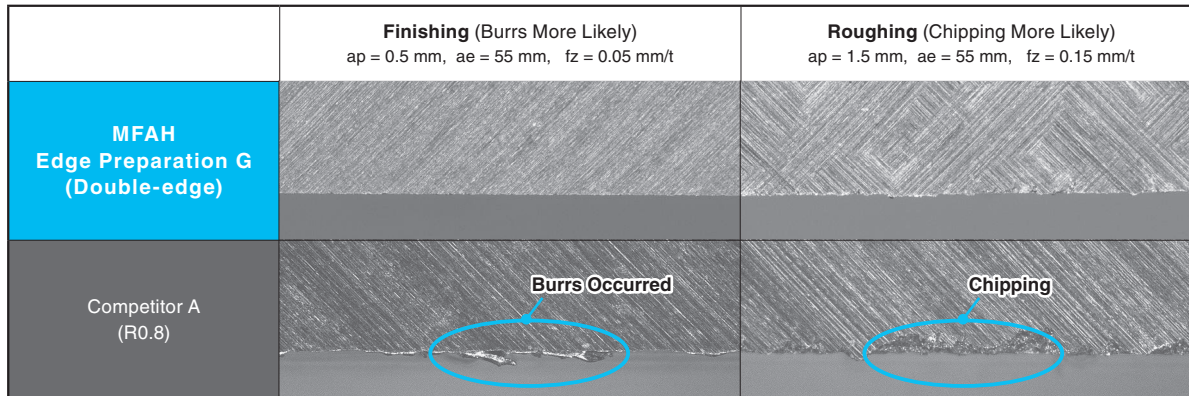
Easily Adjust Blade Runout

2 Body Types and 3 Inserts for a Variety of Milling Applications

### 1 Low Cutting Force Minimizes Burrs for High Quality Machining

Large True Rake Angle and Double-edge Insert Designs

Burr and Chipping Comparison (Internal evaluation)

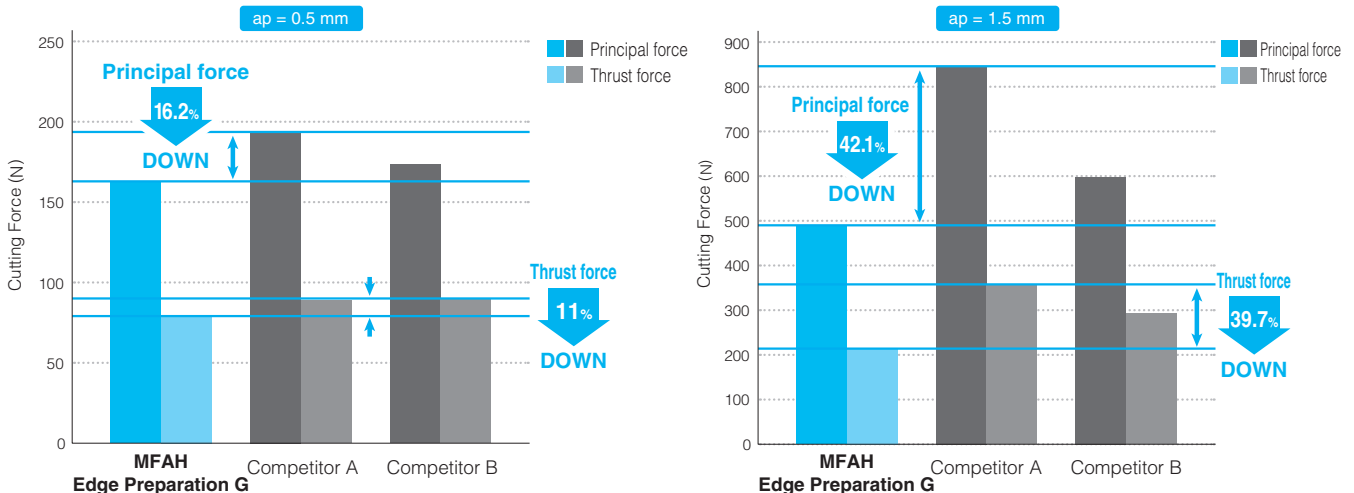


Cutting Conditions : Vc = 2,500 m/min, Wet, Cutter Dia. ø80  
MFAH080RS-10T-SF, ENET0905PAER-G KPD001  
Workpiece Material : ADC12

### 2 Low Cutting Force Design

Low Cutting Force, Reduced Chattering and High Efficiency Machining

Cutting Force Comparison (Internal evaluation)



Cutting Conditions : Vc = 2,500 m/min, ae = 55 mm, fz = 0.1 mm/t, Wet, Cutter Dia. ø80  
MFAH080RS-10T-SF ENET0905PAER-G KPD001 Workpiece Material : ADC12

M

Milling

- Insert
- Lead Angle 45°-20°
- Lead Angle 15°
- Lead Angle 0°/2°
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others



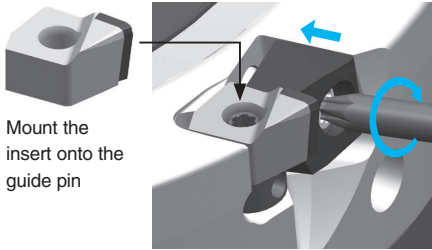
# 3

## Adjustable Blade Runout

### Easily Install Inserts and Adjust Blade Runout

#### Easy Insert Installment

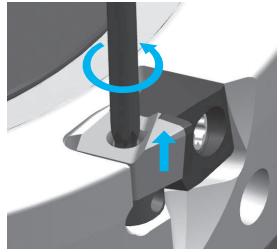
Guide Pin Allows for Easier Positioning



Mount the insert onto the guide pin

#### Easily Adjust Blade Runout

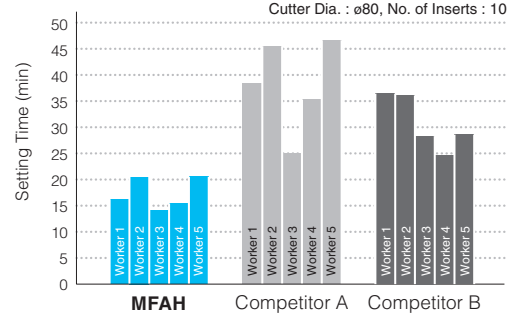
Adjustable from Both the Front and Outer Periphery



Unique Design for Easily Adjusting from the Front

#### Blade Runout Setting Time Comparison (Internal evaluation)

\* Operation Time of 5 Workers Comparison



The MFAH can drastically shorten the setting time

# 4

## Large Tooling Lineup

Steel Body and Light-weight Hybrid Body with Internal Coolant Available

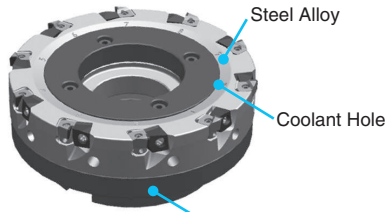
3 Different Edge Designs Offer a Variety of Machining Applications

#### Cutter Body



Steel Body

ø50~ø125



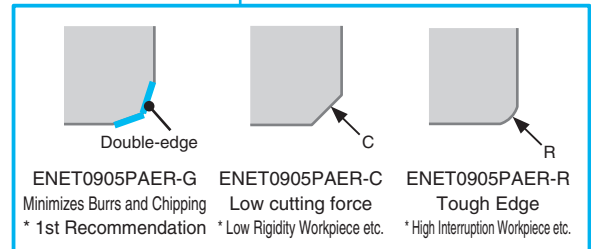
Light-weight Hybrid Body

ø80~ø315

#### Insert (Edge Design)

PCD(KPD001)

3 Different Edge Designs Offer a Variety of Machining Applications

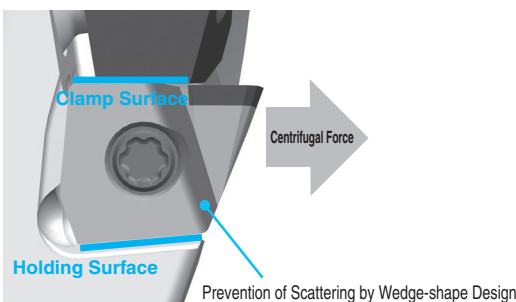


# 5

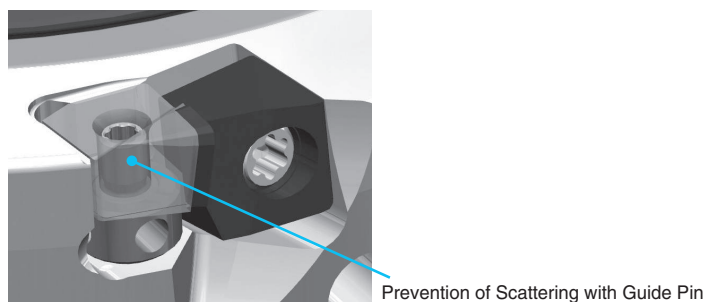
## Safety Enhancements during High-speed Revolution

### Scattering Prevention Mechanism

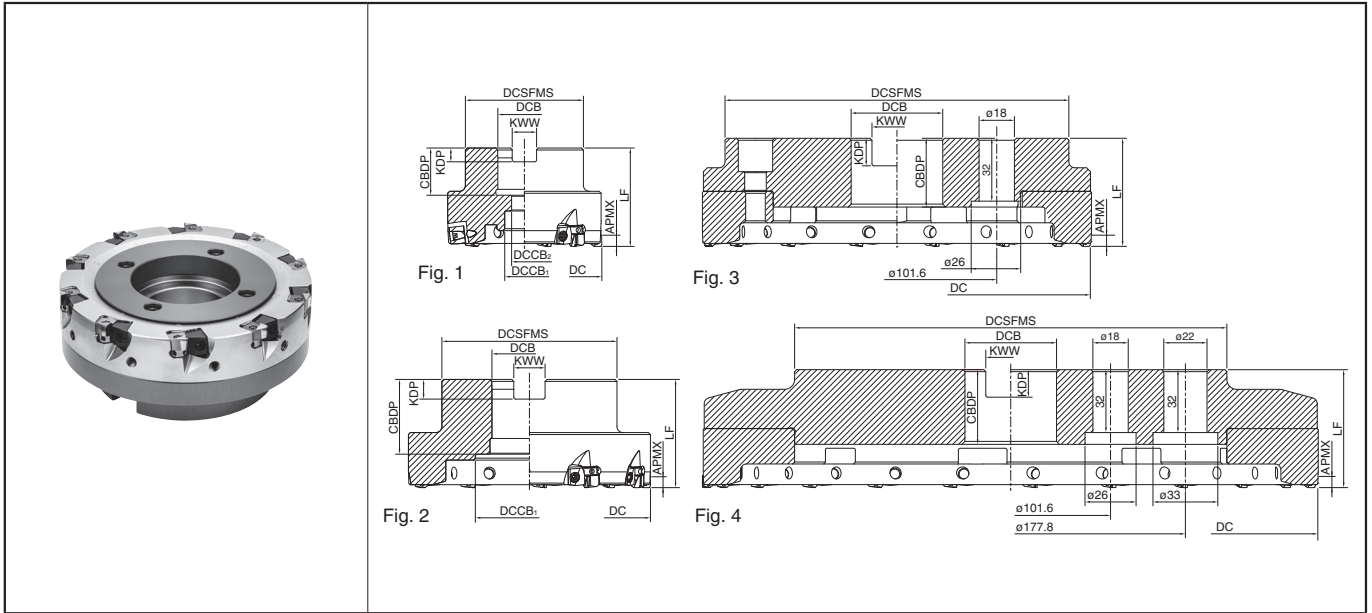
- Prevention of Scattering by Wedge-shape Design  
New wedge-shape feature holds insert firmly in place and reduces chattering



- Prevention of Scattering with Guide Pin  
Guide pins improve safety during high-speed rotation



## MFAH (Light-weight Hybrid Body)



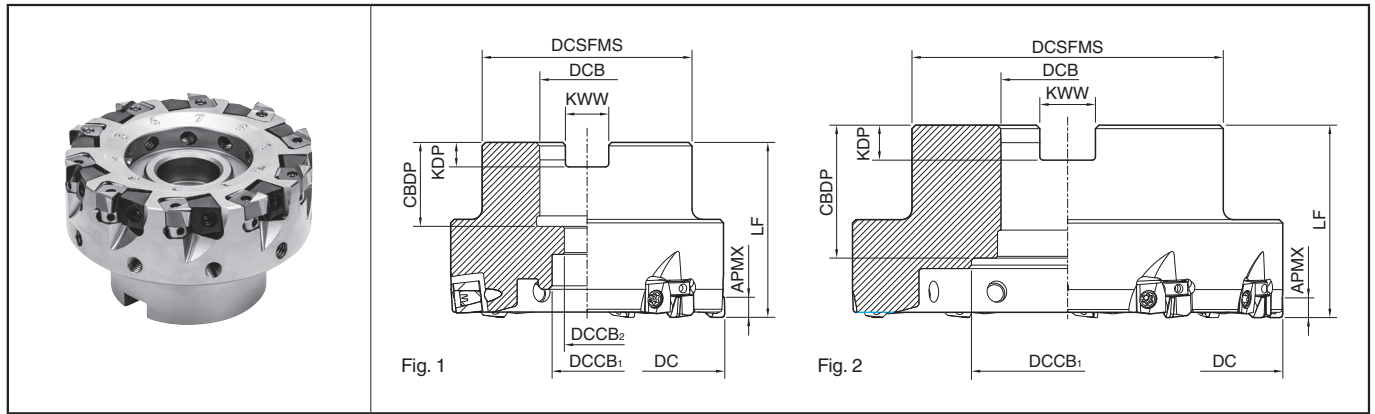
### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)									Coolant Hole	Drawing	Max. Revolution (min <sup>-1</sup> )	Weight (kg)	Arbor Bolt (Attachment)	Coolant Cover (Attachment)	Coolant Cover (Sold separately)															
			DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CBDP	KDP	KWW								APMX														
Metric	MFAH 080RA-6T-M-SF	● 6	80	62	27	20	13	27	7.0	12.4	4.6	Yes	Fig. 1	14,600	0.82	HH12X35HC	-	-															
	080RA-10T-M-SF	● 10																															
	100RA-8T-M27-SF	● 8																															
	100RA-12T-M27-SF	● 12																															
	100RA-8T-M-SF	● 8																															
	100RA-12T-M-SF	● 12																															
	125RA-10T-M27-SF	● 10																	100	62	27	20	13	50	24	8.0	14.4	Fig. 2	13,000	1.20	HH12X35HC	-	-
	125RA-16T-M27-SF	● 16																															
	125RA-10T-M-SF	● 10																	125	60	27	20	13	24	7.0	12.4	Fig. 1	11,400	1.80	HH12X35H	CC-125-MFAH	-	
	125RA-16T-M-SF	● 16																															
	160RA-12T-M-SF	● 12																	160	125	40	57	55	33	9.0	16.4	Fig. 2	8,000	2.1	HF20X53HA	CC-160-MFAH	-	
	160RA-20T-M-SF	● 20																															
	200RA-16T-M-SF	MTO 16																	200	175	126	-	35	14.0	25.7	Fig. 3	5,600	4.7	-	-	CC-200-MFAH		
	200RA-24T-M-SF	MTO 24																															
	250RA-20T-M-SF	MTO 20																	250	140	60	165	38	14.0	25.7	Fig. 4	4,500	6.9	-	-	CC-250-MFAH		
	250RA-32T-M-SF	MTO 32																															
315RA-24T-M-SF	MTO 24	315	220	220	60	38	11.7	11.5	Fig. 4	3,500	11.7	-	-	CC-315-MFAH																			
315RA-40T-M-SF	MTO 40																																
Bore Dia. Inch spec	MFAH 080RA-6T-SF	● 6	80	62	25.4	20	13	27	6.0	9.5	4.6	Yes	Fig. 1	14,600	0.83	HH12X35HC	-	-															
	080RA-10T-SF	● 10																															
	100RA-8T-254-SF	● 8																															
	100RA-12T-254-SF	● 12																															
	100RA-8T-SF	● 8																															
	100RA-12T-SF	● 12																															
	125RA-10T-254-SF	● 10																	100	62	25.4	20	13	50	24	8.0	12.7	Fig. 2	13,000	1.21	HH12X35HC	-	-
	125RA-16T-254-SF	● 16																															
	125RA-10T-SF	● 10																	125	60	25.4	20	13	24	6.0	9.5	Fig. 1	11,400	1.80	HH12X35H	CC-125-MFAH	-	
	125RA-16T-SF	● 16																															
	160RA-12T-SF	● 12																	160	130	50.8	70	55	38	10.0	15.9	Fig. 2	8,000	3.4	HF24X60HA	CC-160-MFAH	-	
	160RA-20T-SF	● 20																															
	200RA-16T-SF	MTO 16																	200	175	126	-	35	14.0	25.4	Fig. 3	5,600	4.9	-	-	CC-200-MFAH		
	200RA-24T-SF	MTO 24																															
	250RA-20T-SF	MTO 20																	250	140	47.625	165	60	38	11.7	11.5	Fig. 4	3,500	7.0	-	-	CC-250-MFAH	
	250RA-32T-SF	MTO 32																															
315RA-24T-SF	MTO 24	315	220	220	60	38	11.7	11.5	Fig. 4	3,500	11.7	-	-	CC-315-MFAH																			
315RA-40T-SF	MTO 40																																

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range

● : Std. Item  
MTO : Made to order

## MFAH (Steel Body)



### Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)										Coolant Hole	Drawing	Max. Revolution (min <sup>-1</sup> )	Weight (kg)	Mounting bolt (Attachment)			
			DC	DCSFMS	DCB	DCCB <sub>1</sub>	DCCB <sub>2</sub>	LF	CDBP	KDP	KWW	APMX								
Metric	MFAH 050RS-4T-M-SF	●	4	50	48	16	13.6	9	40	19	5.6	8.4	4.6	No	Fig. 1	19,200	0.44	HH8X25		
	MFAH 050RS-5T-M-SF	●	5														0.43			
	MFAH 063RS-5T-M-SF	●	5														0.69			
	MFAH 063RS-6T-M-SF	●	6	63	61	22	23	11	21	6.3	10.4	16,800					0.68		HH10X30	
	MFAH 080RS-6T-M-SF	●	6	80	60	27	20	13	50	24	7.0	12.4					14,600		1.16	HH12X35
	MFAH 080RS-10T-M-SF	●	10														1.11			
	MFAH 100RS-8T-M-SF	●	8	100	70	32	45	-	50	30	8.0	14.4					13,000		1.56	-
	MFAH 100RS-12T-M-SF	●	12														1.51			
	MFAH 125RS-10T-M-SF	●	10														2.6			
MFAH 125RS-16T-M-SF	●	16	125	89	40	55	-	55	33	9.0	16.4	11,400	2.5	-						
Bore Dia. Inch spec	MFAH 080RS-6T-SF	●	6	80	50	25.4	20	13	50	27	6.0	9.5	4.6	No	Fig. 1	14,600	1.02	HH12X35		
	MFAH 080RS-10T-SF	●	10														0.98			
	MFAH 100RS-8T-SF	●	8	100	70	31.75	45	-	50	34	8.0	12.7					13,000		1.59	-
	MFAH 100RS-12T-SF	●	12														1.55			
	MFAH 125RS-10T-SF	●	10														2.63			
	MFAH 125RS-16T-SF	●	16	125	89	38.1	55	-	55	38	10.0	15.9					11,400		2.56	-

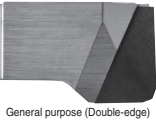
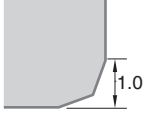
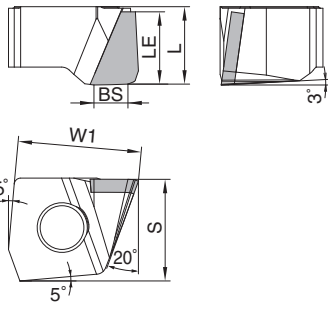
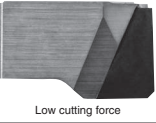
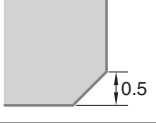


### Spare Parts

Description		Wedge	Wedge Screw	Wrench	Adjust Screw	Wrench	Adjust Screw	Anti-seize Compound	Applicable Inserts
Light-weight Hybrid Body	MFAH080RA- ... MFAH315RA- ...								
Steel Body	MFAH050RS- ... MFAH125RS- ...	C08R	W5X13L	TTW-15	AJ-4170	DTPM-8	HS6X4	P-37	ENET0905...

● : Std. Item

# High Efficiency Milling Cutter for Finishing Aluminum MFAH

## ● Applicable Inserts

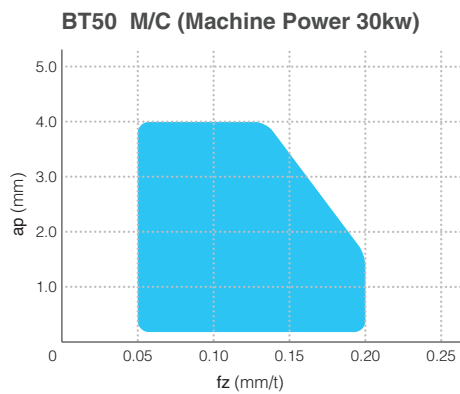
Insert			Description	Dimension (mm)					PCD
				W1	S	L	BS	LE	KPD001
			ENET 0905PAER-G	9.61	7.9	6.02	2.6	5.6	●
			ENET 0905PAER-C	9.61	7.9	6.02	3.0	5.6	●
			ENET 0905PAER-R	9.61	7.9	6.02	3.1	5.6	●

## ◆ Recommended Cutting Conditions

Workpiece Material	Property	Cutting Speed Vc (m/min)	Feed fz (mm/t)	Recommended Insert Grades
Aluminum Alloys	Si Ratio 12.5% or less	1,000 - <b>2,500</b> - 3,000	0.05 - <b>0.10</b> - 0.20	KPD001
	Si Ratio 12.5% and over	400 - <b>600</b> - 800	0.05 - <b>0.10</b> - 0.20	

Recommended cutting conditions are reference values. Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity. Do not use the cutter at speeds exceeding the maximum cutting speed limit.

## ● Cutting Performance



## ● Max. Revolution and Max. Cutting Speed for Each Cutting Diameter

Cutting Dia. DC (mm)	Max. Revolution n (min <sup>-1</sup> )	Cutting Speed Vc max (m/min)
ø50	19,200	3,016
ø63	16,800	3,325
ø80	14,600	3,669
ø100	13,000	4,084
ø125	11,400	4,477
ø160	8,000	4,021
ø200	5,600	3,519
ø250	4,500	3,534
ø315	3,500	3,464

Cutting Conditions : Vc = 2,500 m/min, ae = 55 mm, Wet, Cutter Dia. ø80  
MFAH080RS-10T-SF ENET0905PAER-G KPD001  
Workpiece Material : ADC12

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

Slot Mill

Ball-nose  
Radius

Others

● : Std. Item

## ● Cautions

### While in Use

#### Caution

Please use within recommended cutting conditions

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body  
 Inserts or cutter body may be damaged due to the centrifugal force and cutting load

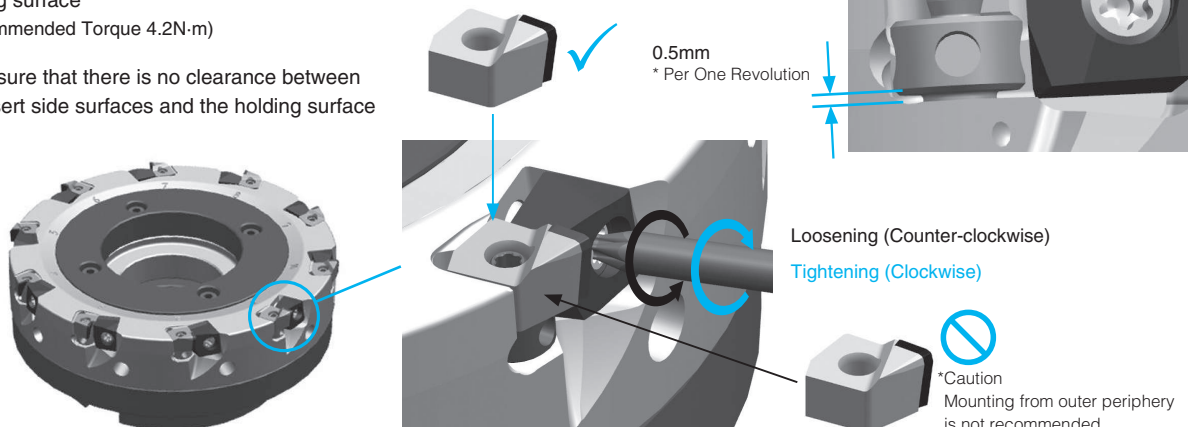
Please do not use under the following conditions :

- When cutter is not fully loaded with inserts
- If the body and/or clamp is damaged
- If a clamp or clamp screw is removed
- If inserts that have different regrind amounts are mounted

Please wear protective equipment such as protective glove when changing inserts or adjusting edge fluctuation  
 Injury can occur when touching the cutting edge

## ● How to Mount Insert

- 1 Adjust the clearance between adjustment screw for cutting edge and the surface of insert to be 0.5mm
- 2 Mount insert on guide pin  
 (Be sure to install from the head. Mounting from outer periphery is not recommended)
- 3 Tighten the clamp screw while lightly pressing the insert against the holding surface  
 (Recommended Torque 4.2N·m)
- 4 Make sure that there is no clearance between the insert side surfaces and the holding surface



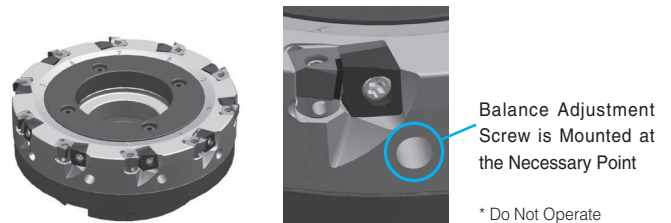
## Dynamic Balance

Balance adjustment on the cutter is completed before shipping  
 Balance adjustment has been made with special high precision inserts to be ISO balance grade (ISO1940/1) G2.5

\* See page **M186** for Recommended Cutting Conditions at Max. Revolution

Do not operate the balance adjustment screw at the outer periphery of cutter  
 ⇒ This could lead to improper dynamic balance

Do not completely remove clamp and clamp screw from cutter  
 ⇒ This requires additional balance adjustment

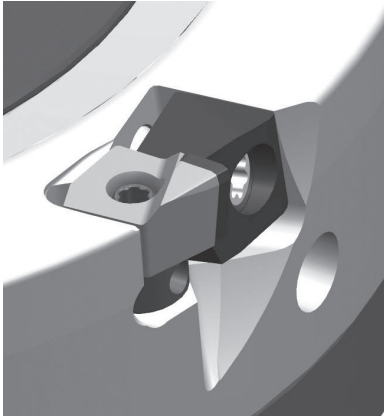


Insert Grades	A
Turning	B
Indexable Inserts	C
CBN & PCBN Tools	D
External	E
Small Parts Machining	F
Boring	G
Grooving	H
Cut-off	J
Threading	K
Drilling	L
Solid Tools	M
Milling	N
Tools for Turning Mill	P
Spare Parts	R
Technical Information	T

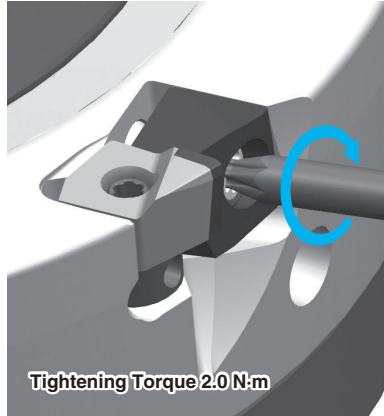
# High Efficiency Milling Cutter for Finishing Aluminum MFAH

## ● How to Adjust Blade Runout

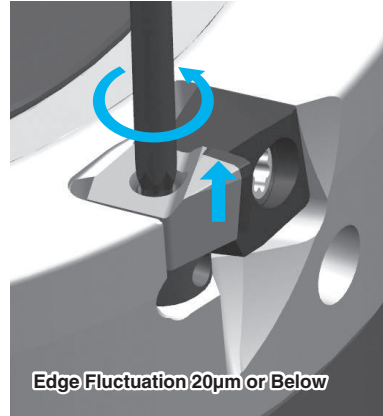
1 Install an Insert



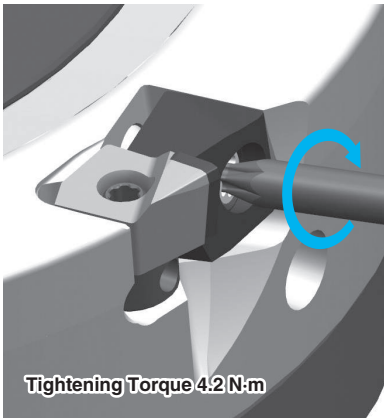
2 Partially Tighten



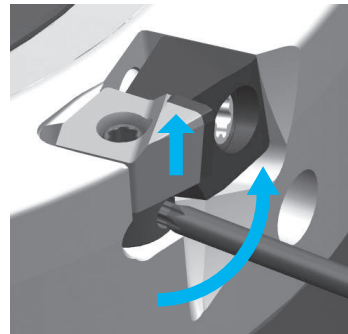
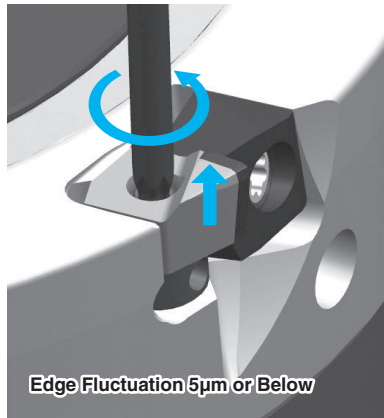
3 Adjustable Blade Runout



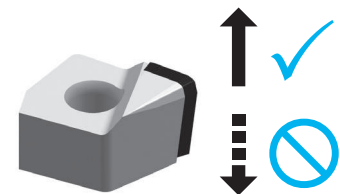
4 Fully Tighten



5 Adjustable Blade Runout



- 1 Install inserts into all pockets.
- 2 Partially tighten the clamp screw (Recommended Torque 2.0N·m)
- 3 Turn the screw with the wrench to adjust and make sure that all screw heights are within 20μm of each other (Recommended)
- 4 Fully tighten the clamp screw with tightening torque 4.2 N·m
- 5 Slightly adjust position of cutting edge (Recommended Position Difference: 5μm or Below)  
\* All inserts should be fine-tuned



\* Caution  
Do not adjust cutting edge to lower position

M

Milling

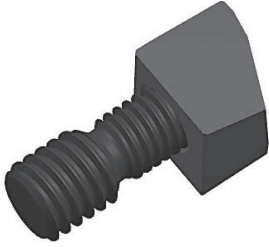
Insert
Lead Angle 45°~20°
Lead Angle 15°
Lead Angle 0°/2°
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others



# Precaution for Changing Clamp

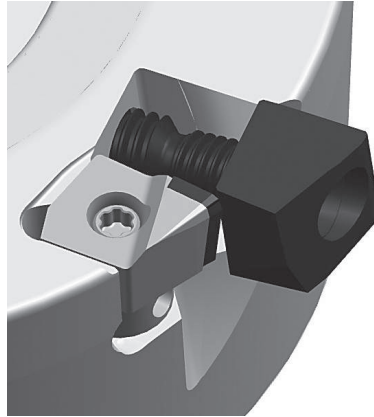
## ● How to mount a clamp on a holder

1 Attach clamp screw into clamp first



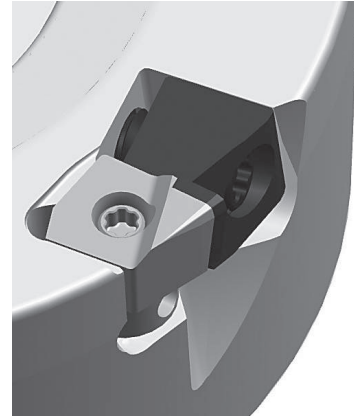
Attaching Clamp screw into clamp (about 1 revolution)

2 Mounting



Mount it to the holder

3 Fastening



Fasten with recommended torque (Completed)

## ● Mount position of clamp screw



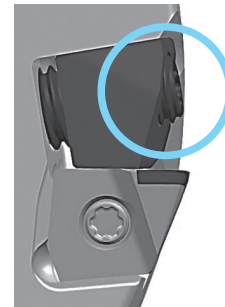
**Right position**

(Screw head does not come out)



**Wrong position**

(Screw head comes out)



Confirm if clamp screw is not coming out after fastening clamp screw with recommended torque.

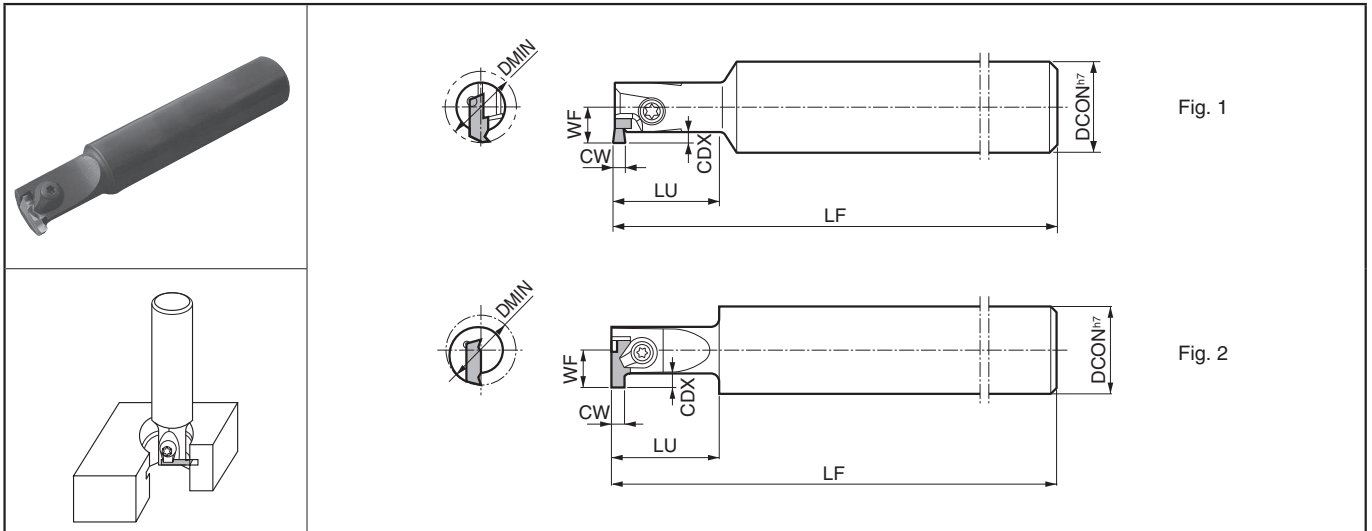
Re-mount if the clamp screw is coming out

Adjust the balance is needed after mounting in case removing a clamp screw completely such as clamp change.

Insert Grades	A
Turning Indexable Inserts	B
CBN & PCBN Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T

# Grooving End Mill MGI

## MGI



### Toolholder Dimensions

Description	Stock	Min. Bore Dia.	Dimension (mm)					Edge Width	Drawing	Spare Parts			Applicable Inserts ● M191
			DMIN	DCON	LF	LU	WF			CDX	CW	Clamp Set	
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			25	7.8				-	SB-4085TR	FT-15	GVR...-020S
	2020-1A	● 20	110	30	9.8	2.2	1.0-3.4	Fig. 2	CPS-5F	-	FT-15	GVR...-020A	
	2220-1B	● 22			11	2.8						1.45-4.0	GVR...-AR
	3225-1C	● 32	25	120	35	16	5.5 (4.5)	2.8-4.0	CPS-6F	-	LW-3	GVR...-020B	
	4025-1C	● 40			40	20						GVR...-BR	
												GVR...-020C	

· CDX shows available grooving depth.

· GVR280-020C, GVR300-020C is available to the groove depth up to 4.5mm.

· GVR430 ~ 500-020C can be installed to MGI3225-1C and 4025-1C, but not recommended for steel machining because of toolholder's rigidity.

### Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)					
		Cermet			MEGA COAT	PVD Coated Carbide	Carbide
		TN90	TC40N	TC60M	PR1225	PR930	KW10
Carbon Steel	0.05~0.15	★ 120~200	☆ 120~200	☆ 100~180	★ 80~150	☆ 80~150	-
Alloy Steel	0.05~0.15	★ 120~200	☆ 120~200	☆ 100~180	★ 80~150	☆ 80~150	-
Mold Steel	0.03~0.12	★ 100~180	☆ 100~180	☆ 80~150	★ 60~130	☆ 60~130	-
Stainless Steel	0.03~0.12	☆ 100~180	☆ 100~180	★ 80~150	★ 60~130	☆ 60~130	-
Cast Iron	0.05~0.2	★ 100~150	☆ 100~150	-	-	-	★ 80~150
Non-ferrous Metals	0.05~0.2	-	-	-	-	-	★ 100~300

· Use down-cut machining.

★ : 1st Recommendation ☆ : 2nd Recommendation

M

Milling

Insert

Lead Angle  
45°~20°

Lead Angle  
15°

Lead Angle  
0°/2°

High Feed  
Cutter

Multi-  
Function

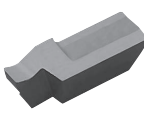
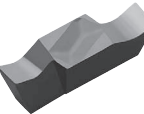
Slot Mill

Ball-nose  
Radius

Others

● : Std. Item

● Applicable Inserts

Insert	Description	Dimension (mm)						Insert Grades											
		CW	CDX	RE	W1	INSL	S	Cermet			MEGA COAT	PVD Coated Carbide	Carbide						
								TN90	TC40N	TC60M	PR1225	PR930	KW10						
Handed Insert shows Right-hand																			
 <p>1-edge</p>	<b>GVR</b> 100-020SS 125-020SS 145-020SS 200-020SS 250-020SS 300-020SS	1.00	2.3	0.2	3.6	9	3.0	●		●	●	●	●						
		1.25						●		●	●	●	●						
		1.45						●		●	●	●	●						
		2.00						●		●	●	●	●						
		2.50						□		●	●	●	●						
		3.00						●		●	●	●	●						
	<b>GVR</b> 100-020S 125-020S 145-020S 185-020S 200-020S 250-020S 340-020S	1.00	2.3	0.2	4.0	11	4.0	●	●	●	●	●	●						
		1.25						●	●	●	●	●	●						
		1.45						□	●	●	●	●	●						
		1.85						●	●	●	●	●	●						
		2.00						●	●	●	●	●	●						
		2.50						□	●	●	●	●	●						
		3.40						●	●	●	●	●	●						
		 <p>2-edge</p>						<b>GVR</b> 100-020A 125-020A 145-020A 185-020A 200-020A 250-020A 300-020A 340-020A	1.00	2.3	0.2	4.0	12	5.0	●	●	●	●	●
1.25									●						●	●	●	●	●
1.45									●						●	●	●	●	●
1.85	●		●	●	●	●	●												
2.00	●		●	●	●	●	●												
2.50	●		●	●	●	●	●												
3.00	●		●	●	●	●	●												
3.40	□		●	●	●	●	●												
<b>GVR</b> 145-020B 185-020B 200-020B 230-020B 250-020B 280-020B 300-020B 340-020B 400-020B	1.45		2.8	0.2	4.5	15	5.5	●	●	●	●	●	●						
	1.85							●	●	●	●	●	●						
	2.00							●	●	●	●	●	●						
	2.30							●	●	●	●	●	●						
	2.50							●	●	●	●	●	●						
	2.80							□	●	●	●	●	●						
<b>GVR</b> 280-020C 300-020C 340-020C 400-020C (430-020C) (460-020C) (500-020C)	2.80	4.5	0.2	5.8	21	6.5	●	●	●	●	●	●							
	3.00						●	●	●	●	●	●							
	3.40						●	●	●	●	●	●							
	4.00						●	●	●	●	●	●							
	4.30						●	●	●	●	●	●							
	4.60						●	●	●	●	●	●							
	5.00						●	●	●	●	●	●							
<b>GVR</b> 200-100AR 250-125AR 300-150AR <b>GVR</b> 200-100BR 300-150BR	2.00	2.3	1.00	4.0	12	5.0			●	●	●	●							
	2.50								●	●	●	●							
	3.00							1.50		●	●	●							
	2.00						3.2	1.00	4.5	15	5.5	●		●	●	●			
	3.00						4.2	1.50				●		●	●	●			

· Only Right-hand insert is applicable.

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

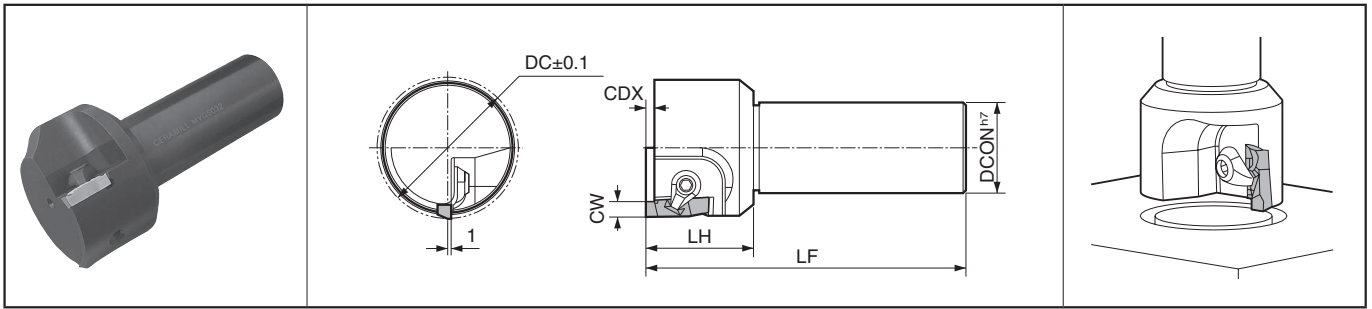
Insert Grades  
 Turnable  
 Indexable Inserts  
 CN & PCD Tools  
 External  
 Small Parts  
 Machining  
 Boring  
 Grooving  
 Cut-off  
 Threading  
 Drilling  
 Solid Tools  
 Milling  
 Turning Mill  
 Spare Parts  
 Technical Information  
 Index

A  
 B  
 C  
 D  
 E  
 F  
 G  
 H  
 J  
 K  
 L  
 M  
 N  
 P  
 R  
 T

# Ring Grooving End Mill MVG



## MVG



### Toolholder Dimensions

Description	Stock	Dimension (mm)						Edge Width	Spare Parts		
		DC	DCON	LF	LH	CDX	CW		Clamp Set	Wrench	
<b>MVG</b>	<b>3032</b>	●	30						CPS-6V	LW-3	
	<b>3532</b>	●	35								
	<b>4032</b>	●	40								
	<b>4532</b>	●	45	32	120	40	5.2	4.00			
	<b>5032</b>	●	50								4.90
	<b>5532</b>	●	55								
	<b>6032</b>	●	60								

· CDX shows available grooving depth.

### Applicable Inserts

Insert	Description	Dimension (mm)						Insert Grades					
		CW	CDX	RE	W1	INSL	S	Cermet			MEGA COAT	PVD Coated Carbide	Carbide
								TN90	TC40N	TC60M	PR1225	PR930	KW10
	<b>GVFR 400-020B</b>	4.00						●	●	●	●	●	●
	<b>430-020B</b>	4.30						●	●	●	●	●	●
	<b>460-020B</b>	4.60	5.3	0.2	5.8	20	5.0	●	●	□	●	●	●
	<b>490-020B</b>	4.90						●	●	●	●	●	●

· GVFR430B-020B is applicable for sealing groove of G-series  
For other ring grooving, GVFR400B ~ 490B-020B are applicable.  
· Only Right-hand insert is applicable.

### Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)					
		Cermet			MEGA COAT	PVD Coated Carbide	Carbide
		TN90	TC40N	TC60M	PR1225	PR930	KW10
Carbon Steel	0.05~0.15		★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Alloy Steel	0.05~0.15		★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Mold Steel	0.03~0.12		★ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Stainless Steel	0.03~0.12		☆ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Cast Iron	0.05~0.2		-	-	-	-	★ 80~150
Non-ferrous Metals	0.05~0.2		-	-	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

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

# Recommended Cutting Conditions

## Cutting Conditions Table

### ◆ Recommended Cutting Conditions (MSO45 Ⓢ M42)

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)								
		Cermet			MEGACOAT		Carbide		PCD	
		TN60	TN100M	TC60M	PR1225	PR1210	PW30	KW10	KPD230	
Carbon Steel	~0.3		★ 120-200		★ 120-250	-		-	-	
Alloy Steel	~0.3		★ 100-180		★ 100-220	-		-	-	
Mold Steel	~0.25		★ 100-180		★ 80-180	-		-	-	
Stainless Steel	~0.25		☆ 120-200		★ 120-220	-		-	-	
Cast Iron	~0.3		-		-	★ 100-220		☆ 80-150	-	
Non-ferrous Metals	~0.2		-		-	-		★ 100-300	★ 300-800	

★ : 1st Recommendation ☆ : 2nd Recommendation

Insert Grades	A
Turning Indexable Inserts	B
CBN & PCD Tools	C
External	D
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Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T